

CHAPTER 4

4. Power System Security

4.1 Introduction

4.1.1 Purpose

- (a) This Chapter:
 - (1) provides the framework for achieving and maintaining a secure *power system*;
 - (2) provides the conditions under which *AEMO* can intervene in the processes of the *spot market* and issue *directions* to *Registered Participants* so as to maintain or re-establish a secure and reliable *power system*;
 - (3) has the following aims:
 - (i) to detail the principles and guidelines for achieving and maintaining *power system security*;
 - (ii) to establish the processes for the assessment of the adequacy of *power system* reserves;
 - (iii) to establish processes to enable *AEMO* to plan and conduct operations within the *power system* to achieve and maintain *power system security*; and
 - (iv) to establish processes for the actual *dispatch* of *scheduled generating units*, *semi-scheduled generating units*, *scheduled loads*, *scheduled network services* and *ancillary services* by *AEMO*.
- (b) By virtue of this Chapter and the *National Electricity Law*, *AEMO* has responsibility to maintain and improve *power system security*. This Chapter also requires the *Jurisdictional System Security Coordinator* for each *participating jurisdiction* to advise *AEMO* of the requirements of the *participating jurisdiction* regarding *sensitive loads* and priority of *load shedding* and requires *AEMO* to provide copies of the relevant *load shedding procedures* to the *Jurisdictional System Security Coordinator*.

4.2 Definitions and Principles

This rule sets out certain definitions and concepts that are relevant to this Chapter.

4.2.1 [Deleted]

4.2.2 Satisfactory Operating State

The *power system* is defined as being in a *satisfactory operating state* when:

- (a) the *frequency* at all energised *busbars* of the *power system* is within the *normal operating frequency band*, except for brief excursions outside the *normal operating frequency band* but within the *normal operating frequency excursion band*;
- (b) the *voltage* magnitudes at all energised *busbars* at any *switchyard* or *substation* of the *power system* are within the relevant limits set by the relevant *Network Service Providers* in accordance with clause S5.1.4 of schedule 5.1;
- (c) the current flows on all *transmission lines* of the *power system* are within the ratings (accounting for time dependency in the case of emergency ratings) as defined by the relevant *Network Service Providers* in accordance with schedule 5.1;
- (d) all other *plant* forming part of or impacting on the *power system* is being operated within the relevant operating ratings (accounting for time dependency in the case of emergency ratings) as defined by the relevant *Network Service Providers* in accordance with schedule 5.1;
- (e) the configuration of the *power system* is such that the severity of any potential fault is within the capability of circuit breakers to *disconnect* the faulted circuit or equipment; and
- (f) the conditions of the *power system* are stable in accordance with requirements designated in or under clause S5.1.8 of schedule 5.1.

4.2.3 Credible and non-credible contingency events

- (a) A “*contingency event*” means an event affecting the *power system* which *AEMO* expects would be likely to involve the failure or removal from operational service of one or more *generating units* and/or *transmission elements*.
- (b) A “*credible contingency event*” means a *contingency event* the occurrence of which *AEMO* considers to be reasonably possible in the surrounding circumstances including the *technical envelope*. Without limitation, examples of *credible contingency events* are likely to include:
 - (1) the unexpected automatic or manual *disconnection* of, or the unplanned reduction in capacity of, one operating *generating unit*; or
 - (2) the unexpected *disconnection* of one major item of *transmission plant* (e.g. *transmission line*, *transformer* or *reactive plant*) other than as a result of a three phase electrical fault anywhere on the *power system*.
- (c) **[Deleted]**
- (d) **[Deleted]**
- (e) A “*non-credible contingency event*” is a *contingency event* other than a *credible contingency event*. Without limitation, examples of *non-credible contingency events* are likely to include:

- (1) three phase electrical faults on the *power system*; or
- (2) simultaneous disruptive events such as:
 - (i) multiple *generating unit* failures; or
 - (ii) double circuit *transmission line* failure (such as may be caused by tower collapse).
- (f) **[Deleted]**

4.2.3A Re-classifying contingency events

- (a) *Abnormal conditions* are conditions posing added risks to the *power system* including, without limitation, severe weather conditions, lightning, storms and bush fires.
- (b) *AEMO* must take all reasonable steps to ensure that it is promptly informed of *abnormal conditions*, and when *abnormal conditions* are known to exist *AEMO* must:
 - (1) on a regular basis, make reasonable attempts to obtain all information relating to how the *abnormal conditions* may affect a *contingency event*; and
 - (2) identify any *non-credible contingency event* which is more likely to occur because of the existence of the *abnormal conditions*.
- (c) As soon as practicable after *AEMO* identifies a *non-credible contingency event* which is more likely to occur because of the existence of *abnormal conditions*, *AEMO* must provide *Market Participants* with a notification specifying:
 - (1) the *abnormal conditions*;
 - (2) the relevant *non-credible contingency event*;
 - (3) whether *AEMO* has reclassified this *non-credible contingent event* as a *credible contingency event* under clause 4.2.3A(g);
 - (4) information (other than *confidential information*) in its possession that is relevant to its consideration under clause 4.2.3A(e), the source of that information and the time that information was received or confirmed by *AEMO*;
 - (5) the time at which the notification has been issued; and
 - (6) the time at which an updated notification is expected to be issued, where this might be necessary.
- (d) *AEMO* must update a notification issued in accordance with clause 4.2.3A(c) as it becomes aware of new information that is material to its consideration under clause 4.2.3A(e), and in any event no later than the time indicated in the

original notification under clause 4.2.3A(c)(6), until such time as it issues a notification specifying that the *abnormal conditions* have ceased to have a material effect on the likely occurrence of the *non-credible contingency event*.

- (e) If *AEMO* identifies a *non-credible contingency event* which is more likely to occur because of the existence of *abnormal conditions* it must, on a regular basis, consider whether the occurrence of that *non-credible contingency event* is reasonably possible, having regard to all the facts and circumstances identified in accordance with clause 4.2.3A(b).
- (f) In undertaking its consideration in accordance with clause 4.2.3A(e), *AEMO* must have regard to the criteria referred to in clause 4.2.3B.

Note: Clause 4.2.3A(f) will not come into effect until *NEMMCO* has established the criteria referred to in clause 4.2.3B.

- (g) If, after undertaking a consideration in accordance with clause 4.2.3A(e), *AEMO* decides that the existence of the *abnormal conditions* make the occurrence of a *non-credible contingency event* reasonably possible, it must reclassify that event to be a *credible contingency event* and must notify *Market Participants* as soon as practicable.
- (h) If, after reclassifying a *non-credible contingency event* to be a *credible contingency event* in accordance with clause 4.2.3A(g), *AEMO* considers that the relevant facts and circumstances have changed so that the occurrence of that *credible contingency event* is no longer reasonably possible, *AEMO* may reclassify that *credible contingency event* to be a *non-credible contingency event*. If *AEMO* does so, it must notify *Market Participants* as soon as practicable.
- (i) Every six months, *AEMO* must issue a report setting out its reasons for all decisions to re-classify *non-credible contingency events* to be *credible contingency events* under clause 4.2.3A(g) during the relevant period. The report:
 - (1) must include an explanation of how *AEMO* applied the criteria established in accordance with clause 4.2.3B for each of those decisions; and
 - (2) may also include *AEMO*'s analysis of re-classification trends during the relevant period and its appraisal of the appropriateness and effectiveness of the relevant criteria that were applied in the case of each reclassification decision.

4.2.3B Criteria for re-classifying contingency events

- (a) Within six months of the commencement of this clause, *NEMMCO* must establish criteria that it must use when considering whether the existence of *abnormal conditions* make the occurrence of a *non-credible contingency event* reasonably possible under clause 4.2.3A(e).

- (b) *AEMO* must review the criteria established under clause 4.2.3B(a) every two years after the date of establishment.
- (c) *AEMO* may amend the criteria established under clause 4.2.3B(a).
- (d) In establishing, reviewing or amending the criteria under this clause, *AEMO* must:
 - (1) first consult with relevant stakeholders including *Market Participants*, *Transmission Network Service Providers*, *Jurisdictional System Security Coordinators* and relevant emergency services agencies;
 - (2) ensure that the criteria include a requirement to have regard to the particulars of any risk(s) to the *power system* associated with the various types of *abnormal conditions* that might arise; and
 - (3) *publish* the criteria on its website as soon as practicable after the criteria have been established or amended.

4.2.4 Secure operating state and power system security

- (a) The *power system* is defined to be in a *secure operating state* if, in *AEMO*'s reasonable opinion, taking into consideration the appropriate *power system security* principles described in clause 4.2.6:
 - (1) the *power system* is in a *satisfactory operating state*; and
 - (2) the *power system* will return to a *satisfactory operating state* following the occurrence of any *credible contingency event* in accordance with the *power system security and reliability standards*.
- (b) Without limitation, in forming the opinions described in clause 4.2.4(a), *AEMO* must:
 - (1) consider the impact of each of the potentially *constrained interconnectors*; and
 - (2) use the *technical envelope* as the basis of determining events considered to be *credible contingency events* at that time.

4.2.5 Technical envelope

- (a) The *technical envelope* means the technical boundary limits of the *power system* for achieving and maintaining the *secure operating state* of the *power system* for a given demand and *power system* scenario.
- (b) *AEMO* must determine and revise the *technical envelope* (as may be necessary from time to time) by taking into account the prevailing *power system* and *plant* conditions as described in clause 4.2.5(c).
- (c) In determining and revising the *technical envelope* *AEMO* must take into account matters such as:

- (1) *AEMO's forecast of total power system load;*
 - (2) *the provision of the applicable contingency capacity reserves;*
 - (3) *operation within all plant capabilities of plant on the power system;*
 - (4) *contingency capacity reserves available to handle any credible contingency event;*
 - (5) *advised generation minimum load constraints;*
 - (6) *constraints on transmission networks, including short term limitations;*
 - (7) *ancillary service requirements;*
 - (8) **[Deleted]**
 - (9) *the existence of proposals for any major equipment or plant testing, including the checking of, or possible changes in, transmission plant availability; and*
 - (10) *applicable performance standards.*
- (d) *AEMO must, when determining the secure operating limits of the power system, assume that the applicable performance standards are being met, subject to:*
- (1) *a Registered Participant notifying AEMO, in accordance with rule 4.15(f), that a performance standard is not being met; or*
 - (2) *AEMO otherwise becoming aware that a performance standard is not being met.*

4.2.6 General principles for maintaining power system security

The *power system security* principles are as follows:

- (a) *To the extent practicable, the power system should be operated such that it is and will remain in a secure operating state.*
- (b) *Following a contingency event (whether or not a credible contingency event) or a significant change in power system conditions, AEMO should take all reasonable actions:*
 - (1) *to adjust, wherever possible, the operating conditions with a view to returning the power system to a secure operating state as soon as it is practical to do so, and, in any event, within thirty minutes; or*
 - (2) *if any principles and guidelines have been published under clause 8.8.1(a)(2a), to adjust, wherever possible, the operating conditions, in accordance with such principles and guidelines, with a view to returning*

the *power system* to a *secure operating state* within at most thirty minutes.

- (c) Adequate *load shedding* facilities initiated automatically by *frequency* conditions outside the *normal operating frequency excursion band* should be available and in service to restore the *power system* to a *satisfactory operating state* following significant multiple *contingency events*.
- (d) **[Deleted]**
- (e) Sufficient *system restart ancillary services* should be available in accordance with the *system restart standard* to allow the restoration of *power system security* and any necessary restarting of *generating units* following a *major supply disruption*.

4.2.7 Reliable Operating State

The *power system* is assessed to be in a *reliable operating state* when:

- (a) *AEMO* has not *disconnected*, and does not expect to *disconnect*, any points of *load connection* under clause 4.8.9;
- (b) no *load shedding* is occurring or expected to occur anywhere on the *power system* under clause 4.8.9; and
- (c) in *AEMO's* reasonable opinion the levels of *short term* and *medium term capacity reserves* available to the *power system* are at least equal to the required levels determined in accordance with the *power system security and reliability standards*.

4.2.8 Time for undertaking action

The provisions of clause 1.7.1(l) do not apply to this Chapter and an event which is required under this Chapter to occur on or by a stipulated *day* must occur on or by that *day* whether or not a *business day*.

4.3 Power System Security Responsibilities and Obligations

4.3.1 Responsibility of AEMO for power system security

The *AEMO power system security responsibilities* are:

- (a) to maintain *power system security*;
- (b) to monitor the operating status of the *power system*;
- (c) to co-ordinate the *System Operators* in undertaking certain of its activities and operations and monitoring activities of the *power system*;
- (d) to ensure that *high voltage* switching procedures and arrangements are utilised by *Network Service Providers* to provide adequate protection of the *power system*;

- (e) to assess potential infringement of the *technical envelope* or *power system operating procedures* which could affect the security of the *power system*;
- (f) to ensure that the *power system* is operated within the limits of the *technical envelope*;
- (g) to ensure that all *plant* and equipment under its control or co-ordination is operated within the appropriate operational or emergency limits which are advised to AEMO by the respective *Network Service Providers* or *Registered Participants*;
- (h) to assess the impacts of technical and any operational *plant* on the operation of the *power system*;
- (i) to arrange the *dispatch* of *scheduled generating units*, *semi-scheduled generating units*, *scheduled loads*, *scheduled network services* and *ancillary services* (including *dispatch* by remote control actions or specific directions) in accordance with the *Rules*, allowing for the dynamic nature of the *technical envelope*;
- (j) to determine any potential *constraint* on the *dispatch* of *generating units*, *loads*, *market network services* and *ancillary services* and to assess the effect of this *constraint* on the maintenance of *power system security*;
- (k) to assess the availability and adequacy, including the dynamic response, of *contingency capacity reserves* and *reactive power reserves* in accordance with the *power system security and reliability standards* and to ensure that appropriate levels of *contingency capacity reserves* and *reactive power reserves* are available:
 - (1) to ensure the *power system* is, and is maintained, in a *satisfactory operating state*; and
 - (2) to arrest the impacts of a range of significant multiple *contingency events* (affecting up to 60% of the total *power system load*) to allow a prompt restoration or recovery of *power system security*, taking into account under-frequency initiated *load shedding* capability provided under *connection agreements* or otherwise;
- (l) to determine the required levels of *short term capacity reserves* and *medium term capacity reserves* in accordance with the *power system security and reliability standards*, and to assess the availability of the actual *short term capacity reserve* and actual *medium term capacity reserve* in accordance with the *projected assessment of system adequacy (PASA)*, described in Chapter 3, which would be available to supplement utilised *contingency capacity reserves* and, if necessary, initiate action in relation to a *relevant AEMO intervention event*;
- (m) to make available to *Registered Participants* as appropriate, information about the potential for, or the occurrence of, a situation which could significantly impact, or is significantly impacting, on *power system security*, and advise of any *low reserve* condition for the relevant periods where the *short term*

capacity reserve and/or *medium term capacity reserve* is assessed as being less than that determined in accordance with the *short term capacity reserve standard* or *medium term capacity reserve standard* respectively;

- (n) to refer to *Registered Participants*, as *AEMO* deems appropriate, information of which *AEMO* becomes aware in relation to significant risks to the *power system* where actions to achieve a resolution of those risks are outside the responsibility or control of *AEMO*;
- (o) to utilise resources and services provided or procured as *ancillary services* or otherwise to maintain or restore the *satisfactory operating state* of the *power system*;
- (p) to procure adequate *system restart ancillary services* in accordance with clause 3.11.4A to enable *AEMO* to co-ordinate a response to a *major supply disruption*;
- (q) to interrupt, subject to clause 4.3.2(l), *Registered Participant connections* as necessary during emergency situations to facilitate the re-establishment of the *satisfactory operating state* of the *power system*;
- (r) to issue a *direction* or *clause 4.8.9 instruction* (as necessary) to any *Registered Participant*;
- (s) to co-ordinate and direct any rotation of widespread interruption of demand in the event of a *major supply* shortfall or disruption;
- (t) to liaise with *participating jurisdictions* should there be a need to manage an extensive disruption, including the use of emergency services powers in a *participating jurisdiction*;
- (u) to determine the extent to which the levels of *contingency capacity reserves* and *reactive power reserves* are or were appropriate through appropriate testing, auditing and simulation studies;
- (v) to investigate and review all major *power system* operational incidents and to initiate action plans to manage any abnormal situations or significant deficiencies which could reasonably threaten *power system security*. Such situations or deficiencies include without limitation:
 - (1) *power system frequencies* outside those specified in the definition of *satisfactory operating state*;
 - (2) *power system voltages* outside those specified in the definition of *satisfactory operating state*;
 - (3) actual or potential *power system* instability; and
 - (4) unplanned/unexpected operation of major *power system* equipment; and
- (w) to ensure that each *System Operator* satisfactorily interacts with *AEMO*, other *System Operators* and *Distribution System Operators* for both *transmission* and

distribution network activities and operations, so that *power system security* is not jeopardised by operations on the *connected transmission networks* and *distribution networks*.

4.3.2 System security

- (a) *AEMO* must use its reasonable endeavours, as permitted under the *Rules*, including through the provision of appropriate information to *Registered Participants* to the extent permitted by law and under the *Rules*, to achieve the *AEMO power system security responsibilities* in accordance with the *power system security* principles described in clause 4.2.6.
- (b) Where an obligation is imposed on *AEMO* under this Chapter to arrange or control any act, matter or thing or to ensure that any other person undertakes or refrains from any act, that obligation is limited to a requirement for *AEMO* to use reasonable endeavours as permitted under the *Rules*, including to give such directions as are within its powers, to comply with that obligation.
- (c) If *AEMO* fails to arrange or control any act, matter or thing or the acts of any other person notwithstanding the use of *AEMO's* reasonable endeavours, *AEMO* will not be taken to have breached such obligation.
- (d) *AEMO* must make accessible to *Registered Participants* such information as:
 - (1) *AEMO* considers appropriate;
 - (2) *AEMO* is permitted to disclose in order to assist *Registered Participants* to make appropriate *market* decisions; and
 - (3) *AEMO* is able to disclose to enable *Registered Participants* to consider initiating procedures to manage the potential risk of any necessary action by *AEMO* to restore or maintain *power system security*,

provided that, in doing so, *AEMO* must use reasonable endeavours to ensure that such information is available to those *Registered Participants* who request the information on equivalent bases.

- (e) The *Jurisdictional System Security Coordinator* for a *participating jurisdiction* may nominate an individual to be the principal point of contact with *AEMO* for the *Jurisdictional System Security Coordinator*.
- (f) The *Jurisdictional System Security Coordinator* for each *participating jurisdiction* must provide *AEMO* with:
 - (1) a schedule of *sensitive loads* in that jurisdiction, specifying:
 - (i) the priority, in terms of security of *supply*, that each *load* specified in the schedule has over the other *loads* specified in the schedule; and
 - (ii) the *loads* (if any) for which the approval of the *Jurisdictional System Security Coordinator* must be obtained by *AEMO* under

clause 4.3.2(l) before *AEMO* can interrupt *supply* to, or prevent reconnection of, that *load*: and

- (2) a schedule setting out the order in which *loads* in the *participating jurisdiction*, other than *sensitive loads*, may be shed by *AEMO* for the purposes of undertaking any *load shedding* under rule 4.8.
- (g) A *Jurisdictional System Security Coordinator* may from time to time amend the schedules provided to *AEMO* under clause 4.3.2(f) and must provide to *AEMO* a copy of the amended schedules.
- (h) *AEMO* must develop, update and maintain a set of procedures for each *participating jurisdiction* under which *loads* will be shed and restored in accordance with the priorities set out in the schedules for that *participating jurisdiction* (which procedures for a *participating jurisdiction* shall be known as the "*load shedding procedures*" for that jurisdiction).
- (i) *AEMO* must provide the *Jurisdictional System Security Coordinator* for a *participating jurisdiction* with a copy of the *load shedding procedures* for that *participating jurisdiction*, as amended from time to time.
- (j) The *load shedding procedures* for a *participating jurisdiction* must be consistent with the schedules of the *participating jurisdiction* provided under clause 4.3.2(f) and must, without limitation, include a requirement that:
 - (1) automatic *disconnection* of a *sensitive load* under clause 4.3.5(a) is not to occur until the occurrence of a specified *power system frequency* referred to in the *load shedding procedures*;
 - (2) any such *sensitive load* (or part thereof) which would otherwise have been part of a block of *interruptible load* in an under-frequency band specified in clause 4.3.5(b), must be replaced in that band in relation to the *participating jurisdiction* with an equivalent amount of *interruptible load* nominated by other *Market Customers* in the relevant *participating jurisdiction*;
 - (3) after *supply* is interrupted to a *load*, *supply* to that *load* must be restored as soon as this can be achieved and in accordance with the schedules of *loads* referred to in clause 4.3.2(f); and
 - (4) in the event of a major *supply* shortfall, the rotation of any *load shedding* requirements within *regions* (or parts of *regions*) in the *participating jurisdiction* must be in accordance with the *load shedding procedures*.
- (k) Notwithstanding any other provision of the *Rules*, *AEMO* must use its reasonable endeavours to ensure that the *power system* is operated in a manner that maintains security of *supply* to any *sensitive loads* prescribed by the *Jurisdictional System Security Coordinator* for each *participating jurisdiction* under clause 4.3.2(f).
- (l) (1) Notwithstanding any other provision of the *Rules*, in the event that *AEMO*, in its reasonable opinion for reasons of public safety or for *power*

system security, needs to interrupt *supply* to any *sensitive loads*, *AEMO* may only give a direction requiring that interruption:

- (i) in accordance with the *load shedding procedures*; and
 - (ii) if it is a *sensitive load* of a type described in clause 4.3.2(f)(1)(ii), once the *Jurisdictional System Security Coordinator* for the relevant *participating jurisdiction* has given *AEMO* its approval (which approval must not be unreasonably withheld).
- (2) Other than to ensure the maintenance of *power system security* or public safety, after *disconnection*, notwithstanding any other provision of the *Rules*, *AEMO* must not take any steps to prevent the reconnection of a *sensitive load* of the type described in clause 4.3.2(f)(1)(ii) without the approval of the *Jurisdictional System Security Coordinator* for the relevant *participating jurisdiction* (which approval must not be unreasonably withheld).

4.3.3 The role of System Operators

- (a) For the purpose of complying with its obligations under clause 4.3.2, *AEMO* may, from time to time, in addition to any other power or right under the *Rules*:
 - (1) engage such agents or appoint such delegates as it considers appropriate to carry out on its behalf some or all of its rights, functions and obligations under this Chapter (such persons being known as “*System Operators*” upon registration with *AEMO*); and
 - (2) organise, enter into and manage any contractual arrangements with appropriately competent service providers.
- (b) *AEMO* must make accessible to *Registered Participants* information as to:
 - (1) the engagement or appointment of any agent, delegate or service provider under clause 4.3.3;
 - (2) the identity of that agent, delegate or service provider; and
 - (3) the scope of the engagement or appointment, including without limitation, the activities in relation to which the engagement or appointment applies.
- (c) A *Registered Participant* must ensure that, where *AEMO* has engaged or appointed an agent, delegate or service provider under clause 4.3.3 in relation to certain of its rights, functions or obligations, any communications from the *Registered Participant* to *AEMO* under this Chapter concerning the rights, functions or obligations within the scope of the agent's, delegate's or service provider's engagement or appointment are made through that agent, delegate or service provider to the extent notified to the *Registered Participant* by *AEMO*.

- (d) A *System Operator* must carry out the rights, functions and obligations in respect of which it has been engaged or appointed by *AEMO* in accordance with the provisions of the *Rules*.
- (e) A *System Operator* must, to the extent that the *System Operator* is aware or ought reasonably to have been aware, keep *AEMO* fully and timely informed as to:
 - (1) the state of the security of the *power system*;
 - (2) any present or anticipated risks to *power system security*; and
 - (3) any action contemplated or initiated to address a risk to *power system security* or to restore or maintain the *power system* in a *satisfactory operating state*.
- (f) *AEMO* must ensure that any agent engaged, or delegate appointed, under clause 4.3.3(a)(1) is registered by it as a *System Operator*.
- (g) Notwithstanding that *AEMO* may have engaged or appointed an agent, delegate or service provider under clause 4.3.3 to carry out a right, function or obligation of *AEMO*, *AEMO* remains liable under the *Rules* for performance of that right, function or obligation.

4.3.4 Network Service Providers

- (a) Each *Network Service Provider* must use reasonable endeavours to exercise its rights and obligations in relation to its *networks* so as to co-operate with and assist *AEMO* in the proper discharge of the *AEMO power system security responsibilities*.
- (b) Each *Network Service Provider* must use reasonable endeavours to ensure that *interruptible loads* are provided as specified in clause 4.3.5 and clause S5.1.10 of schedule 5.1 (including without limitation, through the inclusion of appropriate provisions in *connection agreements*).
- (c) Each *Network Service Provider* must arrange and maintain, in accordance with the standards described in clause 4.3.4(e), controls, monitoring and secure communication systems to facilitate a manually initiated, rotational *load shedding* and restoration process which may be necessary if there is, in *AEMO's* opinion, a prolonged major *supply* shortage or extreme *power system* disruption.
- (d) Each *Network Service Provider* must advise *AEMO* of any *ancillary services* or similar services provided under any *connection agreement* to which it is a party.
- (e) *AEMO* must develop, and may amend, standards in consultation with *Network Service Providers* in accordance with the *Rules consultation procedures* which must be met by *Network Service Providers* in arranging and maintaining the controls, monitoring and secure communication systems referred to in clause 4.3.4(c).

- (f) Until the standards contemplated by clause 4.3.4(e) are issued by *AEMO*, each *Network Service Provider* must maintain the control, monitoring and secure communication systems referred to in clause 4.3.4(c) that were in place at 13 December 1998 so as to achieve substantially the same performance and functionality as they did over the 12 months prior to 13 December 1998.
- (g) Each *Network Service Provider* must plan or operate its *transmission system* or *distribution system* in accordance with the *power system* stability guidelines described in clause 4.3.4(h).
- (h) *AEMO* must develop, and may amend, guidelines for *power system* stability but only in consultation with *Registered Participants* in accordance with the *Rules consultation procedures*, and must *publish* the guidelines for *power system* stability.
- (i) The *power system* stability guidelines developed in accordance with clause 4.3.4(h) must detail the policies governing *power system* stability so as to facilitate the operation of the *power system* within stable limits.

4.3.5 Market Customer obligations

- (a) All *Market Customers* having expected peak demands at *connection points* in excess of 10 MW, must provide automatic *interruptible load* of the type described in clause S5.1.10 of schedule 5.1. The level of this automatic *interruptible load* must be a minimum of 60% of their expected demand, or such other minimum *interruptible load* level as may be periodically determined by the *Reliability Panel*, to be progressively automatically *disconnected* following the occurrence of a *power system* under-frequency condition described in the *power system security and reliability standards*.
- (b) *Market Customers* must provide their *interruptible load* in manageable blocks spread over a number of steps within under-frequency bands from 49.0 Hz down to 47.0 Hz as nominated by *AEMO*.
- (c) Any *load shedding* capability the subject of an *ancillary services agreement* or *enabled* as a *market ancillary service* can be counted as automatic *interruptible load* provided for the purposes of clause 4.3.5.

4.4 Power System Frequency Control

4.4.1 Power system frequency control responsibilities

AEMO must use its reasonable endeavours to:

- (a) control the *power system frequency*; and
- (b) ensure that the *frequency operating standards* set out in the *power system security and reliability standards* are achieved.

4.4.2 Operational frequency control requirements

To assist in the effective control of *power system frequency* by AEMO the following provisions apply:

- (a) AEMO may give *dispatch instructions* in respect of *scheduled generating units*, *semi-scheduled generating units*, *scheduled loads*, *scheduled network services* and *market ancillary services* pursuant to rule 4.9;
- (b) Each *Generator* must ensure that all of its *generating units* meet the technical requirements for frequency control in clause S5.2.5.11;
- (c) AEMO must use its reasonable endeavours to arrange to be available and specifically allocated to *regulating duty* such *generating plant* as AEMO considers appropriate which can be automatically controlled or directed by AEMO to ensure that all normal *load* variations do not result in *frequency* deviations outside the limitations specified in clause 4.2.2(a); and
- (d) AEMO must use its reasonable endeavours to ensure that adequate *facilities* are available and are under the direction of AEMO to allow the managed recovery of the *satisfactory operating state* of the *power system*.

4.4.3 Generator protection requirements

Generators must, in accordance with schedule 5.2 and Chapter 5, provide any necessary automatically initiated protective device or systems to protect their *plant* and associated *facilities* against abnormal *voltage* and extreme *frequency* excursions of the *power system*.

4.5 Control of Power System Voltage

4.5.1 Power system voltage control

- (a) AEMO must determine the adequacy of the capacity of the *power system* to produce or absorb *reactive power* in the control of the *power system voltages*.
- (b) AEMO, in consultation with *Network Service Providers*, must assess and determine the limits of the operation of the *power system* associated with the avoidance of *voltage* failure or collapse under any *credible contingency event* scenario.
- (c) The limits of operation of the *power system* must be translated by AEMO, in consultation with *Network Service Providers*, into key location operational *voltage* settings or limits, *transmission line* capacity limits, *reactive power* production (or absorption) capacity or other appropriate limits to enable their use by AEMO in the maintenance of *power system security*.
- (d) The determination referred to in clause 4.5.1(b) must include a review of the dynamic stability of the *voltage* of the *power system*.

- (e) *AEMO* must use its reasonable endeavours to maintain *voltage* conditions throughout the *power system* so that the *power system* remains in a *satisfactory operating state*.
- (f) *AEMO* must use its reasonable endeavours to arrange the provision of *reactive power facilities* and *power system voltage* stabilising *facilities* through:
 - (1) contractual arrangements for *ancillary services* with appropriate *Registered Participants* in accordance with rule 3.11;
 - (2) negotiation and agreement with appropriate *Network Service Providers*; or
 - (3) obligations on the part of *Registered Participants* under their *connection agreements* in accordance with clause 3.11.4(b)(1).
- (g) Without limitation, such *reactive power facilities* may include:
 - (1) *synchronous generator voltage controls* (rotor current adjustment) usually associated with *tap-changing transformers*;
 - (2) *synchronous condensers* (compensators);
 - (3) *static VAR compensators* (SVC);
 - (4) *shunt capacitors*;
 - (5) *shunt reactors*.

4.5.2 Reactive power reserve requirements

- (a) *AEMO* must use its reasonable endeavours to ensure that sufficient *reactive power reserve* is available at all times to maintain or restore the *power system* to a *satisfactory operating state* after the most critical *contingency event* as determined by previous analysis or by periodic contingency analysis by *AEMO*.
- (b) If *voltages* are outside acceptable limits, and the means of *voltage* control set out in this rule 4.5 are exhausted, *AEMO* must take all reasonable actions, including to direct changes to demand (through selective *load shedding* from the *power system*), additional *generation* operation or reduction in the *transmission line* flows but only to the extent necessary to restore the *voltages* to within the relevant limits. A *Registered Participant* must comply with any such direction.

4.5.3 Audit and testing

AEMO must arrange, co-ordinate and supervise the conduct of appropriate tests to assess the availability and adequacy of the provision of *reactive power* to control and maintain *power system voltages* under both *satisfactory operating state* and *contingency event* conditions.

4.6 Protection of Power System Equipment

4.6.1 Power system fault levels

- (a) *AEMO*, in consultation with *Network Service Providers*, must determine the fault levels at all *busbars* of the *power system* as described in clause 4.6.1(b).
- (b) *AEMO* must ensure that there are processes in place, which will allow the determination of fault levels for normal operation of the *power system* and in anticipation of all *credible contingency events* that *AEMO* considers may affect the configuration of the *power system*, so that *AEMO* can identify any *busbar* which could potentially be exposed to a fault level which exceeds the fault *current ratings* of the circuit breakers associated with that *busbar*.

4.6.2 Power system protection co-ordination

AEMO must use its reasonable endeavours to co-ordinate, in consultation with the *Network Service Providers*, the protection of *transmission system plant* and equipment that *AEMO* reasonably considers could affect *power system security*.

4.6.3 Audit and testing

AEMO must use its reasonable endeavours to co-ordinate such inspections and tests as *AEMO* thinks appropriate to ensure that the protection of the *power system* is adequate to protect against damage to *power system plant* and equipment.

4.6.4 Short-term thermal ratings of power system

- (a) *AEMO* may act so as to use, or require or recommend actions which use, the full extent of the thermal ratings of *transmission elements* to maintain *power system security*, including the short-term ratings (being time dependent ratings), as defined by the *Network Service Providers* from time to time.
- (b) *AEMO* must use its reasonable endeavours not to exceed the ratings defined by the *Network Service Providers* and not to require or recommend action which causes those ratings to be exceeded, to the extent that *AEMO* is or ought reasonably to be aware of such ratings.

4.6.5 Partial outage of power protection systems

- (a) Where there is an *outage* of one *protection system* of a *transmission line*, *AEMO* must determine, in consultation with the relevant *Network Service Provider*, the most appropriate action. Depending on the circumstances the determination may be:
 - (1) to leave the *transmission element* in service for a limited duration;
 - (2) to take the *transmission element* out of service immediately;
 - (3) to install a temporary *protection system*;

- (4) to accept a degraded performance from the *protection system*, with or without additional operational measures or temporary protection measures to minimise *power system* impact; or
 - (5) to operate the *transmission element* at a lower capacity.
- (b) If there is an *outage* of both *protection systems* on a *transmission line* and AEMO determines this to be an unacceptable risk to *power system security*, AEMO must take the *transmission element* out of service as soon as possible and advise the appropriate *Network Service Provider* immediately this action is undertaken.
- (c) The *Network Service Provider* must comply with a determination made by AEMO under this clause 4.6.5 unless, in the reasonable opinion of the *Network Service Provider*, it would threaten the safety of any person or cause material damage.

4.7 Power System Stability Co-ordination

4.7.1 Stability analysis co-ordination

- (a) AEMO must, in cooperation with the relevant *Network Service Providers*, apply the *power system* stability guidelines described in clause 4.3.4(h) to the conduct of all necessary calculations associated with the stable operation of the *power system* and use its reasonable endeavours to coordinate the determination of the settings of equipment used to maintain *power system* stability. The *Network Service Providers* must submit to AEMO for approval the settings of any *transmission* equipment used to maintain the stable operation of the *power system*.
- (b) AEMO must arrange and endorse the installation of *power system* devices which are approved by AEMO to be necessary to assist the stable operation of the *power system*.

4.7.2 Audit and testing

AEMO must arrange, co-ordinate and supervise the conduct of such inspections and tests as it deems appropriate to assess the availability and adequacy of the devices installed to maintain *power system* stability.

4.8 Power System Security Operations

4.8.1 Registered Participants' advice

A *Registered Participant* must promptly advise AEMO or a relevant *System Operator* at the time that the *Registered Participant* becomes aware, of any circumstance which could be expected to adversely affect the secure operation of the *power system* or any equipment owned or under the control of the *Registered Participant* or a *Network Service Provider*.

4.8.2 Protection or control system abnormality

- (a) If a *Registered Participant* becomes aware that any relevant *protection system* or *control system* is defective or unavailable for service, that *Registered Participant* must advise AEMO. If AEMO considers it to be a threat to *power system security*, AEMO may direct that the equipment protected or operated by the relevant *protection system* or *control system* be taken out of operation or operated as AEMO directs.
- (b) A *Registered Participant* must comply with a direction given by AEMO under clause 4.8.2(a).

4.8.3 AEMO's advice on power system emergency conditions

- (a) AEMO must *publish* all relevant details promptly after AEMO becomes aware of any circumstance with respect to the *power system* which, in the reasonable opinion of AEMO, could be expected to materially adversely affect *supply* to or from *Registered Participants*.
- (b) Without limitation, such circumstances may include:
 - (1) electricity *supply* capacity shortfall, being a condition where there are insufficient *generation* or *supply* options available to securely *supply* the total load in a *region*;
 - (2) unexpected disruption of *power system security*, which may occur when:
 - (i) an unanticipated major *power system* or *generation plant contingency event* occurs; or
 - (ii) significant environmental or similar conditions, including weather, storms or fires, are likely to, or are affecting, the *power system*; or
 - (3) a *major supply disruption*.

4.8.4 Declaration of conditions

AEMO may declare the following conditions in relation to a period of time, either present or future:

- (a) *Low reserve* condition - when AEMO considers that the *short term capacity reserves* or *medium term capacity reserves* for the period being assessed have fallen below those determined by AEMO as being in accordance with the relevant *short term capacity reserve standards* or *medium term capacity reserve standards*;
- (b) *Lack of reserve* level 1 (LOR1) – when AEMO considers that there is insufficient *short term capacity reserves* available to provide complete replacement of the *contingency capacity reserve* on the occurrence of the *credible contingency event* which has the potential for the most significant impact on the *power system* for the period nominated. This would generally be the instantaneous loss of the largest *generating unit* on the *power system*.

Alternatively, it might be the loss of any *interconnection* under *abnormal conditions*.

- (c) *Lack of reserve level 2 (LOR2)* – when *AEMO* considers that the occurrence of the *credible contingency event* which has the potential for the most significant impact on the *power system* is likely to require *involuntary load shedding*. This would generally be the instantaneous loss of the largest *generating unit* on the *power system*. Alternatively, it might be the loss of any *interconnection* under *abnormal conditions*.
- (d) *Lack of reserve level 3 (LOR3)* - when *AEMO* considers that *Customer load* (other than *ancillary services* or contracted *interruptible loads*) would be, or is actually being, interrupted automatically or manually in order to maintain or restore the security of the *power system*.

4.8.5 Managing declarations of conditions

- (a) *AEMO* must as soon as reasonably practicable *publish* any declaration under clause 4.8.4.
 - (a1) The *publication* of any such declaration must, to the extent reasonably practicable, include the following:
 - (1) the nature and extent of the *low reserve* or *lack of reserve* condition; and
 - (2) the time period over which the *low reserve* or *lack of reserve* condition applies.
- (b) If *AEMO* makes a declaration under clause 4.8.4, *AEMO* must use its reasonable endeavours to follow the processes set out in clauses 4.8.5A and 4.8.5B.
- (c) Following a declaration under clause 4.8.4, *AEMO* must as soon as reasonably practicable *publish* notice of:
 - (1) any cancellation of that declaration; or
 - (2) any significant change in the *low reserve* or *lack of reserve* condition due to changed positions of *Scheduled Network Service Providers*, *Market Customers*, *Semi-Scheduled Generators* and *Scheduled Generators* or due to other reasons.

4.8.5A Determination of the latest time for AEMO intervention

- (a) *AEMO* must immediately *publish* a notice of any foreseeable circumstances that may require *AEMO* to implement a *AEMO intervention event*.
- (b) A notice referred to in paragraph (a) must include the forecast circumstances creating the need for the *AEMO intervention event*.
- (c) *AEMO* must, as soon as reasonably practicable after the *publication* of a notice in accordance with paragraph (a), estimate and *publish* the latest time at which

it would need to intervene through a *AEMO intervention event* should the response from the *market* not be such as to obviate the need for the *AEMO intervention event*.

- (d) In order to estimate the time referred to in paragraph (c), *AEMO* may request information from a *Scheduled Network Service Provider*, *Scheduled Generator*, *Semi-Scheduled Generator* or *Market Customer* and may specify the time within which that information is to be provided.
- (e) The information that *AEMO* may request in accordance with paragraph (d) may include, but is not limited to:
 - (1) *plant* status;
 - (2) any expected or planned *plant outages* and the MW capacity affected by the *outage*, proposed start date and time and expected end date and time associated with the *outage* and an indication of the possibility of deferring the *outage*; and
 - (3) estimates of the relevant costs to be incurred by the *Scheduled Network Service Provider*, *Scheduled Generator* or *Market Customer* should it be the subject of a *direction*, but only if *AEMO* considers it reasonably likely that such *Scheduled Network Service Provider*, *Scheduled Generator* or *Market Customer* will be subject to a *direction*.
- (f) A *Scheduled Network Service Provider*, *Scheduled Generator* or *Semi-Scheduled Generator* or *Market Customer* must use reasonable endeavours:
 - (1) to comply with a request for information under paragraph (d); and
 - (2) to provide *AEMO* with the information required in the time specified by *AEMO*.
- (g) *AEMO* must regularly review its estimate of the latest time at which it would need to intervene through a *AEMO intervention event*, and *publish* any revisions to the estimate.
- (h) *AEMO* must treat any information provided in response to a request under paragraph (d) as *confidential information* and use it for the sole purpose of assessing to which *Scheduled Network Service Provider*, *Market Customer* or *Scheduled Generator* it should issue *directions*.

4.8.5B Notifications of last time of AEMO intervention

If the latest practicable time for a *AEMO intervention event*, as estimated by *AEMO* under clause 4.8.5A, is reached and, taking into account *relevant AEMO intervention events*, the circumstances described under clause 4.8.5A(a) have not been alleviated, *AEMO* must to the extent reasonably practicable immediately:

- (1) *publish* a notice that *AEMO*:

- (i) considers the time for the negotiation of further *reserve contracts* in accordance with rule 3.20 has elapsed; and
 - (ii) intends to implement a *AEMO intervention event*; and
- (2) amend the *pre-dispatch schedule* to ensure that it is a physically realisable schedule for all periods in which *AEMO* intends to implement a *AEMO intervention event*.

4.8.6 [Deleted]

4.8.7 Managing a power system contingency event

- (a) During the period when the *power system* is affected by a *contingency event* *AEMO* must carry out actions, in accordance with the guidelines set out in the *power system security and reliability standards* and its obligations concerning *sensitive loads*, to:
 - (1) identify the impact of the *contingency event* on *power system security* in terms of the capability of *generating units* or *transmission* or *distribution networks*; and
 - (2) identify and implement the actions required in each affected *region* to restore the *power system* to its *satisfactory operating state*.
- (b) When *contingency events* lead to potential or actual electricity *supply* shortfall events, *AEMO* must follow the procedures outlined in clause 4.8.9.

4.8.8 [Deleted]

4.8.9 Power to issue directions and clause 4.8.9 instructions

- (a) Notwithstanding any other provision of rule 4.8:
 - (1) *AEMO* may require a *Registered Participant* to do any act or thing if *AEMO* is satisfied that it is necessary to do so to maintain or re-establish the *power system* to a *secure operating state*, a *satisfactory operating state*, or a *reliable operating state*; and
 - (2) *AEMO* may authorise a person to do any of the things contemplated by section 116 of the *National Electricity Law* if *AEMO* is satisfied that it is necessary to do so for reasons of public safety or the security of the electricity system.
- (a1) If *AEMO*, or a person authorised by *AEMO*, requires a *Registered Participant* to:
 - (1) take action as contemplated by clause 4.8.9(a) or section 116 of the *National Electricity Law* in relation to *scheduled plant* or a *market generating unit*, *AEMO* is taken to have issued a *direction*; or

- (2) take some other action contemplated by clause 4.8.9(a) or section 116 of the *National Electricity Law*, AEMO is taken to have issued a *clause 4.8.9 instruction*.
- (a2) AEMO must use reasonable endeavours to ensure that persons authorised by AEMO under clause 4.8.9(a)(2) follow all relevant processes in clause 4.8 prior to issuing a *direction*, unless it is not reasonably practical to do so.
- (b) AEMO must develop, and may amend from time to time, in accordance with the *Rules consultation procedures*, procedures for the issuance of *directions*. Such procedures must reflect the following principles:
 - (1) AEMO must use its reasonable endeavours to minimise any cost related to *directions* and compensation to *Affected Participants* and *Market Customers* pursuant to clause 3.12.2 and compensation to *Directed Participants* pursuant to clauses 3.15.7 and 3.15.7A;
 - (2) a *direction* should be revoked as soon as AEMO determines that the *direction* is no longer required;
 - (3) AEMO must take into account any applicable guidelines issued by the *Reliability Panel*;
 - (4) AEMO must observe its obligations under clause 4.3.2 concerning *sensitive loads*;
 - (5) AEMO must expressly notify a *Directed Participant* that AEMO's requirement or that of another person authorised by AEMO pursuant to clause 4.8.9(a) is a *direction*.
- (c) A *Registered Participant* must use its reasonable endeavours to comply with a *direction* or *clause 4.8.9 instruction* unless to do so would, in the *Registered Participant's* reasonable opinion, be a hazard to public safety, or materially risk damaging equipment, or contravene any other law.
- (c1) Subject to clause 4.8.9(c) a *Registered Participant* must use its best endeavours to comply with a *direction* or *clause 4.8.9 instruction* in accordance with the timeframe specified by AEMO in the *direction* or *clause 4.8.9 instruction*.
- (c2) A *Market Participant* must not by any act or omission, whether intentionally or recklessly, cause or significantly contribute to the circumstances causing a *direction* to be issued, without reasonable cause.
- (d) A *Registered Participant* must immediately notify AEMO of its inability to comply or its intention not to comply with a *direction* or *clause 4.8.9 instruction*.
- (e) If a *Registered Participant* does not comply with a *direction* or *clause 4.8.9 instruction*, it must within 2 *business days* of the *direction* or *clause 4.8.9 instruction* deliver to AEMO and the AER a report detailing the reasons for the non compliance together with all relevant facts.

- (f) *AEMO* must *publish* a report in accordance with clause 3.13.6A.
- (g) Any *Registered Participant* who is aware of a failure to comply with a *direction* or *clause 4.8.9 instruction* or who believes any such failure has taken place must notify *AEMO* and the *AER* in writing and as soon as practicable of that fact.
- (h) If *AEMO* issues a *direction* or *clause 4.8.9 instruction*, *AEMO* may, to give effect to the *direction* or *clause 4.8.9 instruction*:
 - (1) submit, update or vary *dispatch bids*, *dispatch offers* or *rebids* in relation to the *plant* of *Directed Participants* and *Affected Participants*;
 - (2) change other inputs to the *dispatch process*; or
 - (3) select a *Market Participant* or *Market Participants* to become *Affected Participants* to implement clause 3.8.1(b)(11).
- (i) When issuing *clause 4.8.9 instructions* to implement *load shedding* across *interconnected regions*, *AEMO* must use reasonable endeavours to implement *load shedding* in an equitable manner as specified in the *power system security and reliability standards*, taking into account the *power transfer capability* of the relevant *networks*.
- (j) When issuing *clause 4.8.9 instructions* to implement *load shedding*, *AEMO* must comply with its obligations under clauses 4.3.2(e) to (l) and Part 8 of the *National Electricity Law*.

4.8.9A System security directions

- (a) Notwithstanding any other provision of the *Rules*, a *Registered Participant* must follow any *direction* issued by or on behalf of *AEMO* and with which that *Registered Participant* is required to comply under Chapter 4 or section 116 of the *National Electricity Law*.
- (b) Any event or action required to be performed pursuant to a *direction* issued under Chapter 4 or section 116 of the *National Electricity Law* on or by a stipulated *day* is required by the *Rules* to occur on or by that *day*, whether or not a *business day*.
- (c) Any failure to observe such a *direction* will be deemed to be a breach of the *Rules*.
- (d) *AEMO* or any *Registered Participant* who is aware of any such failure must notify the *AER* in writing of the failure.

4.8.10 Disconnection of generating units and market network services

- (a) Where, under the *Rules*, *AEMO* has the authority or responsibility to *disconnect* a *generating unit* or a *market network service*, then it may do so (either directly or through any agent) as described in rule 5.9.

- (b) The relevant *Generator* or *Market Network Service Provider* must provide all reasonable assistance to *AEMO* for the purpose of such *disconnection*.

4.8.11 [Deleted]

4.8.12 System restart plan and local black system procedures

- (a) *AEMO* must prepare, and may amend, a *system restart plan* for the purpose of managing and coordinating system restoration activities during any *major supply disruption*.
- (b) The *system restart plan* is *confidential information*.
- (c) The *system restart plan* must be consistent with the *system restart standard*.
- (d) Each *Generator* and *Network Service Provider* must develop *local black system procedures* in accordance with the guidelines referred to in clause 4.8.12(e). A *Generator's* or *Network Service Provider's local black system procedures* must be consistent with any *ancillary services agreement* to provide *system restart ancillary services* to which that *Generator* or *Network Service Provider* is a party. On request from *AEMO*, or as a result of a significant change of circumstances, a *Generator* or *Network Service Provider* must review, and amend if appropriate, its *local black system procedures*.
- (e) Subject to clause 4.8.12(f), *AEMO* must develop and *publish*, and may amend, guidelines for the preparation of *local black system procedures* in consultation with *Generators* and *Network Service Providers*.
- (f) *Local black system procedures* must:
 - (1) provide sufficient information to enable *AEMO* to understand the likely condition and capabilities of *plant* following any *major supply disruption* such that *AEMO* is able to effectively co-ordinate the safe implementation of the *system restart plan*; and
 - (2) appropriately incorporate any relevant *energy support arrangements* to which a *Generator* or *Network Service Provider* may be party.
- (g) Each *Generator* and *Network Service Provider* must submit its *local black system procedures*, including any amendments to those procedures, to *AEMO* for approval. In considering whether to grant approval, *AEMO* must take into account the consistency of the *local black system procedures* with:
 - (1) the guidelines referred to in clause 4.8.12(e); and
 - (2) relevant components of the *system restart plan*.
- (h) *AEMO* may request amendments to *local black system procedures*, including, without limitation, imposing conditions in respect of any *energy support arrangement* as *AEMO* reasonably considers necessary to ensure the integrity of the *system restart plan*. When requesting amendments to the *local black*

system procedures, AEMO must provide reasons for those requested amendments.

- (i) Requests by AEMO for amendments under clause 4.8.12(h) must be by notice in writing to a *Generator* or *Network Service Provider*. Reasonable requests by AEMO for amendments under clause 4.8.12(h) must be complied with by a *Generator* or *Network Service Provider*.
- (j) AEMO and *Network Service Providers* must jointly develop communication protocols to facilitate the exchange of all information relevant to the roles played by AEMO, *Network Service Providers*, *Generators* and *Customers* in the implementation of the *system restart plan*.

4.8.13 [Deleted]

4.8.14 Power system restoration

- (a) AEMO must notify a *Registered Participant* if, in AEMO's reasonable opinion, there is a *major supply disruption* which is affecting, or which may affect, that *Registered Participant*.
- (b) If AEMO advises a *Generator* or *Network Service Provider* of a *major supply disruption*, or if the terms of the relevant *local black system procedures* require the *Generator* or *Network Service Provider* to take action, then the *Generator* or *Network Service Provider* must comply with the requirements of the *local black system procedures* as quickly as is practicable.
- (c) Where in AEMO's reasonable opinion the *system restart plan* cannot be implemented to effectively ameliorate the actual *power system* conditions created by a *major supply disruption*, AEMO may adapt or vary the *system restart plan* as it considers reasonably necessary to suit those actual *power system* conditions.
- (d) If there is a *major supply disruption*, a *Generator* or *Network Service Provider* must comply with AEMO's *directions* or *clause 4.8.9 instructions* regarding the restoration of the *power system*.
- (e) If there is a *major supply disruption*, a *Market Customer* must comply with AEMO's *directions* with respect to the timing and magnitude of *load* restoration.

4.8.15 Review of operating incidents

- (a) For the purposes of this clause 4.8.15:

Reviewable operating incident means:

- (1) an incident comprising:
 - (i) a *non-credible contingency event* or multiple *contingency events* on the *transmission system*; or

- (ii) a *black system* condition; or
- (iii) an event where the *frequency* of the *power system* is outside limits specified in the *power system security and reliability standards*; or
- (iv) an event where the *power system* is not in a *secure operating state* for more than 30 minutes; or
- (v) an event where *AEMO* issues a *clause 4.8.9 instruction* for *load shedding*,

being an incident identified, in accordance with guidelines determined by the *Reliability Panel* under rule 8.8, to be of significance to the operation of the *power system* or a significant deviation from normal operating conditions; or

- (2) an incident where *AEMO* has been responsible for the *disconnection* of *facilities* of a *Registered Participant* under the circumstances described in clause 5.9.5; or
- (3) any other operating incident identified, in accordance with guidelines determined by the *Reliability Panel* under rule 8.8, to be of significance to the operation of the *power system* or a significant deviation from normal operating conditions;

but does not include an incident in respect of which *AEMO* is required to conduct a review under clause 3.14.3(c).

- (b) *AEMO* must conduct a review of every reviewable operating incident in order to assess the adequacy of the provision and response of *facilities* or services, and the appropriateness of actions taken to restore or maintain *power system security*.
- (c) *AEMO* must prepare a report on the review of a reviewable operating incident, and where that report relates to an incident described in clause 4.8.15(a)(1) or (3), *AEMO* must make the report available to *Registered Participants* and to the public.
- (ca) With respect to a report that has been prepared by *AEMO* in accordance with clause 4.8.15(a)(1) or (3) that relates to an operating incident involving a *non-credible contingency event*, the report must include details of how the reclassification criteria published under clause 4.2.3B were assessed and applied in the context of that *non-credible contingency event*.
- (d) Where *AEMO* has been responsible for the *disconnection* of *facilities* of a *Registered Participant* under the circumstances described in clause 5.9.5, *AEMO* must provide a report on that review to the *Registered Participant*, the *AEMC* and the *AER* advising of the circumstances requiring that action.
- (e) A *Registered Participant* must co-operate in any review conducted by *AEMO* including making available relevant records and information.
- (f) *AEMO* may request a *Registered Participant* to provide such information relating to the performance of equipment of that *Registered Participant* during

and after reviewable operating incidents, as *AEMO* reasonably requires for the purposes of analysing or reporting on the incident.

- (g) A *Registered Participant* must provide the information requested by *AEMO* under clause 4.8.15(f) within 20 *business days* unless *AEMO* agrees to a longer period, taking into account:
 - (1) the particular circumstances of the reviewable operating incident; and
 - (2) any request made under clause 4.8.15(h).
- (h) *AEMO* must as soon as practicable, provide to a *Registered Participant* such information relating to the performance of equipment of the *Registered Participant* during and after a reviewable operating incident as the *Registered Participant* reasonably requests and in relation to which *AEMO* is required to conduct a review under this clause 4.8.15.
- (i) At any time when no guidelines are in force under rule 8.8, *AEMO* may conduct a review of any incident referred to in clause 4.8.15(a)(1) that *AEMO* considers to be of significance to the operation of the *power system* or a significant deviation from normal operating conditions, and this clause 4.8.15 applies to and in respect of the review as if the incident were a reviewable operating incident.

4.9 Power System Security Related Market Operations

4.9.1 Load forecasting

- (a) *AEMO* must produce (at the intervals indicated and in accordance with the *timetable*) an indicative *load* forecast for each *region* for the periods indicated below:
 - (1) each *day*, a forecast for the *day* ahead, such forecast divided into half-hourly *load* forecasts for each *trading interval*;
 - (2) each *day*, a forecast for 2 to 7 *days* (inclusive) ahead, the forecasts for each *day* divided into half-hourly *load* forecasts for each *trading interval*;
 - (3) every week, a forecast for the 24 *months* ahead of the *day* on which the forecast is produced, with a daily profile based on an estimated weekly peak load condition with allowances for weekends and holidays.
- (b) These forecasts must provide an indicative estimate of the total *generation* capacity required to meet the forecast *load* (called “forecast load (as generated)”), and an equivalent estimation of the *supply* required to be delivered to the relevant *transmission network* (called “forecast load (sent out)”).
- (c) The following factors must be taken into account in the development of the *load* forecasts, to the extent that such are relevant to the particular forecast:

- (1) the annual *load* forecasts and *load* profiles collected by the *Network Service Providers* from all *Registered Participants* as required by schedule 5.7, including *load* management expectations and expected *sent out* generation from *embedded generating units*;
 - (2) historic *load* data, including *transmission* losses and *power station* in-house use of the *generated* output;
 - (3) weather forecasts and the current and historic weather conditions and pattern;
 - (4) the incidence of major events or activities which are known to *AEMO*;
 - (5) anticipated pumped storage *loads*;
 - (6) official economic activity forecasts from *participating jurisdictions*; and
 - (7) other information provided by *Registered Participants*.
- (d) *AEMO* must develop a methodology to create the indicative *load* forecasts.
- (e) A 10% probability of exceedence of *load* forecast must be adopted for the purposes of determination of *short term capacity reserve* and *medium term capacity reserve* requirements under the *power system security and reliability standards*.
- (f) *AEMO* must aggregate the regional forecasts to produce a total *interconnected transmission network* indicative *load* schedule for use in *AEMO* processes such as the determination of the required levels of *short term capacity reserves*, *medium term capacity reserves*, the *PASA* assessments and *pre-dispatch schedules*.
- (g) The *load* forecasts produced by *AEMO* are indicative only as *AEMO* has no direct influence over *Market Participants* in their decisions about their level of demand and, accordingly, no person may claim any loss or damage from *AEMO* as a result of any difference between *load* forecasts and actual *load*.

4.9.2 Instructions to Scheduled Generators and Semi-Scheduled Generators

- (a) To implement *central dispatch* or, where *AEMO* has the power to direct or to instruct a *Scheduled Generator* or *Semi-Scheduled Generator* either under Chapter 3 or this Chapter, then for the purpose of giving effect to that direction or instruction, *AEMO* may at any time give an instruction to the *Generator* in relation to any of its *generating units* (a "*dispatch instruction*"), in accordance with clause 4.9.5(b), nominating:
- (1) whether the facilities for *generation* remote control by *AEMO*, if available, must be in service;
 - (2) in the case of a *scheduled generating unit*, the level or schedule of power to be supplied by the *generating unit* over the specified period; and

- (3) in the case of a *semi-scheduled generating unit*, the maximum level of power to be supplied by the *generating unit* over the specified period.
- (b) Subject to paragraph (c), *AEMO* may at any time give an instruction to a *Generator* in relation to any of its *generating units* with a *nameplate rating* of 30MW or more, or its *systems* of combined *nameplate rating* of 30 MW or more, nominating that:
 - (1) the *generating unit* or *generating system* transformer is to be set to a nominated tap position (if it has on-load tap changing capability);
 - (2) the *generating unit's* or *generating system's voltage control system* set-point is to be set to give a nominated *voltage*; or
 - (3) the *generating unit* or *generating system* is to be operated to supply or absorb a nominated level of *reactive power* at its *connection point*.
- (c) Unless otherwise provided under an *ancillary services agreement* or a *connection agreement*, *AEMO* must not give an instruction under paragraph (b) that requires a *generating unit* or *generating system* to supply or absorb *reactive power* at a level outside the *plant's relevant performance standard*.
- (d) A *Scheduled Generator* or *Semi-Scheduled Generator* must, with respect to its *generating units* that have an availability offer of greater than 0 MW (whether *synchronised* or not), ensure that appropriate personnel are available at all times to receive and immediately act upon *dispatch instructions* issued by *AEMO* to the relevant *Generator*.

4.9.2A Dispatch Instructions to Scheduled Network Service Providers

- (a) Where *AEMO* has the power to direct or to instruct a *Scheduled Network Service Provider* either under Chapter 3 or this Chapter then, for the purpose of giving effect to that direction or instruction, *AEMO* may at any time give an instruction to a *Scheduled Network Service Provider* in relation to any of its *scheduled network services* (a "*dispatch instruction*"), in accordance with clause 4.9.5(b), nominating:
 - (1) whether the facilities for remote control by *AEMO*, if available, must be in service; and
 - (2) the level or schedule of power to be transferred by the *scheduled network service* over the specified period.
- (b) A *Scheduled Network Service Provider* must, with respect to its *scheduled network services* that have an availability offer of greater than 0 MW, ensure that appropriate personnel are available at all times to receive and immediately act upon *dispatch instructions* issued by *AEMO* to the *Scheduled Network Service Provider*.

4.9.3 Instructions to Registered Participants

- (a) *AEMO* may, at any time, give instructions to *Registered Participants* to reduce their *load* for electricity consistent with *dispatch bids* made in accordance with Chapter 3 ("*dispatch instructions*").
- (b) A *Market Customer* must, with respect to *scheduled loads* in relation to which a *dispatch bid* has been submitted for a particular *trading interval*, ensure that appropriate personnel or electronic facilities are available at all times to receive and immediately act upon *dispatch instructions* issued by *AEMO* to the *Market Customer*.

4.9.3A Ancillary services instructions

- (a) *AEMO* may at any time give an instruction (a "*dispatch instruction*") to a *Market Participant* which has classified one or more of its *generating units* or *market loads* as an *ancillary service generating unit* or an *ancillary service load*:
 - (1) stating that the relevant *generating unit* or *load* has been selected for the provision of a *market ancillary service*;
 - (2) stating the *market ancillary service* concerned; and
 - (3) nominating the range to be *enabled*.
- (b) *AEMO* may at any time give an instruction (a "*dispatch instruction*") to a *Registered Participant* with which *AEMO* has an *ancillary services agreement* in relation to the provision of *non-market ancillary services* under that *ancillary services agreement* or which *AEMO* is otherwise entitled to give under that *ancillary services agreement*.
- (c) A *Market Participant* which has:
 - (1) classified one or more of its *generating units* or *market loads* as an *ancillary service generating unit* or an *ancillary service load*; and
 - (2) submitted a *market ancillary service offer* in respect of that *generating unit* or *load*,

must ensure that appropriate personnel or electronic facilities are available at all times to receive and immediately act upon *dispatch instructions* issued to the *Market Participant* by *AEMO*.

- (d) A *Registered Participant* with which *AEMO* has an *ancillary services agreement* must ensure that appropriate personnel or electronic facilities are available in accordance with that agreement at all times to receive and immediately act upon *dispatch instructions* issued to the *Registered Participant* by *AEMO*.

4.9.3B Compliance with dispatch instructions

- (a) A *dispatch instruction* applies from the time it is given (or any later time specified in the *dispatch instruction*) until the earlier of:
 - (1) the cessation time specified in the *dispatch instruction* (if any); or
 - (2) the time when the next *dispatch instruction* applies.

4.9.4 Dispatch related limitations on Scheduled Generators and Semi-Scheduled Generators

A *Scheduled Generator* or *Semi-Scheduled Generator* (as the case may be) must not, unless in the *Generator's* reasonable opinion, public safety would otherwise be threatened or there would be a material risk of damaging equipment or the environment:

- (a) send out any *energy* from the *generating unit*, except:
 - (1) in accordance with a *dispatch instruction*;
 - (2) in response to remote control signals given by *AEMO* or its agent;
 - (3) in connection with a test conducted in accordance with the requirements of this Chapter or Chapter 5; or
 - (4) in the case of a *scheduled generating unit*:
 - (i) in accordance with the *self-commitment* procedures specified in clause 4.9.6 up to the *self-dispatch level*; or
 - (ii) as a consequence of operation of the *generating unit's* automatic *frequency response mode* to *power system* conditions;
- (b) adjust the *transformer tap position* or *excitation control system voltage* set-point of a *scheduled generating unit* or *semi-scheduled generating unit* except:
 - (1) in accordance with a *dispatch instruction*;
 - (2) in response to remote control signals given by *AEMO* or its agent;
 - (3) if, in the *Generator's* reasonable opinion, the adjustment is urgently required to prevent material damage to the *Generator's plant* or associated equipment, or in the interests of safety; or
 - (4) in connection with a test conducted in accordance with the requirements of rule 5.7;
- (c) *energise* a *connection point* in relation to a *generating unit* without obtaining approval from *AEMO* immediately prior to *energisation*;

- (d) *synchronise or de-synchronise a scheduled generating unit with a nameplate rating of 30MW or more, without prior approval from AEMO or other than in response to a dispatch instruction except:*
 - (1) *de-synchronisation as a consequence of the operation of automatic protection equipment; or*
 - (2) *where such action is urgently required to prevent material damage to plant or equipment or in the interests of safety;*
- (e) *change the frequency response mode of a scheduled generating unit without the prior approval of AEMO; or*
- (f) *remove from service or interfere with the operation of any power system stabilising equipment installed on that generating unit.*

4.9.4A Dispatch related limitations on Scheduled Network Service Providers

A *Scheduled Network Service Provider* must not, unless in the *Scheduled Network Service Provider's* reasonable opinion public safety would otherwise be threatened or there would be a material risk of damaging equipment or the environment:

- (a) *energise a connection point in relation to a scheduled network service without prior approval from AEMO. This approval must be obtained immediately prior to energisation; or*
- (b) *synchronise a scheduled network service to, or de-synchronise a scheduled network service from, the power system without prior approval from AEMO except de-synchronisation as a consequence of the operation of automatic protection equipment or where such action is urgently required to prevent material damage to plant or equipment or in the interests of safety.*

4.9.5 Form of dispatch instructions

- (a) A *dispatch instruction* for a *scheduled generating unit, semi-scheduled generating unit, scheduled network service or scheduled load* must include the following:
 - (1) *specific reference to the generating unit (including any aggregated generating unit), scheduled network service or scheduled load or other facility to which the dispatch instruction applies;*
 - (2) *the desired outcome of the dispatch instruction (if applicable) such as active power, reactive power, transformer tap or other outcome;*
 - (3) *in the case of a dispatch instruction under clause 4.9.2, the ramp rate (if applicable) which is to be followed by the generating unit or a specific target time to reach the outcome specified in the dispatch instruction;*
 - (4) *the time the dispatch instruction is issued;*

- (5) if the time at which the *dispatch instruction* is to take effect is different from the time the *dispatch instruction* is issued, the start time; and
- (6) in the case of a *dispatch instruction* for a *semi-scheduled generating unit*:
 - (i) a notification as to whether the *dispatch interval* to which the *dispatch instruction* relates is a *semi-dispatch interval* or a *non semi-dispatch interval*; and
 - (ii) the *dispatch level*.
- (a1) A *dispatch instruction* for an *ancillary service* must include:
 - (1) specific reference to the *generating unit* or *load* to which the *dispatch instruction* applies;
 - (2) the desired outcome of the *dispatch instruction*;
 - (3) the time the *dispatch instruction* is issued; and
 - (4) if the time at which the *dispatch instruction* is to take effect is different from the time the *dispatch instruction* is issued, the start time.
- (b) The *dispatch instruction* must be provided as provided in clause 3.8.21.

4.9.6 Commitment of scheduled generating units

- (a) Self-commitment:
 - (1) In relation to any *scheduled generating unit*, the *Scheduled Generator* must confirm with *AEMO* the expected *synchronising* time at least one hour before the expected actual *synchronising* time, and update this advice 5 minutes before *synchronising* unless otherwise agreed with *AEMO*. *AEMO* may require further notification immediately before *synchronisation*.
 - (2) The *Scheduled Generator* must advise *AEMO* when a *generating unit* reaches the *self-dispatch level* (being a *self-dispatch level* that is greater than zero MW) and must not increase output above that level unless instructed otherwise by *AEMO* to increase output or unless the increase in output results from the *generating unit* being placed under remote control to be loaded in accordance with Chapter 3.
- (b) Instructions by *AEMO* to commit a *generating unit* for service:
 - (1) A *dispatch instruction* for a *scheduled generating unit* to commit given by *AEMO* in response to a *dispatch offer* must be consistent with the start-up time specified in the latest *dispatch offer* in relation to the *generating unit*.
 - (2) When *AEMO* issues a *dispatch instruction* to a *generating unit* for *commitment*, *AEMO* must nominate the time at which the *generating unit* is to be *synchronised*.

- (3) After a *dispatch instruction* for *commitment* of a *generating unit* has been issued, the relevant *Scheduled Generator* must promptly advise AEMO of any inability to meet the nominated time to *synchronise*.
- (4) Unless instructed otherwise by AEMO, at the time a *dispatch instruction* to *commit* takes effect, the relevant *generating unit* must remain on *self-dispatch level* until AEMO issues a further *dispatch instruction*.

4.9.7 De-commitment, or output reduction, by Scheduled Generators

- (a) In relation to any *scheduled generating unit*, the *Scheduled Generator* must confirm with AEMO the expected *de-synchronising* time at least one hour before the expected actual *de-synchronising* time, and update this advice 5 minutes before *de-synchronising* unless otherwise agreed with AEMO. AEMO may require further notification immediately before *de-synchronisation*.
- (b) The *Scheduled Generator* must not de-commit a *generating unit* unless it has confirmed with AEMO:
 - (1) the time to commence decreasing the output of the *generating unit*;
 - (2) the *ramp rate* to decrease the output of the *generating unit*;
 - (3) the time to *de-synchronise* the *generating unit*; and
 - (4) the output from which the *generating unit* is to be *de-synchronised*.

4.9.8 General responsibilities of Registered Participants

- (a) A *Registered Participant* must comply with a *dispatch instruction* given to it by AEMO unless to do so would, in the *Registered Participant's* reasonable opinion, be a hazard to public safety or materially risk damaging equipment.
- (b) A *Scheduled Generator* must ensure that each of its *scheduled generating units* is at all times able to comply with the latest *generation dispatch offer* under Chapter 3 in respect of that *generating unit*.
- (b1) A *Scheduled Network Service Provider* must ensure that each of its *scheduled network services* is at all times able to comply with the latest *network dispatch offer* under Chapter 3 in respect of that *market network service*.
- (c) A *Registered Participant* must ensure that each of its *facilities* is at all times able to comply with any relevant *dispatch bid* under Chapter 3 in respect of the *facility* (as adjusted by any subsequent restatement of that bid under Chapter 3).
- (d) A *Market Participant* which has classified a *generating unit* or *load* as an *ancillary service generating unit* or an *ancillary service load*, as the case may be, must ensure that the *ancillary service generating unit* or *ancillary service load* is at all times able to comply with the latest *market ancillary service offer* for the relevant *trading interval*.

- (e) A *Semi-Scheduled Generator* must ensure that each of its *semi-scheduled generating units* is at all times able to comply with its latest *generation dispatch offer*.

4.9.9 Scheduled Generator plant changes

A *Scheduled Generator* must, without delay, notify *AEMO* of any event which has changed or is likely to change the operational availability of any of its *scheduled generating units*, whether the relevant *generating unit* is *synchronised* or not, as soon as the *Scheduled Generator* becomes aware of the event.

4.9.9A Scheduled Network Service Provider plant changes

A *Scheduled Network Service Provider* must, without delay, notify *AEMO* of any event which has changed or is likely to change the operational availability of any of its *scheduled network services* as soon as the *Scheduled Network Service Provider* becomes aware of the event.

4.9.9B Ancillary service plant changes

A *Market Participant* which has classified a *generating unit* or *load* as an *ancillary service generating unit* or an *ancillary service load* must, without delay, notify *AEMO* of any event which has changed or is likely to change the availability of a *market ancillary service*, or the capability of the *generating unit* or *load* to respond in the manner contemplated by the *market ancillary service specification*, as soon as the *Market Participant* becomes aware of the event.

4.10 Power System Operating Procedures

4.10.1 Power system operating procedures

- (a) The *power system operating procedures* are:
 - (1) any instructions which may be issued by *AEMO* from time to time covering *market* operations and relating to the operation of the *power system*;
 - (2) any guidelines issued from time to time by *AEMO* in relation to *power system security*;
 - (3) regional specific *power system operating procedures* covering the operational activities and associated responsibilities of the relevant *Network Service Provider* and any *Registered Participants* connected to the relevant *transmission network* and operational activities for operational elements of the *transmission network* which interface with *Scheduled Generators* and other *Registered Participants* including, but not limited to, those relating to *sensitive loads*;
 - (4) the *load shedding procedures*; and
 - (5) any other procedures, instructions or guidelines which *AEMO* nominates to be and advises to *Registered Participants* as being *power system operating procedures* from time to time.

- (b) *AEMO must compile the regional specific power system operating procedures in conjunction with the relevant Network Service Providers and the relevant Jurisdictional System Security Coordinators to the extent required under clause 4.10.1(a)(3).*
- (c) *AEMO must ensure that the various elements of the power system operating procedures are consistent with the load shedding procedures.*

4.10.2 Transmission network operations

- (a) *AEMO must exercise any power granted to it by the Rules or the power system operating procedures to:*
 - (1) *approve the manner in which operations are carried out on a transmission network by the relevant Network Service Provider; or*
 - (2) *instruct the relevant Network Service Provider to take any action on the transmission network,**in accordance with the appropriate power system operating procedures.*
- (b) *A Registered Participant must observe the requirements of the relevant power system operating procedures.*
- (c) *Registered Participants must operate their equipment interfacing with a transmission network in accordance with the requirements of Chapter 5, any applicable connection agreement, ancillary services agreement, and the associated power system operating procedures.*
- (d) *Registered Participants must ensure that transmission network operations performed on their behalf are undertaken by authorised persons advised in writing to AEMO.*
- (e) *AEMO must ensure the regular review and update of the regional specific power system operating procedures.*

4.10.3 Operating interaction with distribution networks

- (a) *AEMO and each Distribution System Operator must maintain effective communications concerning the conditions of its distribution network and the transmission network or other distribution network to which that distribution network is connected and to co-ordinate activities where operations are anticipated to affect other transmission or distribution networks.*
- (b) *AEMO must use its reasonable endeavours to give at least 3 days' notice to all affected Distribution System Operators prior to a Transmission Network Service Provider carrying out switching related to a transmission network which could reasonably be expected to affect security of supply to any distribution network.*

4.10.4 Switching of a Distributor's high voltage networks

- (a) A *Distribution System Operator* must use reasonable endeavours to give *AEMO* at least 3 days' prior notice of plans to carry out switching related to the *high voltage* network which could reasonably be expected to materially affect power flows at points of *connection* to a *transmission network*. The *Distribution System Operator* must also notify *AEMO* immediately prior to carrying out any such switching.
- (b) A *Distribution System Operator* must provide confirmation to *AEMO* of any such switching immediately after it has occurred.

4.10.5 Switching of reactive power facilities

- (a) *AEMO* may instruct a *Distribution System Operator* to place *reactive power facilities* belonging to or controlled by that *Distribution System Operator* into or out of service for the purposes of maintaining *power system security* where prior arrangements concerning these matters have been made between *AEMO* and the *Distribution System Operator*.
- (b) Without limitation to its obligations under such prior arrangements, a *Distribution System Operator* must use reasonable endeavours to comply with such an instruction given by *AEMO* or its authorised agent.

4.10.6 Automatic reclose

- (a) A *Network Service Provider* or a *Distribution System Operator* may request *AEMO* to disable or enable *automatic reclose equipment* in relation to a particular *transmission* or *distribution network* circuit or a feeder connecting its *distribution network* to a *transmission network* which has *automatic reclose equipment* installed on it.
- (b) If a *Distribution System Operator* makes such a request, then *AEMO* must use reasonable endeavours to comply with the request as soon as reasonably practical.
- (c) *AEMO* is not responsible for the consequences of automatic reclosure in relation to a circuit or a feeder and the *Distribution System Operator* must indemnify *AEMO* against any loss or damage arising out of *AEMO* complying with such a request unless the loss or damage is due to the failure by *AEMO* to comply with the request within a reasonable period of time.

4.10.7 Inspection of facilities by AEMO

AEMO may inspect a *facility* of a *Registered Participant* as specified in clause 5.7.1.

4.11 Power System Security Support

4.11.1 Remote control and monitoring devices

- (a) All remote control, operational *metering* and monitoring devices and local circuits as described in schedules 5.2, 5.3 and 5.3a, must be installed and maintained in accordance with the standards and protocols determined and advised by AEMO (for use in the *control centres*) for each:
 - (1) *scheduled generating unit* and *semi-scheduled generating unit* connected to the *transmission* or *distribution network*; and
 - (2) *substation* connected to the *network*.
- (b) The provider of any *ancillary services* must arrange the installation and maintenance of all *remote control equipment* and *remote monitoring equipment* in accordance with the standards and protocols determined and advised by AEMO for use in the relevant *control centre*.
- (c) The control and monitoring devices must include provision for indication of *active power* and *reactive power* output, provision for signalling the status and any associated alarm condition relevant to achieving adequate control of the *transmission network*, and provision for indication of *generating plant* active and reactive output.
- (d) Where reasonably necessary to allow AEMO to discharge its *market* and *power system security* functions AEMO may, by notice in writing, require a *Network Service Provider*, a *Generator* or a *Market Network Service Provider* to:
 - (1) install *remote monitoring equipment* which, in AEMO's reasonable opinion, is adequate to enable AEMO to remotely monitor the performance of a *transmission system* or *distribution system*, *generating unit* (including its *dynamic performance*) or a *market network service facility* as appropriate; and
 - (2) upgrade, modify or replace any *remote monitoring equipment* already installed in a *facility* provided that the existing *remote monitoring equipment* is, in the reasonable opinion of AEMO, no longer fit for the intended purpose.
- (e) A *Network Service Provider*, *Generator* or *Market Network Service Provider* who receives a notice in accordance with clause 4.11.1(d), must comply with the notice within 120 *business days* or such further period that AEMO requires.
- (f) **[Deleted]**
- (g) A *Generator* or *Market Network Service Provider* wishing to receive *dispatch instructions* electronically from AEMO's *automatic generation control system* under clause 3.8.21(d) must comply with AEMO's reasonable requirements in respect of how the remote control signals are issued by the *automatic generation control system* and transmitted to the *facility*.

4.11.2 Operational control and indication communication facilities

- (a) Each *Network Service Provider* must provide and maintain, in accordance with the standards referred to in clause 4.11.2(c), the necessary primary and, where nominated by *AEMO*, back-up communications facilities for control, operational *metering* and indication from the relevant local sites to the appropriate interfacing termination as nominated by *AEMO*.
- (b) *AEMO* must provide and maintain the communication facilities between control centres of each *Transmission Network Service Provider*, on the one hand, and the *AEMO co-ordinating centre*, on the other hand.
- (c) *AEMO* must develop, and may amend, standards in consultation with *Network Service Providers* in accordance with the *Rules consultation procedures* which must be met by *Network Service Providers* in providing and maintaining the facilities referred to in clause 4.11.2(a).
- (d) Until the standards contemplated by clause 4.11.2(c) are issued by *AEMO*, each *Network Service Provider* must maintain the primary and back-up communications facilities referred to in clause 4.11.2(a) that were in place at 13 December 1998 so as to achieve substantially the same performance and functionality as they did over the 12 months prior to 13 December 1998.

4.11.3 Power system voice/data operational communication facilities

- (a) *Network Service Providers*, *System Operators*, *Distribution System Operators*, *Generators* and *Market Participants* must advise *AEMO* of each nominated person for the purposes of giving or receiving *operational communications* in relation to each of its *facilities*. The persons so nominated must be those responsible for undertaking the operation of the relevant equipment of the relevant *Registered Participant*.
- (b) Contact personnel details which must be forwarded to *AEMO* include:
 - (1) title of contact personnel;
 - (2) the telephone numbers of those personnel;
 - (3) the telephone numbers of other available communication systems in relation to the relevant *facility*;
 - (4) a facsimile number for the relevant *facility*; and
 - (5) an electronic mail address for the relevant *facility*.
- (c) Each *Registered Participant* must provide, for each nominated person, two independent telephone communication systems fully compatible with the equipment installed at the appropriate *control centre* nominated by *AEMO*.
- (d) Each *Registered Participant* must maintain both telephone communication systems in good repair and must investigate faults within 4 hours, or as

otherwise agreed with *AEMO*, of a fault being identified and must repair or procure the repair of faults promptly.

- (e) Each *Registered Participant* must establish and maintain a form of electronic mail facility as approved by *AEMO* for communication purposes (such approval may not be unreasonably withheld).
- (f) *AEMO* must advise all *Registered Participants* of nominated persons for the purposes of giving or receiving *operational communications*.
- (g) Contact personnel details to be provided by *AEMO* include title, telephone numbers, a facsimile number and an electronic mail address for the contact person.

4.11.4 Records of power system operational communication

- (a) *AEMO* and the *System Operators* must record each telephone *operational communication* in the form of log book entries or by another auditable method which provides a permanent record as soon as practicable after making or receiving the *operational communication*.
- (b) Records of *operational communications* must include the time and content of each communication and must identify the parties to each communication.
- (c) Voice recordings of telephone *operational communications* may be undertaken by *AEMO* and the *System Operators*. *AEMO* and the *System Operators* must ensure that, when a telephone conversation is being recorded under this clause, the persons having the conversation receive an audible indication that the conversation is being recorded. Voice recordings may be used as an alternative to written logs.
- (d) *AEMO* and the *System Operators* must retain all *operational communications* records including voice recordings for a minimum of 7 years.
- (e) In the event of a dispute involving an *operational communication*, the records of that *operational communication* maintained by, or on behalf of, *AEMO* will constitute prima facie evidence of the contents of the *operational communication*.
- (f) Any recordings made in accordance with this clause 4.11.4 must be made in accordance with the provisions of all applicable privacy laws.

4.11.5 Agent communications

- (a) A *Registered Participant* may appoint an agent (called a “*Registered Participant Agent*”) to co-ordinate operations of one or more of its *facilities* on its behalf, but only with the prior written consent of *AEMO*.
- (b) A *Registered Participant* which has appointed a *Registered Participant Agent* may replace that *Registered Participant Agent* but only with the prior written consent of *AEMO*.

- (c) *AEMO* may only withhold its consent to the appointment of a *Registered Participant Agent* under clause 4.11.5(a) or (b) if it reasonably believes that the relevant person is not suitably qualified or experienced to operate the relevant facility.
- (d) For the purposes of the *Rules*, acts or omissions of a *Registered Participant Agent* are deemed to be acts or omissions of the relevant *Registered Participant*.
- (e) *AEMO* and its representatives (including authorised agents) may:
 - (1) rely upon any communications given by a *Registered Participant Agent* as being given by the relevant *Registered Participant*; and
 - (2) rely upon any communications given to a *Registered Participant Agent* as having been given to the relevant *Registered Participant*.
- (f) *AEMO* and the *System Operators* are not required to consider whether any instruction has been given to a *Registered Participant Agent* by the relevant *Registered Participant* or the terms of those instructions.

4.12 Nomenclature Standards

- (a) A *Network Service Provider* must use the *nomenclature standards* for *transmission* equipment and apparatus as agreed with *AEMO* or, failing agreement, as determined by *AEMO*.
- (b) A *Registered Participant* must use reasonable endeavours to ensure that its *representatives* comply with the *nomenclature standards* in any *operational communications* with *AEMO*.
- (c) A *Registered Participant* must ensure that nameplates on its equipment relevant to operations at any point within the *power system* conform to the requirements set out in the *nomenclature standards*.
- (d) A *Registered Participant* must use reasonable endeavours to ensure that nameplates on its equipment relevant to operations at any point within the *power system* are maintained to ensure easy and accurate identification of equipment.
- (e) A *Registered Participant* must ensure that technical drawings and documentation provided to *AEMO* comply with the *nomenclature standards*.
- (f) *AEMO* may, by notice in writing, request a *Registered Participant* to change the existing numbering or nomenclature of *transmission* equipment and apparatus of the *Registered Participant* for purposes of uniformity, and the *Registered Participant* must comply with such a request provided that if the existing numbering or nomenclature conforms with the *nomenclature standards*, *AEMO* must pay all reasonable costs incurred in complying with the request.

4.13 [Deleted]

4.14 Acceptance of Performance Standards

- (a) [Deleted]
- (b) [Deleted]
- (c) [Deleted]
- (d) [Deleted]
- (e) [Deleted]
- (f) [Deleted]
- (g) [Deleted]
- (h) [Deleted]
- (i) [Deleted]
- (j) [Deleted]
- (k) [Deleted]
- (l) [Deleted]
- (m) [Deleted]
- (n) *AEMO* must establish and maintain a register of the *performance standards* applicable to *plant* as advised by *Registered Participants* in accordance with clause 5.3.7(g)(1) or established in accordance with rule 4.14.
- (o) *AEMO* or, in respect of a matter concerning the quality of *supply* to *Network Users*, *AEMO* in consultation with the relevant *Network Service Provider*, must, when determining the applicable *performance standard* for a particular requirement based on any provision of schedules 5.1, 5.2, 5.3 and 5.3a, require a *Registered Participant* to meet or exceed the *minimum access standard* but must not require the *Registered Participant* to exceed the relevant *automatic access standard* for that requirement.
- (p) A *performance standard* may be amended at any time by agreement between *AEMO*, the relevant *Registered Participant* and the *Network Service Provider* if:
 - (1) where the *performance standard* was established under a transitional arrangement in rule 4.16 or 4.17, the amendment is consistent with the actual *plant* capability agreed between *AEMO*, the relevant *Registered Participant* and the *Network Service Provider*, even if it is less than the relevant *minimum access standard* that applied to applications to *connect* at the time of agreement; or

- (2) the amendment satisfies all requirements for *negotiated access standards* under clause 5.3.4A(b); or
- (3) the amendment satisfies all requirements to be an *automatic access standard*.
- (q) AEMO must not withhold agreement under rule 4.14(p) on a matter that is not a *AEMO advisory matter* under clause 5.3.4A(a), unless the proposed amendment would adversely affect *power system security*.
- (r) The *Network Service Provider* may as a condition of considering an amendment proposed under rule 4.14(p) 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 proposed amendment.
- (s) The *Network Service Provider* must require payment of a fee under rule 4.14(r) if so requested by AEMO.
- (t) On payment of the required fee referred to in rule 4.14(r), the *Network Service Provider* must pay the costs anticipated to be incurred by the other *Network Service Providers* and AEMO, as appropriate.

4.15 Compliance with Performance Standards

- (a) A *Registered Participant* must:
 - (1) ensure that its *plant* meets or exceeds the *performance standard* applicable to its *plant*; and
 - (2) ensure that its *plant* is not likely to cause a material adverse effect on *power system security* through its failure to comply with a *performance standard*; and
 - (3) immediately ensure that its *plant* ceases to be likely to cause a material adverse effect on *power system security* through its failure to comply with a *performance standard*, if:
 - (i) the *Registered Participant* reasonably believes that by failing to comply with a *performance standard*, its *plant* is likely to cause a material adverse effect on *power system security*; or
 - (ii) AEMO advises the *Registered Participant* that by failing to comply with a *performance standard*, the *Registered Participant's plant* is likely to cause a material adverse effect on *power system security*.
- (b) A *Registered Participant* who engages in the activity of planning, owning, controlling or operating a *plant* to which a *performance standard* applies must institute and maintain a compliance program which complies with rule 4.15(c). The compliance program must be instituted, as soon as reasonably practicable, but no later than:

- (1) 6 months after the day that *AEMO* gives notice to the *Registered Participant* of registration of the *performance standard* under rule 4.14(n); or
 - (2) 6 months after the day on which the *plant* commences operation.
- (c) A compliance program instituted and maintained under rule 4.15(b) must:
 - (1) be consistent with the *template for generator compliance programs*; and
 - (2) include procedures to monitor the performance of the *plant* in a manner that is consistent with *good electricity industry practice*; and
 - (3) be modified to be consistent with any amendments made under clause 8.8.3(ba) to the *template for generator compliance programs*, by no later than 6 months after amendments to the *template for generator compliance programs* are *published* or by a date determined by the *Reliability Panel*; and
 - (4) provide reasonable assurance of ongoing compliance with each applicable *performance standard*.
- (ca) The *template for generator compliance programs* must:
 - (1) cover all *performance standards*; and
 - (2) define suitable testing and monitoring regimes for each *performance standard* so that a *Registered Participant* can select a regime that complies with the obligations set out in rules 4.15(a), 4.15(b) and 4.15(c) for their particular *plant*.
- (d) The *AER* may request that a *Registered Participant*, who is required to institute and maintain a compliance program in accordance with rule 4.15(b) or clause 5.7.4(a1), deliver to the *AER*:
 - (1) the compliance program records setting out the written results of the performance monitoring conducted in accordance with rule 4.15(f) or clause 5.7.4(a2)(1); and
 - (2) any other records maintained in accordance with clause 5.7.3 or clause 5.7.4, if applicable.
- (e) Each *Registered Participant* must maintain the compliance program records and any other records developed or maintained under clause 5.7.3 or clause 5.7.4 for 7 years and deliver such records to the *AER*, in accordance with rule 4.15(d), within 5 *business days* of the date of the request or such further period as the *AER* requires.
- (f) A *Registered Participant* who engages in the activity of planning, owning, controlling or operating a *plant* to which a *performance standard* applies must immediately notify *AEMO* if:
 - (1) the *Registered Participant* becomes aware that the *plant* is breaching a *performance standard* applicable to the *plant*; or

- (2) the *Registered Participant* reasonably believes that the *plant* is likely to breach a *performance standard* applicable to the *plant*,

and *AEMO* must forward a copy of that notice to the *AER* and the relevant *Network Service Provider* no later than 5 *business days* from the day on which *AEMO* received the notice.

- (g) A notice in accordance with rule 4.15(f) must detail:
 - (1) the reason for the actual or likely non-conformance of the *plant* with the *performance standard*;
 - (2) the actual or likely time of commencement of non-conformance of the *plant* with the *performance standard*;
 - (3) the expected duration of non-conformance of the *plant* with the *performance standard*; and
 - (4) the expected performance of the *plant* in comparison with the *performance standard*.
- (h) A *Registered Participant* who has notified *AEMO* in accordance with rule 4.15(f), must notify *AEMO* and the relevant *Network Service Provider* that its *plant* has returned to compliance with the *performance standard* immediately following the *Registered Participant* becoming aware of the return of the *plant* to compliance with the *performance standard*.
- (i) If:
 - (1) a *Registered Participant* notifies *AEMO* in accordance with rule 4.15(f); or
 - (2) *AEMO* otherwise reasonably believes that the *plant* of a *Registered Participant*, in respect of which a *performance standard* applies, is in breach of that *performance standard*,then:
 - (3) *AEMO* must, in accordance with rule 4.15(j), notify the *Registered Participant* and the relevant *Network Service Provider* of its determination on the period within which the *Registered Participant* must rectify the breach; and
 - (4) *AEMO* must notify the *AER* of a breach notified in accordance with rule 4.15(i)(1) or of its reasonable belief of a breach in accordance with rule 4.15(i)(2), as the case may be; and
 - (5) the *Registered Participant* must rectify the breach within that period, unless the *Registered Participant* seeks a review from the *AER* of the rectification period under rule 4.15(n).
- (j) *AEMO* must, when determining the period within which a *Registered Participant* is required to rectify a *performance standard* breach in accordance with rule 4.15(i), take into consideration:

- (1) the time that *AEMO*, in its reasonable opinion, considers necessary to provide the *Registered Participant* with the opportunity to remedy the breach; and
 - (2) the impact on the operation of the *NEM*, including on the *power system* and the *spot market*, resulting from the breach; and
 - (3) any actions required by *AEMO* in response to the breach.
- (k) **[Deleted]**
- (l) **[Deleted]**
- (m) **[Deleted]**
- (n) If *AEMO* notifies a *Registered Participant* of a rectification period under rule 4.15(i) and that *Registered Participant* considers that *AEMO* has not reasonably applied the criteria under rule 4.15(j) with respect to the rectification period, the *Registered Participant* may, no later than 20 *business days* from the day of receiving *AEMO*'s notification on the rectification period, make an application to the *AER* requesting a review of *AEMO*'s notification and the *Registered Participant*'s reasons for a review.
- (o) If the *AER* receives an application under rule 4.15(n), the *AER* must review the application, no later than 30 *business days* from receiving the application, and either:
- (1) accept the rectification period determined by *AEMO*; or
 - (2) determine the rectification period on the *Registered Participant*,
- and provide reasons in writing for its determination to the *Registered Participant*, *AEMO* and the relevant *Network Service Provider*.
- (p) The *Registered Participant* must comply with any determination on the rectification period made under rule 4.15(o) from the day of receiving the *AER*'s determination.
- (q) If the *plant* of a *Registered Participant* remains operating in a manner that is in breach of a *performance standard* for a period greater than that determined in accordance with rule 4.15(i) or 4.15(o), *AEMO* must notify the *AER* and the relevant *Network Service Provider*.

4.16 Transitioning arrangements for establishment of performance standards

4.16.1 Definitions

In this rule 4.16 and in rule 4.17:

actual capability of an eligible plant in respect of a performance requirement means the capability of the eligible plant in relation to that performance requirement when it is being operated under normal conditions in accordance with *good electricity industry practice*.

agreed performance standard means a standard of performance that:

- (a) is established as a result of that standard being accepted by *NEMMCO* in accordance with:
 - (1) the Old rule 4.14(d)(1); or
 - (2) clause 4.14(d)(1) of the National Electricity Code; and
- (b) is in respect of a performance requirement.

Amending Rule means the National Electricity Amendment (Performance Standards Compliance of Generators) Rule 2008.

deemed performance standard means a standard of performance that:

- (a) is deemed to apply in accordance with:
 - (1) the Old rule 4.14(h); or
 - (2) clause 4.14(h) of the National Electricity Code; and
- (b) is in respect of a performance requirement.

eligible plant means a *generating unit* (including a pumping generating unit) and *plant* associated with that *generating unit* in relation to which:

- (a) a person was registered as a *Generator* as at the *performance standards commencement date*; or
- (b) a *connection agreement* applied as at the *performance standards commencement date*.

Generator notice means a notice given by a *Generator* to *NEMMCO* in accordance with clause 4.16.3(c).

Generator reply notice means a notice given by a *Generator* to *NEMMCO* in accordance with clause 4.16.3(k).

initiating party has the meaning given to it in clause 4.17.2(a).

mandatory standard means a standard of performance in respect of a performance requirement that is not the subject of a *minimum access standard* or an *automatic access standard*.

National Electricity Code means the code of conduct called the National Electricity Code approved, in accordance with section 6(1) of the Old National Electricity Law, as the initial Code for the purposes of that Law, and as amended from time to time in accordance with its terms and the Old National Electricity Law.

NEMMCO notice means a notice given by *NEMMCO* to a *Generator* in accordance with clause 4.16.3(d).

NEMMCO reply notice means a notice given by *NEMMCO* to a *Generator* in accordance with clause 4.16.3(i).

Old National Electricity Law means the Schedule to the National Electricity (South Australia) Act 1996 (SA) as in force from time to time before the commencement of section 12 of the National Electricity (South Australia) (New National Electricity Law) Amendment Act 2005 (SA).

Old rule 4.14(d)(1) means the rule 4.14(d)(1) in the version of the *Rules* which was in force immediately prior to the commencement of the Amending Rule.

Old rule 4.14(h) means the rule 4.14(h) in the version of the *Rules* which was in force immediately prior to the commencement of the Amending Rule.

performance requirement means in the case of:

- (a) any *generating unit* (including a pumping generating unit) and *plant* associated with that *generating unit* – a requirement referred to in clause S5.2.5, S5.2.6, S5.2.8 or S5.2.9; and
- (b) a pumping generating unit and *plant* associated with that pumping generating unit – a requirement referred to in clause S5.3.3, S5.3.5, S5.3.6, S5.3.7 or S5.3.8.

performance standard requirements means the requirements set out in clause 4.16.5(c).

performance standards committee means the committee established by *NEMMCO* under clauses 4.17.1.

performance standards expert means a person engaged by *NEMMCO* under clause 4.17.1(j).

pumping generating unit means a *generating unit* that can also operate as a hydro-electric pump.

receiving party has the meaning given to it in clause 4.17.2(a).

register means the register of *performance standards* established and maintained by *NEMMCO* under rule 4.14(n).

registered performance standard in respect of an eligible plant means a *performance standard* (including any agreed performance standard or deemed performance standard) that is included in the register as being applicable to that eligible plant and that is in respect of a performance requirement.

4.16.2 Exclusions

For the avoidance of doubt:

- (a) this rule 4.16 does not apply in relation to any *performance standard* for an eligible plant where that *performance standard* applies to that eligible plant by virtue of clause 5.3.4A; and
- (b) nothing in this rule 4.16 is to be taken to preclude a *performance standard* that applies to an eligible plant by virtue of those clauses being amended or replaced in accordance with the *Rules*, in which case the *performance standard* as so amended or replaced supersedes the *performance standard* that applies to that eligible plant by virtue of this rule 4.16 or rule 4.17 (as the case may be).

4.16.3 Notification and acceptance of performance standards

Agreement as to performance standards

- (a) *NEMMCO* and a person who is registered as a *Generator* in relation to eligible plant may, at any time before 1 March 2007, agree to a performance standard in respect of a particular performance requirement that is to apply to that eligible plant without following the procedures set out in this clause 4.16.3, but that performance standard must be a standard which, based on the information available to *NEMMCO* at that time, is consistent with the performance standard requirements.
- (b) A performance standard that is agreed under paragraph (a) is to be taken as the *performance standard* in respect of the relevant performance requirement for that eligible plant and *NEMMCO* must forthwith include that standard in the register as the *performance standard* in respect of that performance requirement for that eligible plant.
- (c) If, as at 1 March 2007:
 - (1) *NEMMCO* is not required to include the performance standard in the register under paragraph (b); and
 - (2) *NEMMCO* and the *Generator* have not agreed that no performance standard in respect of the relevant performance requirement is to apply to that eligible plant,

NEMMCO must give a written notice to the *Generator* of its intention to refer the determination of the performance standard to a performance standards expert.

NEMMCO notice

- (d) As soon as reasonably practicable but by no later than 29 December 2006, *NEMMCO* must give to each person who is registered as a *Generator* in relation to any eligible plant a written notice that specifies:
 - (1) the registered performance standards that apply to all eligible plants in relation to which that *Generator* is so registered;

- (2) which of those registered performance standards *NEMMCO* requires the *Generator* to renegotiate under clause 4.16.5(i) and in which case *NEMMCO* must also specify:
 - (i) the *power system security* issue that *NEMMCO* is seeking to address; and
 - (ii) the actual capability of the eligible plant in respect of the performance requirement the subject of the registered performance standard that *NEMMCO* considers is required to address that *power system security* issue; and
- (3) where:
 - (i) a *performance standard* in respect of a particular performance requirement is not included in the register as being applicable to an eligible plant in relation to which that *Generator* is registered; and
 - (ii) *NEMMCO* considers that a performance standard in respect of that performance requirement should apply to that eligible plant,that performance requirement.

Generator notice

- (e) As soon as reasonably practicable but by no later than 5 January 2007, each person who is registered as a *Generator* in relation to any eligible plant must give to *NEMMCO* a written notice that specifies:
 - (1) each deemed performance standard in respect of a performance requirement which the *Generator* proposes as being applicable to any of its eligible plants, where that performance requirement is not the subject of a registered performance standard that applies to that eligible plant;
 - (2) those registered performance standards that apply to any of its eligible plant which the *Generator* requires *NEMMCO* to renegotiate under clause 4.16.5(k) – in which case the *Generator* must also specify:
 - (i) its best assessment of the actual capability of the eligible plant in respect of the performance requirement the subject of the registered performance standard; and
 - (ii) the lower performance standard that it is proposing in respect of that performance requirement,and must include with its notice information that supports its assessment of the actual capability of that eligible plant;
 - (3) where *NEMMCO* has given the *Generator* a *NEMMCO* notice that specifies the actual capability of an eligible plant in respect of a performance requirement that *NEMMCO* considers is required to address a power system security issue, the *Generator's* best assessment of the

actual capability of that eligible plant in respect of that performance requirement - in which case the *Generator* must also include with its notice information that supports its assessment of that actual capability; and

(4) where:

- (i) *NEMMCO* has given the *Generator* a *NEMMCO* notice that specifies a performance requirement under subparagraph (d)(3); and
- (ii) the *Generator* has not included in its notice a deemed performance standard in respect of that performance requirement that it considers applies to the eligible plant,

the performance standard (if any) that the *Generator* proposes in respect of that performance requirement.

(f) If:

- (1) the *Generator* does not state in a *Generator* notice that it requires a registered performance standard that applies to an eligible plant to be renegotiated under clause 4.16.5(k), and *NEMMCO* has not specified that standard in a *NEMMCO* notice as a registered performance standard that is to be renegotiated under clause 4.16.5(i), that registered performance standard is to be taken as the *performance standard* in respect of the relevant performance requirement for that eligible plant; or
- (2) the required actual capability of an eligible plant in respect of a performance requirement, as notified to the *Generator* under subparagraph (d)(2), is lower than or equal to the *Generator's* best assessment of the actual capability of that eligible plant in respect of that performance requirement,

then:

- (3) the required actual capability of the eligible plant in respect of that performance requirement, as notified to the *Generator* under subparagraph (d)(2), is to be taken as the *performance standard* in respect of that performance requirement for that eligible plant; and
- (4) *NEMMCO* must forthwith include that standard in the register as the *performance standard* in respect of that performance requirement for that eligible plant.

Provision of connection agreements

(g) Where:

- (1) *NEMMCO* has given the *Generator* a *NEMMCO* notice that specifies the actual capability of an eligible plant in respect of a performance requirement that *NEMMCO* considers is required to address a *power*

system security issue and the *performance standard* in respect of that performance requirement is not determined under subparagraphs (f)(2)-(4);

- (2) *NEMMCO* has given the *Generator* a *NEMMCO* notice that specifies a performance requirement under subparagraph (d)(3); or
- (3) a *Generator* gives *NEMMCO* a *Generator* notice that specifies a deemed performance standard under subparagraph (e)(1) or a registered performance standard under subparagraph (e)(2),

and

- (4) the *Generator* has not already provided to *NEMMCO* a copy of the current *connection agreement* that applies to the relevant eligible plant,

then the *Generator* must include with its *Generator* notice or if it does not give *NEMMCO* a *Generator* notice, provide to *NEMMCO* by no later than 5 January 2007, a copy of the current *connection agreement* that applies to the eligible plant.

- (h) The copy of the *connection agreement* referred to in paragraph (g) may be altered in such a way as to mask any commercial arrangements and is *confidential information*.

NEMMCO reply notice

- (i) As soon as reasonably practicable but by no later than the performance standards agreement date, *NEMMCO* must give to each person who is registered as a *Generator* in relation to any eligible plant a written notice that states:
 - (1) where the *Generator* has given *NEMMCO* a *Generator* notice that specifies a deemed performance standard under subparagraph (e)(1), whether *NEMMCO* accepts the deemed performance standard as proposed by the *Generator*;
 - (2) where the *Generator* has given *NEMMCO* a *Generator* notice that specifies a proposed lower performance standard under subparagraph (e)(2), whether *NEMMCO* accepts:
 - (i) the *Generator's* assessment of the actual capability of the eligible plant in respect of the performance requirement the subject of the registered performance standard; and/or
 - (ii) the lower performance standard that has been proposed by the *Generator*;
 - (3) where:
 - (i) the *Generator* has given *NEMMCO* a *Generator* notice that, under subparagraph (e)(3), specifies the *Generator's* best assessment of

the actual capability of the eligible plant in respect of a performance requirement; and

- (ii) the required actual capability of the eligible plant in respect of that performance requirement, as notified to the *Generator* under subparagraph (d)(2), is higher than the *Generator's* assessment of the actual capability referred to in paragraph (l),

whether *NEMMCO* accepts the *Generator's* assessment;

- (4) where the *Generator* has given *NEMMCO* a *Generator* notice that specifies a proposed performance standard under subparagraph (e)(4), whether *NEMMCO* accepts that performance standard; and
- (5) where *NEMMCO* has given to the *Generator* a *NEMMCO* notice that specifies a performance requirement under subparagraph (d)(3) and the *Generator* has either:
 - (i) not proposed a performance standard under subparagraph (e)(4); or
 - (ii) not given a *Generator* notice to *NEMMCO*,

the performance standard (if any) that *NEMMCO* proposes for that purpose.

- (j) If *NEMMCO* states in a *NEMMCO* reply notice that:

- (1) it accepts a standard referred to in subparagraph (i)(1), (2) or (4), that standard is to be taken as the *performance standard* in respect of the relevant performance requirement for the eligible plant and *NEMMCO* must forthwith include that standard in the register as the *performance standard* in respect of that performance requirement for that eligible plant; or
- (2) it accepts the *Generator's* assessment of the actual capability of an eligible plant in respect of a performance requirement as included in a *Generator* notice under subparagraph (e)(3),

and the *Generator's* assessment of that actual capability is lower than the required actual capability of the eligible plant in respect of that performance requirement as notified to the *Generator* under subparagraph (d)(2), then:

- (3) the *Generator's* assessment of the actual capability of that eligible plant as referred to above is to be taken as the *performance standard* in respect of that performance requirement for that eligible plant; and
- (4) *NEMMCO* must forthwith include that standard in the register as the *performance standard* in respect of that performance requirement for that eligible plant.

Generator reply notice

- (k) Where *NEMMCO* has given a *Generator* a *NEMMCO* reply notice that specifies a proposed performance standard under subparagraph (i)(5), that *Generator* must, as soon as reasonably practicable but by no later than 15 January 2007, give written notice to *NEMMCO* which states whether it accepts that performance standard.
- (l) If the *Generator* states in a *Generator* reply notice that it accepts a standard referred to in paragraph (k), that standard is to be taken as the *performance standard* in respect of the relevant performance requirement for the eligible plant and *NEMMCO* must forthwith include that standard in the register as the performance standard in respect of that performance requirement for that eligible plant.

4.16.4 Actual capability

- (a) If *NEMMCO* notifies a *Generator* in a *NEMMCO* reply notice that it does not accept that the *Generator's* assessment of the actual capability of an eligible plant in respect of a particular performance requirement, then:
 - (1) the *Generator* and *NEMMCO* must seek to agree the actual capability of that eligible plant in respect of that performance requirement, taking into account (among other things) the results of relevant tests, the records of the operation of the plant, engineering reports, information provided by *Network Service Providers*, manufacturers' reports and the specifications of the plant or of similar plant; and
 - (2) if, within 20 *business days* of the giving of the *NEMMCO* reply notice, the *Generator* and *NEMMCO* have not agreed the actual capability of that eligible plant in respect of that performance requirement:
 - (i) they must seek to agree to the tests or engineering assessments that are to be undertaken for the purpose of establishing that actual capability and the time by which such tests or engineering assessments are to be completed; and
 - (ii) if, within 30 *business days* of the giving of the reply notice, they have not agreed to the tests or engineering assessments that are to be undertaken, or the time by which they are to be undertaken, the tests or engineering assessments, and the time by which they are to be undertaken, must be as specified by the *AER* in writing to the *Generator* and *NEMMCO*, such specification to be made at the written request of either the *Generator* or *NEMMCO* within 40 *business days* of the giving of the *NEMMCO* reply notice.
- (b) The *Generator* must use all reasonable endeavours, subject to complying with any other applicable provisions of the *Rules*, to have the tests or engineering assessments agreed or specified under subparagraph (a)(2) undertaken as agreed or specified and must promptly provide the results of such tests or engineering assessments to *NEMMCO*.

- (c) The costs of undertaking the tests or engineering assessments and providing the results to *NEMMCO* as referred to in paragraph (b) must be borne by the *Generator*.
- (d) This clause 4.16.4 does not apply where both the *Generator* and *NEMMCO* agree that there is no need to determine the actual capability of the eligible plant in respect of a particular performance requirement.

4.16.5 Criteria for, and negotiation of, performance standards

Restrictions on NEMMCO regarding performance standards

- (a) *NEMMCO*:
 - (1) must, and must only, accept a deemed performance standard or a proposed performance standard under clause 4.16.3(i)(1), (2) or (4) if it is satisfied that, based on the information available to *NEMMCO* at that time, the standard is consistent with the performance standard requirements;
 - (2) must not propose a performance standard under clause 4.16.3(i)(5) unless it is satisfied that, based on the information available to *NEMMCO* at that time, the standard is consistent with the performance standard requirements,and may only agree to a performance standard under clause 4.16.3(a)-(c) or as described in clause 4.17.3(f) if it is satisfied that, based on the information available to *NEMMCO* at that time, the standard is consistent with the performance standard requirements.

Preconditions to obligation to negotiate

- (b) If:
 - (1) *NEMMCO* does not state in a *NEMMCO* reply notice that it accepts a *Generator's* assessment of the actual capability of an eligible plant in respect of a performance requirement, as referred to in clause 4.16.3(i)(3), and the *Generator* is required to renegotiate the relevant registered performance standard pursuant to paragraph (i);
 - (2) *NEMMCO* does not state in a *NEMMCO* reply notice that it accepts a performance standard proposed by a *Generator*, as referred to in clause 4.16.3(i)(2), and *NEMMCO* is required to renegotiate the relevant registered performance standard pursuant to paragraph (k);
 - (3) *NEMMCO* does not state in a *NEMMCO* reply notice that it accepts a deemed performance standard or a proposed performance standard, as referred to in clause 4.16.3(i)(1) or (4); or
 - (4) a *Generator* does not state in a *Generator* reply notice that it accepts a proposed performance standard, as referred to in clause 4.16.3(k),

NEMMCO and the *Generator* must negotiate in good faith to agree the relevant performance standard in accordance with the performance standard requirements.

Criteria for performance standards

- (c) Subject to paragraphs (e) and (f), a performance standard referred to in paragraph (a) or negotiated in accordance with paragraph (b) must be the least onerous of:
 - (1) in the case of a performance standard other than a performance standard referred to in subparagraph (b)(1), the technical characteristics set out in the relevant connection agreement, subject to the technical characteristics set out in any applicable derogation;
 - (2) the relevant *automatic access standard*;
 - (3) the relevant mandatory standard; and
 - (4) the actual capability of the eligible plant in respect of the performance requirement the subject of the performance standard as accepted by *NEMMCO* in a *NEMMCO* reply notice, agreed by *NEMMCO* and the *Generator*, established in accordance with tests or engineering assessments agreed or specified under clause 4.16.4(a)(2), or determined by a performance standards expert.
- (d) As a result of the application of paragraph (c), and notwithstanding anything else to the contrary in the *Rules*, the relevant performance standard may be less than the relevant *minimum access standard* or mandatory standard.
- (e) The performance standard may be such other standard of performance as is agreed by *NEMMCO* and the *Generator* and as is higher than that which complies with the requirements set out in paragraphs (c) and (d).
- (f) *NEMMCO* and the *Generator* may agree that a performance requirement is not applicable to an eligible plant, with the result that no *performance standard* in respect of that performance requirement is required for that eligible plant.

Provision of information

- (g) For the purpose of facilitating the negotiations referred to in paragraph (b), the *Generator* must provide to *NEMMCO* as soon as reasonably practicable but by no later than 22 January 2007, a copy of the current *connection agreement* that applies to the relevant eligible plant and details of the design performance of the eligible plant.
- (h) The obligation in paragraph (g) does not apply to the extent the *Generator* has already provided such documents and information to *NEMMCO* and the copy of the *connection agreement* may be altered in such a way as to mask any commercial arrangements and is *confidential information*.

When NEMMCO may require renegotiation of registered performance standard

- (i) *NEMMCO* may only require a *Generator* to renegotiate a registered performance standard pursuant to a *NEMMCO* notice if:
 - (1) the registered performance standard is lower than what *NEMMCO* considers, based on the information available to it, to be the actual capability of the eligible plant in respect of the performance requirement the subject of the registered performance standard; and
 - (2) *NEMMCO* is satisfied that a higher performance standard in respect of that performance requirement is required to address a *power system security* issue.
- (j) Notwithstanding paragraph (i), a *Generator* is not required to (but may nevertheless agree to) renegotiate a registered performance standard pursuant to that clause if the actual capability of that eligible plant in respect of the performance requirement as agreed by *NEMMCO* and the *Generator*, or as established in accordance with tests or engineering assessments agreed or specified under clause 4.16.4(a)(2), is lower than the registered performance standard.

When Generator may require renegotiation of performance standard

- (k) A *Generator* may only require *NEMMCO* to renegotiate a registered performance standard pursuant to a *Generator* notice if the registered performance standard is higher than the *Generator's* best assessment of the actual capability of the eligible plant in respect of the performance requirement the subject of the registered performance standard.
- (l) Notwithstanding paragraph (k), *NEMMCO* is not required to (but may nevertheless agree to) renegotiate a registered performance standard pursuant to that clause if the actual capability of that eligible plant in respect of the performance requirement as agreed by *NEMMCO* and the *Generator*, or as established in accordance with tests or engineering assessments agreed or specified under clause 4.16.4(a)(2), is higher than the registered performance standard.

Consequences of agreeing performance standard

- (m) If *NEMMCO* and a *Generator* agree a performance standard in respect of a performance requirement for any eligible plant under this clause 4.16.5, that performance standard is to be taken as the *performance standard* in respect of that performance requirement for the eligible plant and *NEMMCO* must forthwith include that standard in the register as the performance standard in respect of that performance requirement for that eligible plant.

4.16.6 Consultation with and assistance by Network Service Providers

- (a) Before *NEMMCO*:

- (1) accepts or agrees to a performance standard under this rule 4.16 or as described in clause 4.17.3(d); or
- (2) agrees that a performance requirement is not applicable to an eligible plant under clause 4.16.5(f),

NEMMCO must notify the *Network Service Provider* to whose network the relevant eligible plant is directly *connected* and give that *Network Service Provider* a reasonable opportunity to provide its views on that matter to *NEMMCO*.

- (b) As soon as reasonably practicable after including a performance standard for an eligible plant in the register under this rule 4.16 or rule 4.17, *NEMMCO* must give written notice of that performance standard to the *Network Service Provider* to whose *network* that eligible plant is directly *connected*.
- (c) If requested to do so by *NEMMCO* or a *Generator*, a *Network Service Provider* must use its reasonable endeavours to provide such assistance as is requested in connection with the proposal, negotiation, acceptance or agreement of a performance standard under this rule 4.16 or as described in clause 4.17.3(d).

4.16.7 Referral to expert determination

- (a) If:
 - (1) in accordance with clause 4.16.5(b), *NEMMCO* and a *Generator* are required to negotiate to agree a performance standard in respect of a particular performance requirement for an eligible plant;
 - (2) *NEMMCO* and the *Generator* have not agreed under clause 4.16.5(f) that such a performance requirement is not applicable to that eligible plant; and
 - (3) as at 29 January 2007, *NEMMCO* is not required under clause 4.16.5(m) to include in the register a performance standard for that eligible plant that is in respect of that performance requirement,

the *Generator* may give a written notice to *NEMMCO* (or *NEMMCO* may give a written notice to the *Generator*) of its intention to refer the determination of the performance standard in respect of the performance requirement to a performance standards expert.

- (b) If:
 - (1) in accordance with clause 4.16.5(b), *NEMMCO* and a *Generator* are required to negotiate to agree a performance standard in respect of a particular performance requirement for an eligible plant;
 - (2) *NEMMCO* and the *Generator* have not agreed under clause 4.16.5(f) that such a performance requirement is not applicable to that eligible plant; and

- (3) as at 1 March 2007, *NEMMCO* is not required under clause 4.16.5(m) to include in the register a performance standard for that eligible plant that is in respect of that performance requirement,

NEMMCO must give a written notice to the *Generator* of its intention to refer the determination of the performance standard in respect of the performance requirement to a performance standards expert.

4.16.8 Prior actions

If the *AEMC*, the *AER*, *NEMMCO* or a *Registered Participant* takes any action to enable any entity to perform functions under, or obligations imposed by, this rule 4.16 or rule 4.17 before 7 December 2006 in anticipation of the relevant provision applying on the performance standards transition commencement date, and the action was taken so far as reasonably practicable in accordance with the provision (as though the provision applied at the time the relevant action was taken), then the action is deemed to have been validly taken in accordance with that provision with effect on and from 7 December 2006.

4.16.9 Deemed performance standards

A deemed performance standard for any eligible plant:

- (a) that is in respect of a particular performance requirement; and
- (b) that is included in the register as at the performance standards transition commencement date,

is to be taken to be the performance standard in respect of that performance requirement for that eligible plant for the purposes of the *Rules* unless it is subsequently amended or replaced in accordance with the *Rules*.

4.16.10 Modification of connection agreements

- (a) Notwithstanding clause 5.2.2(c) and subject to paragraph (b), a *connection agreement* that applies to any eligible plant is to be taken to include:

- (1) such *performance standards* for that eligible plant as are included in the register under this rule 4.16 or rule 4.17; and
- (2) except to the extent they have been superseded by a *performance standard* referred to in subparagraph (1), such *performance standards* for that eligible plant as are included in the register as at the performance standards transition commencement date,

and those *performance standards* prevail over any other standards of performance that are included in that *connection agreement* to the extent of any inconsistency between them.

- (b) Clause 4.16.10(a) does not apply to the extent a *performance standard* that is taken to be included in a *connection agreement* under that clause is subsequently amended or replaced in accordance with the *Rules*.

4.17 Expert determination

4.17.1 Performance standards committee and appointment of performance standards experts

- (a) As soon as reasonably practicable but by no later than 10 January 2007, *NEMMCO* must establish a committee comprising six members (the '**performance standards committee**').
- (b) The six members must consist of:
 - (1) two persons appointed to represent *NEMMCO*, one of whom is appointed as the chairperson of the committee;
 - (2) two persons appointed to represent *Generators*; and
 - (3) two persons appointed to represent *Network Service Providers*.
- (c) A decision of the performance standards committee to nominate a person as a performance standards expert must be made:
 - (1) at a meeting of the performance standards committee; and
 - (2) by at least two thirds of the number of members who attend the meeting.
- (d) A quorum for a meeting of the performance standards committee consists of one member from each of the categories referred to in subparagraph (b)(1) to (3).
- (e) The chairperson of the performance standards committee:
 - (1) is responsible for all procedural matters; and
 - (2) without limiting subparagraph (1), may determine that a member or members may participate in, and form any part of the quorum for, a meeting of the performance standards committee by telephone, closed circuit television or other means, but only if the member who speaks on any matter at that meeting can be heard by the other members at that meeting.
- (f) If a member of the performance standards committee resigns or otherwise ceases to be able or available to perform the functions of a member for more than 2 consecutive meetings of the committee, *NEMMCO* must, as soon as reasonably practicable, appoint another person to replace that member.
- (g) As soon as reasonably practicable after it is established, the performance standards committee must nominate at least two persons as performance standards experts.

- (h) The performance standards committee must:
 - (1) from time to time nominate such number of persons as performance standards experts as is necessary to ensure that the number of performance standards experts at any time is no less than two; and
 - (2) at the request of *NEMMCO*, nominate such additional number of persons as performance standards experts as *NEMMCO* requires.
- (i) If the performance standards committee:
 - (1) fails to nominate at least two persons as performance standards experts within 30 *business days* of the committee being established; or
 - (2) where the number of performance standards experts is reduced to less than two – fails, within 30 *business days* of such reduction occurring, to nominate such number of persons as performance standards experts as is necessary to restore the number of performance standards experts to two,

NEMMCO must request the *AER* in writing to nominate the requisite number of persons as performance standards experts and the *AER* must nominate that number of performance standards experts as soon as reasonably practicable.
- (j) *NEMMCO* must engage a performance standards expert nominated under this clause 4.17.1 for the purpose of performing the functions of a performance standards expert under this rule 4.17.
- (k) *NEMMCO* must notify the *AER* in writing of each performance standards expert that it engages under paragraph (j).
- (l) The performance standards committee will cease to exist one month after 1 June 2007.

4.17.2 Referral to performance standards expert

- (a) Where *NEMMCO* or a *Generator* gives a notice under clause 4.16.3(c) or clause 4.16.7 of its intention to refer the determination of a performance standard to a performance standards expert, the party giving the notice (the '**initiating party**') and the party to whom the notice is given (the '**receiving party**') must seek to agree on a performance standards expert to determine the performance standard.
- (b) If:
 - (1) 5 *business days* from the giving of the notice under clause 4.16.3(c) or clause 4.16.7 (as the case may be) have elapsed; and
 - (2) the initiating party and the receiving party have not agreed on a performance standards expert to determine the performance standard,

then the initiating party or the receiving party may request the *AER* in writing to nominate a performance standards expert to determine the performance standard, in which case:

- (3) the *AER* must make such nomination by notice in writing given to both the initiating party and the receiving party within 5 *business days* of the *AER* receiving the request to do so; and
 - (4) the nominated performance standards expert will determine the performance standard.
- (c) Within 5 *business days* of the selection of the performance standards expert who will determine the performance standard, or within such longer time as the performance standards expert may agree, the initiating party and the receiving party must each give to the performance standards expert a written submission as to the performance standard they contend should be adopted and the reasons (together with supporting evidence) for that contention.

4.17.3 Determinations of performance standards experts

- (a) The initiating party, the receiving party and any *Network Service Provider* required to do so by the performance standards expert must promptly supply the performance standards expert with any information, assistance and cooperation requested in writing by the performance standards expert in connection with its determination of a performance standard.
- (b) The performance standards expert must determine the performance standard in accordance with the performance standard requirements. For these purposes the performance standards expert may, without limitation:
 - (1) determine the actual capability of the eligible plant in respect of the performance requirement the subject of the performance standard; or
 - (2) determine that a performance requirement is not applicable to the relevant eligible plant, with the result that no performance standard in respect of that performance requirement is required for that eligible plant.
- (c) The performance standards expert must, as soon as reasonably practicable but no later than 1 June 2007, determine the performance standard and provide *NEMMCO* and the *Generator* with its written determination (including reasons).
- (d) The performance standards expert must not determine a performance standard in respect of a performance requirement for an eligible plant if, prior to making that determination, *NEMMCO* and the *Generator* notify the expert in writing that they have agreed to the relevant performance standard.
- (e) A performance standard in respect of a particular performance requirement that is:
 - (1) agreed as described in paragraph (d); or

- (2) determined by a performance standards expert,

is to be taken as the performance standard in respect of that performance requirement for the relevant eligible plant and *NEMMCO* must forthwith include that standard in the register as the *performance standard* in respect of that performance requirement for that eligible plant.

- (f) Not later than 1 July 2007, a performance standards expert must provide a summary of each determination it makes under this rule 4.17 to *NEMMCO* and *NEMMCO* must *publish* that summary as soon as is reasonably practicable.
- (g) A summary under paragraph (f) must only include the following information:
 - (1) the name of the relevant *Generator*;
 - (2) the name or a description of the eligible plant; and
 - (3) the performance requirement that is the subject of the performance standard that has been determined by the performance standards expert for that eligible plant.

4.17.4 Other matters

- (a) To the extent permitted by law, a performance standards expert is not liable for any loss, damage or liability suffered or incurred by a *Registered Participant* or any other person as a consequence of any act or omission of the performance standards expert that was done in good faith in connection with the determination of a performance standard.
- (b) Before proceeding to determine a performance standard, a performance standards expert may require the initiating party and the receiving party to execute a release and indemnity in relation to any loss, damage or liability that the performance standards expert might, but for the release and indemnity, suffer or incur as a consequence of any act or omission of the performance standards expert that was done in good faith in connection with the determination of the performance standard.
- (c) As part of its engagement by *NEMMCO*, a performance standards expert must enter into a confidentiality deed with *NEMMCO*, for the benefit of *NEMMCO* and each *Generator* in respect of which the performance standards expert determines a performance standard, under which it undertakes to keep confidential all information provided to it for the purposes of determining any performance standard except to the extent that the disclosure of such information is necessary for the purposes of the summary referred to in clause 4.17.3(f).
- (d) The costs of the performance standards expert must be borne equally as between *NEMMCO* and National Generators Forum Limited (ACN 113 331 623).