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21 April 2008

John Tamblyn
Chairman
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Dear John,

REQUEST FOR RULE CHANGES – TECHNICAL PARAMETERS

This Rule change proposal is the result, at least in part, of the AER's investigation into the events of 31 October 2005 in NSW. During that event, network constraints were imposed as a result of a network outage. The constraints had the effect of constraining dispatch of some generation in the vicinity of the outage, however, NEMMCO's ability to reduce generation was hindered by the rebidding of generator ramp rates to very low levels. The Rule change proposal seeks to limit such risks to system security, while being cognisant of the additional burden such a change places on market participants.

The AER's view is that the National Electricity Rules (NER) implicitly distinguish between two categories of bid and rebid parameters that are of particular relevance to generators – namely, commercial parameters and physical/technical parameters. As explained in the Rule change proposal, commercial parameters (such as generator availability, price and volume) may be bid and rebid in pursuance of commercial objectives, subject to the requirements of the rebidding provisions. However, there are other parameters that the NER implicitly identify as "technical" or "physical" parameters, which are linked to the technical capability of the relevant plant. This Rule change proposal deals with the latter parameters, namely:

- Ramp rates – that is, the rate at which output from a generating unit may be varied up or down
- Parameters related to the provision of frequency control ancillary services – that is, enablement limits, response capability and response breakpoints

The Rule change proposal seeks to limit the ability of market participants to use such parameters in cases where power system security could be compromised.

The Rule change proposal also deals with a related issue – that is, the circumstances in which a market participant may declare itself inflexible. The current NER require a market participant to declare itself inflexible if abnormal plant conditions or abnormal operating conditions exist. However, the NER do not prohibit a participant from declaring itself inflexible when abnormal plant conditions or abnormal operating conditions do not exist. Further, the NER do not require a participant to advise NEMMCO when abnormal plant conditions or abnormal operating conditions cease to exist and, therefore, when the participant's inflexibility status is no longer justified.

Despite ambiguity in the current version of the NER, the objective underlying the relevant provisions is that a market participant should only be entitled to declare itself inflexible for technical reasons. Otherwise, system security may be compromised and the ability of the market to produce truly competitive outcomes could be affected, as experienced during the 31 October 2005 and other similar events. This Rule change proposal seeks to make it clear that a declaration of inflexibility is only permitted when abnormal plant conditions or abnormal operating conditions exist.

This Rule change proposal has the support of NEMMCO. The proposal has also been discussed with the National Generators Forum.

More details about the basis upon which the AER requests the AEMC to make changes to the relevant provisions of the NER are contained in the attached document.

If you have any questions in relation to this investigation please do not hesitate to contact either Peter Adams on (08) 8213 3408 or me on (03) 9290 1421

Yours sincerely

Steve Edwell
Chairman

NATIONAL ELECTRICITY LAW

REQUEST FOR MAKING OF A RULE RELATING TO TECHNICAL PARAMETERS

A. NAME AND ADDRESS OF PERSON MAKING THE REQUEST

Australian Energy Regulator
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B. INTRODUCTION

The efficient and secure operation of the national electricity market (NEM) hinges on the ability to instantaneously match supply and demand of electricity. A centrally coordinated dispatch process has been established under the National Electricity Rules (NER), which allows demand for electricity to be matched with generating capacity at a given point in time during a trading day.

Every trading day, generators provide NEMMCO – the operator of the central dispatch process – with an energy market offer and/or an offer for frequency control ancillary services (FCAS) for each of their scheduled generating units for every five minute dispatch interval during the day. These offers include details related to a generator's generating capacity. Generators are bound by their offers once made. Nevertheless, the NER provide generators with some flexibility to vary particular parameters following submission of their offers, provided that certain conditions specified in the NER have been met.

A fundamental principle underlying the Rules that relate to the dispatch process is that power system security is paramount. Accordingly, the Rules reflect a hierarchy of arrangements that is designed to protect system security.

One set of Rules relates to technical/physical parameters – that is, those parameters that relate to physical or technical capabilities. The bidding and rebidding of these parameters may have an impact upon system security. Such parameters are to be contrasted with purely commercial parameters - namely, whether or not a generator is available[1] and the price and volume at which the generator is willing to supply. If the set of Rules relating to technical/physical parameters does not serve to protect power system security in the context of an incident, NEMMCO can issue system security directions as a mechanism of last resort.

This Rule change proposal fulfils a commitment made by the AER following its investigation into the events of 31 October 2005 to consider the appropriateness of the ability to bid and rebid physical/technical bid parameters to pursue commercial objectives when power system security may be compromised.[2]

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[1] A distinction is drawn in the NER between, on the one hand, physical availability of generators (PASA availability, which is used by NEMMCO in the assessment of adequate generation reserves) and, on the other hand, a generator's availability to be dispatched in the market on the basis of commercial considerations.

[2] The events of 31 October 2005 Investigation Report – published October 2006, p. 9..

The AER has discussed this Rule change proposal with NEMMCO and the National Generators Forum (NGF). NEMMCO supports the Rule change proposal. The NGF has indicated that, overall, the proposed changes appear reasonable.

C. STATEMENT OF ISSUES

1. Ramp rates

i Summary

As part of an energy market offer, a scheduled generator is obliged under the NER to provide NEMMCO with details of the rate at which the output of the generator may vary up and down of their respective generating units. This is generally referred to as the generator's ramp rate and is measured in MW/minute.

Scheduled generators have the ability to rebid their ramp rates during a dispatch interval. The NER provides that offers and rebids be made in good faith. That is, there needs to be an intention to honour the offer, including ramp rates, unless the material conditions and circumstances upon which the original offer was based change. However, the NER does not otherwise restrict the ability to rebid ramp rates.

The AER considers that the provisions of the NER relating to ramp rates, including the ability to bid and rebid ramp rates, were intended to be linked to physical or technical capabilities of the relevant plant or equipment. Nevertheless, this linkage is not made explicit in the NER, which means that ramp rates may be bid and rebid to pursue commercial objectives, even in circumstances when system security is or might be compromised. Precedents of this occurring in the past have affected NEMMCO's ability to ensure security of the system. This Rule change proposal seeks to ensure that these instances are minimised.

The focus of the Rule change proposal is on the bidding and rebidding of ramp rates by generators, as this is the context within which system security concerns have arisen. However, for the sake of consistency, the Rule changes are proposed to cover all participants to whom obligations regarding ramp rates apply.

ii Current Rules

<u>Notification of maximum and normal ramp rates before participation in the NEM</u>

Clause 3.13.3 provides, *inter alia*, that scheduled generators must provide NEMMCO with offer data in accordance with schedule 3.1. In turn, schedule 3.1 provides that scheduled generators must provide generating data including "normal and maximum ramp rates". The term "ramp rates" is defined in the NER as "the rate of change of active power supplied from a generating unit".

Schedule 3.1 requires that normal and maximum ramp rates must be submitted to NEMMCO by scheduled generators at least six weeks before commencing participation in the market. In other words, the obligation in schedule 3.1 regarding notification of ramp rates is a one-off

obligation that must be complied with prior to participation in the market.[3] It would, therefore, appear that the details regarding ramp rates provided to NEMMCO before a generator commences participation in the market are largely linked to normal and maximum *design* capabilities (i.e. the capability of the relevant plant based on the relevant technical/engineering specifications), although this is not explicit in the text of schedule 3.1 itself.

Notification of ramp rate constraints 2 days before trading day

Information regarding a generator's ramp rates must also be supplied on a more short-term basis. Specifically, clause 3.8.4(c) of the NER obliges scheduled generators to provide NEMMCO with details of any "ramp rate constraints" two days ahead of each trading day.

While the phrase "ramp rate constraints" is not defined as a single term in the NER, the term "constraints" is defined as a limitation on the capability of a generating unit such that it is unacceptable to generate the level of electrical power that would occur if the limitation was removed. Accordingly, when the NER definitions of "ramp rates" and "constraints" are read together, the phrase "ramp rate constraints" would appear to be a reference to short-term operational *limitations* on ramp rates that may exist at a particular point in time in contrast to the *designed* ramp rates capability, which is notified under schedule 3.1 before commencing participation in the market.

Notification of ramp rate capability during pre-dispatch period

Before the pre-dispatch period commences, generators must submit dispatch offers in accordance with clause 3.8.5 and the spot market timetable. Clause 3.8.6(b) of the NER requires that the dispatch offer specify for each of the 48 trading intervals in the relevant trading day, "a MW/min ramp rate capability".

The ramp rate capability announced as part of a generator's pre-dispatch offer under clause 3.8.6(b) may be different from the ramp rates announced by generators under schedule 3.1 before commencing participation in the market: the former would appear to concern short-term *operational* ramp rates limits based on physical/technical characteristics associated with the relevant plant or equipment when considered in the light of the prevailing conditions whereas the latter would appear to concern *design* capabilities.

The relationship, if any, between "ramp rate constraints" in clause 3.8.4(c) and "ramp rate capability" in clause 3.8.6(b) is not explicitly dealt with in the NER. In any case, both terms appear to concern physical/technical characteristics associated with the relevant plant or equipment, although this is not explicit in the text of the relevant provisions of the NER.

As a matter of practice, NEMMCO receives two ramp rates from generators during a dispatch interval – an "up" ramp rate for increases in generation levels and a "down" ramp rate for decreases in these levels. While these ramp rates are not usually explicitly designated as such, they would appear to be the *operational* ramp rates covered by clause 3.8.6.

[3] Schedule 3.1 additionally obliges generators to conduct an annual review of registered offer data, including ramp rates, and to notify any changes to NEMMCO.

Rebidding of ramp rates

After the pre-dispatch period commences, generators have the ability under clause 3.8.22(b) to vary their energy and FCAS offers, including "ramp rates of generating units",[4] but only if the requirements of clauses 3.8.22(c) and 3.8.22A have been satisfied.

Under clause 3.8.22(c), generators must provide a brief, verifiable and specific reason for the "rebid", which is defined as a variation made to an offer under clause 3.8.22. Pursuant to clause 3.8.22A, generators must also be able to demonstrate that the rebid was made in good faith – that is, at the time of making the original offer there was an intention to honour that offer if the material conditions and circumstances upon which the offer was made remained unchanged. However, there are no other restrictions on generators' ability to rebid ramp rates for their generating plant and equipment.

iii The problem

The events of 31 October 2005 triggered concern about the threat to system security that the variation of ramp rates by generators could pose in certain circumstances. On that day, the failure of a major transmission link between Wallerawang power station and the South Sydney substation in New South Wales caused significant disruption to the market. Network constraints were imposed as a result of the network outage. These network constraints had the effect of constraining the dispatch of some generation in the vicinity. However, NEMMCO's ability to reduce such generation was hindered by the rebidding of ramp rates to very low levels by certain generators. In particular, in order to reduce the commercial impact of the network constraints, certain generators who were at risk of having their generation levels reduced, lowered the rate at which their dispatch targets could be changed through their ramp rates. This had the effect of limiting the rate at which NEMMCO could require those generators to reduce their respective levels of generation in the face of the network constraints.

It was noted in the AER's investigation of the events of 31 October 2005 that the practice of rebidding ramp rates could have the effect of placing system security in jeopardy.[5] The AER explained in its report that reduced ramp rates could hinder the ability of market systems to rapidly adjust power flows to respond to issues that emerge in the market, as was the case on 31 October 2005. In NEMMCO's incident report for the same event,[6] NEMMCO stated that "[t]he insecurity persisted due to a combination of factors including limited ramp rate capability of NSW generating units, the constraining of interconnector flows, and a number of constraint formulation issues".

Events in Queensland in October and November of 2007 confirm that system security can be compromised through the rebidding of ramp rates.[7] Furthermore, the AER considers that, as transmission congestion builds over time, the system security threats posed by the rebidding of ramp rates in certain circumstances could also increase. Nevertheless, under the current drafting of clauses 3.8.22 and 3.8.22A, generators would theoretically be within their rights to vary the ramp rate capability announced during the pre-dispatch period, subject only to the

[4] Presumably, despite the difference in terminology, it would appear that "ramp rates of generating units" used in clause 3.8.22(b) is equivalent to "ramp rate capability" in clause 3.8.6(b). Therefore, in line with the definition of the latter explained earlier in this paper, the former term would appear to concern physical/technical characteristics associated with the relevant plant or equipment

[5] The events of 31 October 2005 Investigation Report – published October 2006, p. 9.

[6] NEMMCO power system incident report - Simultaneous Outage of 76 and 77 Lines - 31 October 2005 – published 5 March 2006.

[7] NEMMCO market event report - published 15 January 2008. NEMMCO's report states that sustained counter-price flows were brought about by factors including the offering of very low ramp rates of 1MW/min.

condition that a material change in the conditions on which the original offer was based has occurred (such as the imposition of binding network constraints). Currently, there is nothing in the NER that would prevent generators from varying their offer with respect to ramp rates in such circumstances, even if system security is threatened, even though the terms of the NER tend to support the view that ramp rate bids and rebids should reflect the physical/technical capability of the relevant plant and equipment.

The AER considers that bidding and rebidding a reduced ramp rate in pursuance of commercial objectives could have the effect of restricting NEMMCO's ability to take measures to maintain power system security, as was the case on 31 October 2005. Furthermore, the declaration of a ramp rate of zero, which has also occurred at times, is inconsistent with the concept of being a "scheduled generator" – that is, a generator that is willing and able to be scheduled in accordance with NEMMCO's instructions.[8]

iv Proposed solution

The AER believes that the various references to ramp rates in the NER indicate that the bidding and rebidding of ramp rates is intended to be linked to the technical characteristics and/or physical constraints associated with generators' plant or equipment. This view is supported by the fact that the market is operated by NEMMCO in such a way that network constraints will be violated before generator ramp rates.

Following discussions with the National Generators' Forum and NEMMCO, the AER considered a number of options to address the problems arising from the lack of explicit recognition in the NER that ramp rates should be treated as a physical/technical parameter, at least in certain circumstances. These options are identified below together with the AER's assessment of the relative merits of each option.

NEMMCO directions

One option would be to continue to allow generators to pursue commercial objectives through their ramp rate bids and rebids in all circumstances, unless NEMMCO issues directions under clause 4.8.9 of the NER to restrict the availability of this option. NEMMCO could, for example, direct a generator to increase its downward ramp rate in order to reduce the level of generation more rapidly when network constraints are being violated and the power system is considered not to be secure.[9]

However, the issuance of directions by NEMMCO under clause 4.8.9 is generally regarded as a mechanism of last resort to be used only when market failures arise and provides for participant compensation in such cases. This context for the use of clause 4.8.9 directions does not appear appropriate for the issuance of directions to generators merely to reduce supply when network constraints are being violated.[10] Furthermore, under these conditions, NEMMCO will normally have other security issues to manage. In these circumstances, it may be unreasonable to expect NEMMCO to issue directions resulting from reductions in

[8] The use of a ramp rate of zero is even more restricting than the use by generators of the inflexibility provisions, discussed below. A zero ramp rate means that a generator can change its output to any level and the dispatch process administered by NEMMCO must accommodate the new target. Inflexibility means that a generator remains at the fixed level that is offered into the systems.

[9] Network constraints can, at times, be invoked with little or no prior notice, for example following the loss of network equipment, or during unusual weather conditions that lead to the reclassification of the loss of multiple transmission lines as a credible contingency. This can lead to a sudden and significant change in network capability, which requires an equivalent reduction in generation output. If generation output is not reduced significantly then the network operation is no longer secure.

[10] In this regard, it should be noted that network constraints are violated relatively commonly (of the order of 3 times per day on average).

ramp rate capability in addition to executing its other responsibilities aimed at maintaining or re-establishing system security. This may result in delays when urgency is of utmost importance.

Physical parameter

Another option would be to limit generators' ramp rate bids and rebids to levels that correspond to the actual physical or technical capability of their plant.

This approach would appear to be consistent with the relevant provisions of the NER, which tend to indicate that the ramp rate is a technical, rather than commercial, parameter. This approach would also help to ensure that NEMMCO has at its disposal the highest level of flexibility that the market can provide to aid in the management of system security. For example, under this option, generators would not be able to alter their bid ramp rate following a step change in network capability unless the physical/technical capability of their plant justified the rebid.

While this option has the advantage of simplicity and tends to be supported by relevant provisions of the NER, there are certain efficiency costs associated with requiring generators' plant to operate at its technical limits at all times. Operating plant at, or close to, its ramp rate limits typically increases wear and tear and results in associated maintenance costs. These costs cannot be readily reflected in generators' offers for the supply of energy. Finally, this option could have the perverse effect of favouring or incentivising investment in slower technology and/or the reduction of the performance of existing plant to ensure that the technical downward ramp rate applicable to the plant is as low as possible.

Two tiered parameter – "technical" and "nominated commercial"

A variation of the preceding option would be to allow generators to vary their ramp rates to pursue commercial objectives, except in cases where network constraints would otherwise be violated. Under this option, when network constraints exist, generators would be bound by their physical/technical ramp rate capability.

The advantage of this option is that it accounts for the efficiency costs generators would bear if they were to be bound to their physical/technical ramp rate in all circumstances, while also recognising the need to ensure ramp rates reflect the technical capability of generation at times when the security of the power system may be at risk. Under this option, generators would have flexibility to pursue commercial objectives, in keeping with the objective expressed in clause 3.1.4 of the NER to allow market participants the greatest amount of commercial freedom to decide how they will operate in the market.

Nevertheless, there are certain disadvantages associated with this option. In particular, as in the case of the preceding option, this option could be viewed as favouring generators with slower ramp rates, whose designed downward ramp rates means that the impact of binding network constraints is less than for those generators with faster ramp rates. Another consequence of this option is that it could incentivise investment in slower technology and/or the reduction of the performance of existing plant. Finally, the practical implementation of this option is likely to be lengthy and complex from the perspective of both NEMMCO and generators.

Minimum ramp rates

A final option would be to require a participant's ramp rate bids and rebids to be at a level equal to or above a minimum ramp rate that would be applicable to all generators, unless there are verifiable practical/technical reasons for bidding or rebidding at a level below this minimum. Under this option, generators would have flexibility to bid or rebid ramp rates between the stipulated minimum ramp rate up to the maximum designed ramp rate capability for the relevant plant or equipment.

Assuming that an appropriate minimum ramp rate is identified, the AER considers that, under this option, the important system security concerns associated with the use of ramp rates under the present version of the NER would be addressed. The AER further considers that this option also eliminates or, at least, minimises the disadvantages associated with the other options that have been outlined above.

In particular, this option would provide NEMMCO with the requisite flexibility to manage system security when dealing with network constraints without having to worry about the possibility that generators will bid or vary their ramp rate bids so as to constrain the dispatch of generation when the network is constrained. This option also accounts for the efficiency costs generators would bear if they were to be bound by their physical/technical ramp rate in all circumstances by allowing generators to bid and rebid their ramp rates at any level above the stipulated minimum. Unlike the previous two options considered, this option does not result in discrimination between generators with slower ramp rates and those with faster ramp rates. In turn, this option would not result in perverse incentives to invest in slower technology and/or reduce the performance of existing plant.

The minimum ramp rate that the AER considers will achieve all the aforementioned objectives has been assessed as 3MW/min. This figure is somewhat pragmatic. It is designed to balance the financial wear and tear impact of lower ramp rates on generators with the system security requirements of NEMMCO. Analysis of bids for 2007 shows that all except for a handful of generators bid at 3MW/min or greater most of the time. This has occurred despite the lack of an explicit statement in the NER Rules that a ramp rate is a technical parameter. Past ramp rate bidding practices, therefore, suggest that a level of 3MW/min minimum ramp rate would not cause undue wear and tear on plant. Furthermore, NEMMCO is of the view that 3MW/min should accommodate the vast majority of system security issues that may arise in the context of the national electricity market. In the case of particularly unusual circumstances, NEMMCO has the ongoing ability to issue any necessary directions under clause 4.8.9, which would be guided by the actual ramp rate capability of the plant at the time of issuance.

Other options

For the sake of completeness, the AER notes that there may be other market-based options to address the system security issue that the bidding and rebidding of ramp rates might pose. In particular, the NER could be amended to establish better locational pricing signals that alter bidding/rebidding incentives for ramp rates. However, the AER is not proposing to pursue this option.

Implementation of the preferred option: minimum ramp rates

The attached Rule change proposal contained in Appendix A reflects the AER's preferred option – that is, minimum ramp rates. This option would not require major changes to NEMMCO's nor participants' systems and processes.

Rather, it would be incumbent upon generators to ensure that their ramp rate bids and rebids are between the stipulated minimum ramp rate and the maximum designed ramp rate (which is notified to NEMMCO under schedule 3.1). Rebidding of ramp rates would not be subject to the good faith requirement contained in clause 3.8.22A of the NER. However, if generators' ramp rate bids and rebids fall below the stipulated minimum ramp rate, they would be required to notify NEMMCO of the practical/technical justification for this. The reasons provided by generators in such circumstances could be the subject of an audit by the AER.

In the case of plant and equipment that for practical/technical reasons can never operate at a ramp rate above the prescribed minimum, the Rule change proposal would require the market participant to notify NEMMCO of the technical details justifying the ramp rate of less than 3MW/min.

v How amendment of the proposed solution will contribute to the achievement of the NEM objective

The proposed Rule change regarding ramp rates in Appendix A will assist NEMMCO to maintain system security during critical periods when network constraints are binding. In turn, this will facilitate smooth and efficient operation of the spot market, which is one of NEMMCO's core functions. In addition, the amendment will contribute more broadly to the achievement of the NEM objective by clarifying what is currently implicit in the NER, which in turn will enhance enforceability of the relevant provisions of the NER. This will ultimately work to the benefit of all market participants and stakeholders.

vi Benefits and costs and potential impact on those likely to be affected by Rule change

The most significant benefit of the Rule change proposal is that it effectively limits the bidding and rebidding of reduced ramp rates in cases where such bids and rebids could have the effect of restricting NEMMCO's ability to take measures to maintain power system security. Requiring generators to bid ramp rates above 3MW/min, unless there is a verifiable physical/technical reason not to do so, should accommodate the majority of system security issues that may arise in the context of the national electricity market.

The Rule change proposal is unlikely to impose significant costs on generators. Historical evidence indicates that most generators bid at 3MW/min or greater most of the time, even in the absence of a requirement in the NER to do so. This suggests that imposing 3MW/min as the minimum ramp rate that may be bid and rebid by generators would not cause undue wear and tear on generators' plant.

Additionally, the Rule change proposal would not require major changes to NEMMCO's or participants' systems and processes. The only significant practical change needed to implement the Rule change proposal would be for participants to institute mechanisms to

ensure that their ramp rate bids and rebids are between the stipulated minimum ramp rate and the maximum designed ramp rate and to notify NEMMCO if the ramp rate falls below the minimum.

2. Frequency control ancillary service

i Summary

Offers for the supply of frequency control ancillary services (FCAS) include a capability specification that takes the form of an FCAS trapezium, which defines the enablement limits and response breakpoints for a particular generating unit. In essence, the trapezium indicates the maximum amount of FCAS that can be provided for a given MW output level for the generating unit.[11]

The AER considers that the FCAS trapezium is designed to represent technical limitations associated with the plant that will be supplying FCAS, although this is not stated explicitly in the NER. This is apparent from the fact that the FCAS trapezium, which is defined by the enablement limits and response breakpoints, is a construction designed to determine the respective amounts of energy and FCAS that a generator is capable of providing. Nevertheless, the NER does not prevent FCAS enablement limits, response capability and response breakpoints from being bid or rebid to pursue commercial objectives, even in circumstances when system security is or might be compromised. Precedents of this occurring in the past have affected NEMMCO's ability to ensure security of the system. This Rule change proposal seeks to ensure that these instances do not recur.

ii Current Rules

Clause 3.8.7A of the NER contains the requirements that must be complied with in making an FCAS offer prior to a trading day. Clause 3.8.7A(j) provides that market ancillary service offers must include the response breakpoint,[12] the upper and lower enablement limits[13] and the response capability.[14] These parameters are used to construct the FCAS trapezium, which, as previously mentioned, is a construction used to determine, from a technical perspective, the respective amounts of energy and FCAS that a generator is capable of providing simultaneously. Nevertheless, the NER does not explicitly state that FCAS parameters are physical/technical parameters rather than those that are purely commercial in nature.

Under clause 3.8.22(b), generators may alter the availability, enablement limits, response capability and response breakpoints associated with its FCAS offer up to the time of dispatch. As in the case of rebids made with respect to other parameters under clause 3.8.22, the only requirements that must be fulfilled by generators regarding rebids for FCAS are that a brief, verifiable and specific reason is needed for the rebid (clause 3.8.22(c)(2)) and the rebid must be made in good faith (clause 3.8.22A(a)) – that is, at the time of making the rebid, the

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[11] Additionally, generators offer the availability and price of FCAS on a commercial basis, which is not considered here.

[12] A "response breakpoint" is defined in the NER as: (a) in relation to an FCAS offer to raise the frequency of the power system, the level of associated generation or load above which the amount of response specified in the offer reduces with increased generation or load level; and (b) in relation to an FCAS offer to lower the frequency of the power system, the level of associated generation or load below which the amount of response specified in the offer reduces with increased generation or load level.

[13] The term "enablement limit" with respect to an FCAS offer is defined in the NER as the level of associated generation or load above or below which no response is specified as being available.

[14] "Response capability" is defined in the NER as: (a) in relation to an FCAS offer to raise the frequency of the power system, the amount of the response which is specified in the offer for every level of associated generation or load below the associated response breakpoint; and (b) in relation to an FCAS offer to lower the frequency of the power system, the amount of the response which is specified in the offer for every level of associated generation or load above the associated response breakpoint.

material conditions and circumstances upon which the original offer was made have changed. The NER does not contain any requirement that rebids of FCAS parameters must be linked to actual physical/technical constraints associated with generators' plant and equipment.

iii The problem

There have been instances in the past when FCAS trapeziums have been varied through the rebidding process under clause 3.8.22 of the NER to prevent the reduction of energy supply by a particular generator in cases where network constraints would have otherwise resulted in that generator's dispatch target being reduced.

Such rebidding can pose a threat to system security, as illustrated by the events of April and May of 2004 in the Latrobe Valley, Victoria. Network constraints at the Hazelwood terminal station had an impact on all generators located behind that constraint affecting up to 2,600MW of generation. Changes to the FCAS trapezium by one participant[15] meant that it was "trapped" at close to maximum output.[16] In practical terms, this meant that the level of energy output of the trapped generators could not be reduced. This situation was compounded by the fact that the other generators located behind the Hazelwood constraint were ramp rate limited or declared inflexible (the latter issue is discussed later in this paper), which also prevented their supply of energy being reduced and, in turn, had consequences for system security.

Subject to clauses 3.8.22 and 3.8.22A, generators have almost complete freedom to vary the FCAS trapezium up to the time of dispatch. Currently, there is nothing explicit in the NER that would prevent generators from varying their offer with respect to FCAS where binding network constraints are imposed, even if system security is threatened.

The AER considers that bidding and rebidding enablement limits, response capability and response breakpoints associated with an FCAS trapezium in pursuance of commercial considerations can restrict NEMMCO's ability to take measures to maintain power system security, as became evident throughout April and May of 2004 in the Latrobe Valley. Furthermore, the AER believes that the FCAS trapezium, which represents the capability of plant to provide frequency control ancillary services, is intended to reflect the technical characteristics and/or physical constraints associated with generators' plant/equipment. This view is supported by the fact that the market is operated in such a way that network constraints will be violated before parameters associated with the FCAS trapezium. The position of FCAS parameters in the constraint violation hierarchy ensures the market does not operate in such a way that plant and equipment will be damaged.

iii The proposed solution

Market participants have the option whether or not to provide FCAS services. The AER proposes that, when a market participant decides to provide such services, the bidding and rebidding of enablement limits, response capability and response breakpoints should represent the technical/physical capability of the generators' plant. This will ensure that a

[15] Specifically, the generator in question increased its enablement limits so that the upper limit was close to maximum output and the lower limit was only a relatively small amount of energy below the upper limit.

[16] A generator is "trapped" when the level of energy it is supplying falls within the boundaries of its FCAS trapezium. Technical limitations associated with the linear program that optimises dispatch means that the generator can only be dispatched to supply less or more than the energy within the boundaries of its FCAS trapezium if it rebids the enablement limits of its FCAS trapezium or does not conform with its dispatch instruction.

generator cannot prevent NEMMCO from reducing the amount of energy it is supplying when system security demands otherwise, unless real technical or physical constraints exist.

The proposal would entail introduction of a new and a minor consequential amendment to clause 3.8.7A of the NER, dealing with market ancillary services offers. A draft of the proposed rule is contained in Appendix B.

iv How the proposed solution will contribute to the achievement of the NEM objective

The Rule change proposal will assist NEMMCO to operate the national electricity market so that electricity supply is secure. In particular, by preventing scheduled generators from varying their FCAS offer to pursue commercial objectives, NEMMCO will be able to respond more effectively to contingency events and during periods when network constraints are binding. This will help to facilitate smooth and efficient operation of the spot market, one of NEMMCO's core functions.

v Benefits and costs and potential impact on those likely to be affected by Rule change

By linking FCAS bidding and rebidding to the technical/physical capacity of a generator's plant, the Rule change proposal will allow NEMMCO to respond more effectively to events that compromise system security.

The costs to generators associated with this Rule change proposal would be limited. They would merely need to institute mechanisms to ensure that bids and rebids for FCAS parameters correspond to actual technical capability. Most generators treat FCAS parameters as technical parameters in any case.

4. Inflexibility

i Summary

At any time after a scheduled generator or other market participant has lodged its dispatch offer, during or after commencement of the pre-dispatch period, the generator must declare itself "inflexible" – that is, it is unable to operate in accordance with NEMMCO's dispatch instructions[17] – if the conditions in 3.8.19(a) of the NER have been met. Clause 3.8.19(a) explicitly states that the declaration in question must be "due to abnormal plant conditions or other abnormal operating requirements". Pursuant to clauses 3.8.19(b)(1) and 3.8.22(c)(2), a brief, verifiable and specific reason must be given to justify a rebid on the ground of inflexibility in reliance upon clause 3.8.19.

In essence, clause 3.8.19 requires participants to advise NEMMCO of inflexibility once it reasonably expects that the grounds to do so exist. However, the NER do not explicitly prohibit a participant from advising NEMMCO of inflexibility in the absence of those grounds. Nor do the NER explicitly require a participant to advise NEMMCO once those grounds cease to exist. Accordingly, a participant could theoretically have inflexibility status

[17] The term "inflexible" is defined in the NER as meaning that the generating unit in question "is only able to be dispatched in the trading interval at a fixed loading level specified in accordance with clause 3.8.19(a)".

by notifying NEMMCO under clause 3.8.19 even if abnormal conditions do not exist or if such conditions have ceased to exist.

ii Current Rule

Clause 3.8.19(a), which is cast in mandatory terms, requires generators to bid "inflexible" in the limited circumstances specified in that clause - that is when "abnormal plant conditions or other abnormal operating requirements" exist. A literal interpretation of this clause suggests that, when those limited circumstances do not exist, clause 3.8.19(a) does not apply to a generator's decision as to whether or not to inform NEMMCO that it is inflexible. In other words, this would mean that a generator could declare itself inflexible on any grounds but would only be *obliged* to declare itself inflexible in the circumstances specified in clause 3.8.19(a). However, such an interpretation would appear to be at odds with the purpose underlying that clause – namely, to allow a generator to bid "inflexible" only if justified on the grounds of technical characteristics and/or physical constraints associated with generators' plant/equipment.

iii The problem

Since the NEM commenced there have been a number of instances of conduct by participants which was not in accordance with the object underlying clause 3.8.19 of the NER.

In particular, units have been declared inflexible where participants have subsequently admitted that there were no abnormal conditions and that they had erred in declaring unit(s) inflexible. Two such occasions were the events of 19-20 December 2001 and 22 March 2006. In relation to both these events, the regulator chose not to take action for a breach of clause 3.8.19, preferring instead to take action for a breach of clause 3.8.22(c)(2)(i) on the basis that the reason submitted to NEMMCO on both occasions did not fully satisfy the requirement to be brief, verifiable and specific. In both cases, the regulator's position was influenced by the absence of an explicit prohibition in the NER against the use of inflexibility even when the grounds specifically provided for under clause 3.8.19(a) (i.e. abnormal conditions) do not exist. The absence of an explicit prohibition cast doubt on the prospects of successful action under that provision.

The events of 19-20 December 2001

In May 2002, NECA wrote to participants regarding the use of dispatch inflexibility bids and rebids in the following terms:

> "The intent of the market rules is that the dispatch inflexibility provisions should be used only in response to abnormal plant conditions or other abnormal operating requirements in respect of a specific **unit. It is crucial to the efficiency, and indeed ultimately the security, of the market that the 'must run' provisions are used only in response to genuine technical operating requirements. Units** declared inflexible are treated outside the normal pricing and dispatch arrangement. This in turn limits the market's ability to achieve competitive outcomes. Moreover, abuse of those provisions could potentially threaten the safe and/or secure operation of the power system. At the extreme, it could lead to market failure and to intervention by NEMMCO to manage the operation of the system by direction."

This letter followed the National Electricity Tribunal's decision on the events of 19-20 December 2001, which included an order that the participant pay $10,000 for breach of clause 3.8.22(c)(2)(i). NECA's report of the investigation noted that the reasons given by the

participant for the majority of the dispatch inflexibility rebids did not, by its own admission, accord with the object of the provision. Further, in that report, NECA noted that, on a number of occasions in the past, it had drawn the market's attention to questionable uses of the inflexibility provisions. Ultimately, the decision to take action against the participant under clause 3.8.22(c)(2) rather than clause 3.8.19 was influenced by the lack of an explicit prohibition under clause 3.8.19(a).

The events of 22 March 2006

The AER's investigation of events of 22 March 2006 revealed that the inflexibility provision had been used (again by the participant's own admission) where there were no qualifying circumstances. The AER issued an infringement notice for a breach of clause 3.8.22(c)(2)(i) with respect to these events, but did not take action for a breach of clause 3.8.19(a).

In its media release on 31 August 2006, the AER stated:

> " …it is critical that the inflexibility provisions are used only where abnormal operating conditions exist. If generators inappropriately declare themselves inflexible it has the potential to impact on the efficient dispatch of the market and threaten the safe and secure operation of the power system.
>
> For these reasons, the AER carefully monitors and rigorously enforces this area of the rules to ensure that bidding inflexible is used only exceptionally and in response to genuine technical operating requirements. The AER's enforcement tools range from the infringement notice used in this case, to legal action seeking penalties of up to $100,000."

iv Proposed solution

In relation to both of the events described above, the degree of potential harm to users was stressed by the regulator. However, the lack of clarity concerning the circumstances in which clause 3.8.19 applies means that generators may be able to declare themselves "inflexible" despite the absence of abnormal plant or operating conditions and even though such a declaration could threaten system security. This potential threat to system security could be resolved by redrafting clause 3.8.19(a) to make it clear that generators are only entitled to declare themselves "inflexible" in cases where technical/physical constraints justify such a declaration.

The AER does not propose any modification to the circumstances in which inflexibility may be used. Rather, the AER merely proposes amendments to make the prohibition of the improper use of the inflexibility provisions explicit.

v How the proposed solution will address the system security issue and contribute to the achievement of the NEM objective

Units declared inflexible are treated outside the normal pricing and dispatch arrangements. If inflexible bidding was allowed to occur for reasons other than in the case of "abnormal conditions" such as to pursue commercial objectives, the market's ability to deliver competitive outcomes would be limited. Further, if the use of these provisions in the absence of abnormal conditions became commonplace, it could threaten the safe and secure operation of the power system by NEMMCO by restricting its ability to manage events. The AER considers that the amendment proposed in Appendix C will avoid these outcomes.

In addition, the amendment will contribute more broadly to the achievement of the NEM objective by enhancing the efficient operation of the market. In particular, distortions to *efficient* dispatch prices through bids being treated outside the merit order will be minimised since it will be beyond doubt following the Rule change that usage of the inflexibility provisions is restricted to the existence of 'abnormal conditions'. Furthermore, the requirement for information to be passed on as soon as practicable once a reasonable expectation of the basis for inflexibility disappears will provide the opportunity for more efficient outcomes whereby competitive responses once the constraint is removed can occur at the earliest possible stage.

The amendment will also enhance the AER's ability to enforce clause 3.8.19, which in turn will help to maintain system security as well as the efficient dispatch outcomes in the NEM.

vi Benefits and costs and potential impact on those likely to be affected by Rule change

A key benefit of the Rule change proposal is to enhance the safe and secure operation of the power system by NEMMCO by preventing market participants from declaring themselves inflexible in the absence of abnormal plant or operating requirements.

The costs to generators associated with this Rule change proposal would be limited. They would merely need to institute mechanisms to ensure that their plant and equipment is only bid inflexible when abnormal plant or operating conditions exist.

APPENDIX A

RULE CHANGE REQUEST – RAMP RATES

TEXT OF PROPOSED AMENDMENTS

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1. Insert a new clause 3.8.3A

3.8.3A Special provisions relating to ramp rates

A new clause 3.8.3A has been included in the Rule change so that the principles governing the bidding and rebidding of ramp rate, and other related matters, can be dealt with in one clause, rather than repeating them in different places of the NER.

(a) This clause 3.8.3A applies to *ramp rates* provided to *NEMMCO* in accordance with the following clauses:

With respect to notification of scheduled capacity prior to *dispatch*:
(1) clause 3.8.4(c);
(2) clause 3.8.4(d);
(3) clause 3.8.4(e);

With respect to offers for *dispatch*:
(4) clause 3.8.6(b);
(5) clause 3.8.6A(b);
(6) clause 3.8.7(c); and

With respect to *rebids*:
(7) clause 3.8.22(b).

This clause sets out the various ramp rate provisions that the new clause 3.8.3A applies to.

(b) Subject to clauses (c) and (i), a *Scheduled Generator, Market Customer* or *Market Network Service Provider* must provide a *ramp rate* to which this clause 3.8.3A applies that is:

(1) at least 3MW/min; and
(2) at most the relevant *maximum nameplate ramp rate* provided in accordance with clause 3.13.3(b).

This clause requires parties to provide a ramp rate of at least 3MW/min and at most the maximum nameplate ramp rate. It is intended to be a civil penalty provision. As a result, if the AER thinks this clause has been breached, it can use its information gathering powers in section 28 of the NEL to investigate and take action, if necessary.

The following exceptions to this clause apply (these exceptions are set out further below):

- clause 3.8.3A(c) – which allows ramp rates of less than 3MW/min for physical and safety reasons; and

- clause 3.8.3A(i) – which exempts generating units etc that will never attain ramp rates of 3MW/min from these obligations and the related reporting requirements.

NB: The AER intends that clause 3.8.3A(b) be a civil penalty provision. An appropriate insertion in Schedule 1 of the National Electricity (South Australia) Regulations will be necessary to achieve that outcome.

(c) A *Scheduled Generator, Market Customer* or *Market Network Service Provider* may provide a *ramp rate* to which this clause 3.8.3A applies that is less than 3MW/min if the *ramp rate* is necessitated by an event or other occurrence that:

(1) physically prevents the relevant *generating unit, scheduled load* or *scheduled network service* from attaining a *ramp rate* of at least 3 MW/min; or
(2) makes it unsafe for the relevant *generating unit, scheduled load* or *scheduled network service* to operate at a *ramp rate* of at least 3 MW/min.

This clause allows ramp rates of less than 3MW/min for physical and safety reasons.

(d) Where a *Scheduled Generator, Market Customer* or *Market Network Service Provider* provides a *ramp rate* to which this clause 3.8.3A applies, that is less than 3MW/min, it must provide a *ramp rate* that is at least the maximum the relevant *generating unit, scheduled load* or *scheduled network service* can safely attain at that *time*.

This clause requires a ramp rate of less than 3MW/min to be the maximum the generating unit etc can safely attain. It is intended to be a civil penalty provision. As a result, if the AER thinks this clause has been breached, it can use its information gathering powers in the NEL and the NER to investigate.

NB: The AER intends that clause 3.8.3A(d) be a civil penalty provision. An appropriate insertion in Schedule 1 of the National Electricity (South Australia) Regulations will be necessary to achieve that outcome.

(e) Where a *Scheduled Generator, Market Customer* or *Market Network Service Provider* provides a *ramp rate* to which this clause 3.8.3A applies that is less than 3MW/min, it must simultaneously provide *NEMMCO* with a brief, verifiable and specific reason why the *ramp rate* is below 3MW/min.

This clause requires a party providing a ramp rate of less than 3MW/min to provide NEMMCO with a reason why. The reasons would be provided through NEMMCO's electronic bidding systems and would, ultimately, be accessible by the AER.

(f) The AER may require, in writing, a *Scheduled Generator, Market Customer* or *Market Network Service Provider* to provide such additional information as it may require from time to time to substantiate and verify a reason provided in accordance with clause 3.8.3A(e).

This clause allows the AER to audit a reason for a generating unit etc not attaining a ramp rate of 3MW/min. An audit might demonstrate a breach of either clauses 3.8.3A(b) or (d). If so, civil penalties would apply.

(g) The AER must exercise its powers under clause 3.8.3A(f) in accordance with any guidelines issued by the *AER* from time to time in accordance with the *Rules consultation procedures.*

This clause is similar to the existing obligations on the AER concerning its auditing functions under clauses 3.8.19(b)(2) and 3.8.22(c)(3). If guidelines exist regarding the conduct of audits under clause 3.8.3A(f), the AER must act in accordance with those guidelines.

(h) Where a *Scheduled Generator, Market Customer* or *Market Network Service Provider* provides a *maximum nameplate ramp rate* of less than 3MW/min in accordance with clause 3.13.3(b), it must provide *NEMMCO* with a verifiable and specific reason for the *ramp rate* being below 3MW/min.

This clause requires a party providing a ramp rate of less than 3 MW/min in its registered bid and offer data to provide NEMMCO with a reason why.

(i) Clauses 3.8.3A(b), 3.8.3A(c) and 3.8.3A(e) do not apply to a *ramp rate* provided by a *Scheduled Generator, Market Customer* or *Market Network Service Provider* where the *maximum nameplate ramp rate* of its *generating unit, scheduled load* or *scheduled network service* as appropriate is less than 3MW/min and has notified NEMMCO under clause 3.8.3A(h).

This clause excuses generating units etc that will never attain 3MW/min from having to attain ramp rates of 3MW/min or from constantly giving reasons for ramp rates that are below 3MW/min. To be exempted, the generating unit etc must have a maximum nameplate ramp rate of less than 3MW/min.

(j) In addition to the obligations in clause 3.8.3A(d), where clause 3.8.3A(i) applies, the *Scheduled Generator, Market Customer* or *Market Network Service Provider* must only provide *ramp rates* to which this clause applies that are, at most, the *maximum nameplate ramp rate* for the relevant *generating unit, scheduled load* or *scheduled network service*.

This clause requires a Scheduled generator etc with a generating unit etc that has a maximum nameplate ramp rate of less than 3MW/min to provide ramp rates that are no more than the maximum nameplate ramp rate.

NB: The AER intends that clause 3.8.3A(j) be a civil penalty provision. An appropriate insertion in Schedule 1 of the National Electricity (South Australia) Regulations will be necessary to achieve that outcome.

2. Amend clause 3.8.4 as follows:

The amendment to this clause and to 3.8.6, 3.8.6A and 3.8.7 (dealt with below) seek to harmonise terminology relating to ramp rates throughout rule 3.8.

All *Scheduled Generators* and *Market Participants* with *scheduled generating units, scheduled network services* and/or *scheduled loads* must inform *NEMMCO* of their available capacity as follows in accordance with the *timetable*:

(a) *Scheduled Generators* and *Market Participants* must notify *NEMMCO* of the available capacity of each *scheduled generating unit*, *scheduled network service* and/or *scheduled load* for each *trading interval* of the *trading day*;

(b) subsequent *changes* may only be made to the information provided under clause 3.8.4(c), (d) and (e) in accordance with clause 3.8.22;

(c) for *Scheduled Generators*, two *days* ahead of each *trading day*:
  (1) a MW capacity profile that specifies the MW available for each of the 48 *trading intervals* in the *trading day*;
  (2) estimated *commitment* or *decommitment* times;
  (3) daily *energy* availability for *energy constrained generating units*; and
  (4) a *ramp rate* ~~*constraints*~~;

(d) for *scheduled loads*, two *days* ahead of each *trading day*:
  (1) a MW capacity profile that specifies the MW available for *dispatch* for each of the 48 *trading intervals* in the *trading day*;
  (2) daily *energy* availability for *energy constrained scheduled load*; and
  (3) a *ramp rate* ~~*constraints*~~;

(e) for *scheduled network services*, two *days* ahead of each *trading day*:
  (1) a MW capacity profile that specifies the *power transfer capability* in each direction available for each of the 48 *trading intervals* in the *trading day;* and
  (2) a *ramp rate* ~~*constraints*~~.

3. Amend clause 3.8.6(b)(3) as follows:

  (3) a MW/min *ramp rate* ~~capability~~;

4. Amend clause 3.8.6A(b)(2) as follows:

  (2) a MW/min *ramp rate* ~~capability~~;

5. Amend clause 3.8.7(c)(2) as follows:

  (2) a MW/min *ramp rate* ~~capability~~;

6. Amend Clause 3.8.22A(a) as follows:

(a) *Scheduled Generators* and *Market Participants* must make *dispatch offers, dispatch bids* and *rebids* in relation to *available capacity* and daily *energy constraints* in good faith.

This amendment limits the good faith obligation so that it does not apply to physical issues i.e. ramp rates (dealt with in this part of the Rule change), dispatch inflexibilities, and the response breakouts, enablement limits and response limits of market ancillary services (dealt with later in this Rule change).

7. Amend Clause 3.8.22 (b) as follows:

   (b) Subject to clauses 3.8.3A, 3.8.7A(m)[18], 3.8.19(a)[19], 3.8.22(c) and 3.8.22A, a *Scheduled Generator* or *Market Participant* may vary its available capacity, daily *energy constraints*, *dispatch inflexibilities* and *ramp rates* of *generating units*, *scheduled network services* and *scheduled loads*, and the *response breakpoints*, *enablement limits* and response limits of *market ancillary services*.

8. Amend schedule 3.1 as follows:

The amendments to schedule 3.1 remove the requirement to provide NEMMCO with "normal ramp rates" and requires that the "maximum ramp rates" be maximum nameplate ramp rates i.e. physical ramp rates.

NB: data provided in accordance with schedule 3.1 must be reviewed and updated. Accordingly, when data is updated and maximum ramp rates are below 3MW/min, the AER will receive the relevant reasons and be able to audit those. The definition of maximum nameplate ramp rate ensures that these updates cannot be used to avoid the obligations in clause 3.8.3A.

Schedule 3.1 - Registered Bid and Offer Data

The *registered bid and offer data* are the standard data requirements for verification and compilation of *dispatch bids* and *dispatch offers* on the *trading day* schedule. All *Scheduled Generators* and *Market Participants* must notify *NEMMCO* of their *registered bid and offer data* in accordance with this schedule 3.1 in respect of each of their *scheduled loads* and *scheduled generating units* at least six weeks prior to commencing participation in the *market*.

Scheduled Generators and *Market Participants* must review their *registered bid and offer data* annually in accordance with the *timetable* advised by *NEMMCO* and provide details of any *changes* to *NEMMCO.*

Registered bid and offer data may be updated by a *Scheduled Generator* or *Market Participant* at any time but may be subject to audit at *NEMMCO's* request.

A copy of all *changes* to the data must be returned to each *Scheduled Generator* and *Market Participant* for verification and resubmission by the *Scheduled Generator* or *Market Participant* as necessary.

Registered bid and offer data may include tolerance levels.

[18] See Appendix B below regarding proposed amendments to clause 3.8.7A.
[19] See Appendix C below regarding proposed amendments to clause 3.8.19(a)..

Scheduled Generating Unit Data:

Data	Units of Measurement
Power station **information:**	
node number/identifier	
total station registered capacity	MW
total station *sent out* capacity at registered capacity	MW
daily *energy constraint*, if applicable	MWh per day
Generating unit **information:**	
full *load*	MW (*generated and sent out)*
normal or technical minimum *load*	MW (*generated and sent out)*
additional emergency *generation* above registered capacity	MW
~~normal and maximum~~ *maximum nameplate ramp rates*	MW/minute
response time to full *load* from cold standby	minutes
aggregation data	
capability chart	
notice to *synchronise*	minutes
Minimum shutdown time	minutes
maximum shutdowns per day	

Scheduled Load Data:

Data	Units of Measurement
node number/identifier	
normally on or *normally off*	
maximum load	MW
daily *energy constrain*t if applicable	MWh per day
~~normal and maximum~~ *maximum nameplate ramp rates*	MW/min

aggregation data	

Scheduled Network Service Data:

Data	Units of Measurement
node number/identifier for *connection points A* and *B*	
Registered *power transfer capability* to node 1 (may be seasonal etc)	MW
Registered *power transfer capability* to node 2 (may be seasonal etc).	MW
Additional transient *power transfer capability* in each direction	MW
~~Normal and maximum~~ *Maximum nameplate* ~~transfer~~ *ramp rates* for transfer (if applicable)	MW/min
Loss vs flow as piecewise linear relationships for each direction which, taken together, are convex over the entire range of *power transfer capabilities* in both directions	
Aggregation data	

Dispatch Inflexibility Profile

Data	Units of Measurement
Time for response from receipt of *dispatch* instruction from zero *load,* T1 (see clause 3.8.19(e)(1))	minutes
Time after T1 required to reach minimum loading level (see clause 3.8.19(e)(2))	minutes
Time after T2 for which *plant* must operate at or above the minimum *loading level* (see clause 3.8.19(e)(3))	minutes
Time required by *plant* to reduce from its minimum *loading level* to zero (see clause 3.8.19(e)(4))	minutes

minimum *loading level* (see clauses 3.8.19(e)(2),(3),(4))	MW

Aggregation Data

Where *dispatch bids* or *dispatch offers* are submitted for aggregated *generating units*, *market network services* or *loads* then, unless otherwise exempted by *NEMMCO*, each *Scheduled Generator* and *Market Participant* must provide the information required in accordance with this schedule 3.1 for each *generating unit*, *market network service* or *load* included in those *dispatch bids* or *dispatch offers* both separately and in aggregated form.

8. Insert the following definitions in Chapter 10

The amendments to relevant definitions in Chapter 10 make the definition of ramp rate clearer by making it more specific and requiring that a ramp rate be expressed in MW/min.

Adding a definition for maximum nameplate ramp rate ensures that the ramp rate provided in accordance with schedule 3.1 is either:

- the maximum ramp rate specified by the manufacturer; or
- independently certified to reflect changes in the physical capabilities of the equipment involved.

The definition of maximum nameplate ramp rate ensures that ramp rates provided in accordance with schedule 3.1 are physical maximums.

maximum nameplate ramp rate

The maximum *ramp rate* an item of equipment is capable of achieving in normal circumstances. This may be:

(a) as specified by the manufacturer; or
(b) as independently certified from time to time to reflect changes in the physical capabilities of the equipment.

ramp rate

The upward or downward rate of change (expressed as MW/min) of *active power* supplied from a generating unit, supplied to a *load* or transferred by a *scheduled network service*.

APPENDIX B

RULE CHANGE REQUEST – FCAS TRAPEZIUM

TEXT OF PROPOSED AMENDMENTS

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1. Amend clause 3.8.7A as follows:

The following requirements apply to all *market ancillary service offers* for each type of *market ancillary service*:

(a) the *market ancillary service offer* may contain up to 10 *price band*s;

(b) the *market ancillary service offer* must specify for each of the 48 *trading intervals* in the *trading day* an incremental MW amount for each *price band* specified in the *market ancillary service offer*;

(c) the MW quantities specified are to apply at the nominated *connection point* of the *Market Participant* or, with *NEMMCO's* agreement, at any other point in the *Market Participant's* electrical installation or on the *network*;

(d) the *ancillary service offer* must specify a price for each *price band* specified in the *market ancillary service offer*, in dollars and whole cents per MW per hour (an '*enabling price*'), and this price is to apply to the *price band* throughout the *trading day*;

(e) *enabling prices* for each *price band* specified in the *market ancillary service offer* must increase monotonically with an increase in available MWs;

(f) *enabling prices* are to apply at the nominated *connection point* of the *Market Participant* or, with *NEMMCO's* agreement, at any other point in the *Market Participant's* electrical installation or on the *network*;

(g) *enabling prices* offered must be equal to or greater than $0 per MW per hour and may not exceed *VoLL*;

(h) the *enabling price* for a *price band* is to be interpreted as the minimum price at which up to the specified MW response is to be enabled in the *central dispatch* process;

(i) the MW quantity in each *price band* in each *trading interval* must be specified in whole MW;

(j) the *market ancillary service offer* must include the following values:

(1) the *response breakpoint*;

(2) the upper and lower *enablement limits*; and

(3) the *response capability*; and

(k) an *Ancillary Service Provider* that submits a *market ancillary service offer* must ensure that the *ancillary service generating unit* or *ancillary service load*, as the case may be, is at all times capable of responding in the manner contemplated by the *market ancillary service specification*.

(l) the values associated with a *market ancillary service offer* referred to in clause 3.8.7A(j) must represent technical characteristics of the *ancillary service generating unit* or *ancillary service load*.

(m) rebids made under clause 3.8.22 of the values associated with a *market ancillary service offer* referred to in clause 3.8.7A(j) must represent technical characteristics of the *ancillary service generating unit* or *ancillary service load*.

NB: The AER intends that clauses 3.8.7A(l) and 3.8.7A(m) be civil penalty provisions. Appropriate insertions in Schedule 1 of the National Electricity (South Australia) Regulations will be necessary to achieve that outcome.

2. Amend clause 3.8.22(b) by inserting "3.8.7A" after the word "clauses". See Appendix A above.

APPENDIX C

RULE CHANGE REQUEST – INFLEXIBILITY

TEXT OF PROPOSED AMENDMENTS

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1. Amend clause 3.8.19(a) as follows:

"(a) ~~If a~~A *Scheduled Generator* or *Market Participant*:

(1) that reasonably expects one or more of its *scheduled generating units*, *scheduled network services* or *scheduled loads* to be unable to operate in accordance with *dispatch instructions* in any *trading interval*, due to abnormal *plant* conditions or other abnormal operating requirements in respect of that *scheduled generating unit*, *scheduled network service* or *scheduled load*, ~~it~~ must advise *NEMMCO* through the *PASA* process or in its *dispatch offer* or *dispatch bid including any rebid pursuant to 3.8.22*, in respect of that *scheduled generating unit*, *scheduled network service* or *scheduled load*, as appropriate under this Chapter, that the *scheduled generating unit*, *scheduled network service* or *scheduled load* is *inflexible* in that *trading interval* and must specify a fixed *loading level* at which the *scheduled generating unit*, *scheduled network service* or *scheduled load* is to be operated in that *trading interval*~~.~~;

(2) must not advise *NEMMCO* that a *scheduled generating unit*, *scheduled network service* or *scheduled load* is *inflexible* under clause 3.8.19(a)(1) unless it reasonably expects the *scheduled generating unit*, *scheduled network service* or *scheduled load* to be unable to operate in accordance with *dispatch instructions* in any *trading interval*, due to abnormal *plant* conditions or other abnormal operating requirements in respect of that *scheduled generating unit*, *scheduled network service* or *scheduled load*;

(3) must, as soon as practicable, advise *NEMMCO* that a *scheduled generating unit*, *scheduled network service* or *scheduled load* is not *inflexible* once it no longer reasonably expects the *scheduled generating unit*, *scheduled network service* or *scheduled load* to be unable to operate in accordance with *dispatch instructions* in any *trading interval*, due to abnormal *plant* conditions or other abnormal operating requirements in respect of that *scheduled generating unit*, *scheduled network service* or *scheduled load*."

2. Amend clause 3.8.19(b) by deleting the reference to "3.8.19(a)" and substituting "3.8.19(a)(1)".

3. Amend clause 3.8.22(b) by inserting "3.8.19(a)," after the word "clauses". See Appendix A above.

NB: The AER intends that clause 3.8.19 remain a civil penalty provision.