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Your project No.: ERC0075

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Dear John,

### **Contingency Administered Price Period Following a Physical Trigger Event**

Thank you for the opportunity to make a submission on the National Generator Forum's (NGF) proposed Rule change regarding the application of a Contingency Administered Price Cap (CAPP) following a non-credible contingency event (NCCE).

NEMMCO acknowledges the issue the NGF has raised regarding the risks to Generators under the current market design, and that the NGF has had discussions with NEMMCO in developing the proposal. However, NEMMCO does not support the proposed solution because:

- the proposed process is too complex; NEMMCO considers that it is impractical to implement in real time and likely to cause significant operational issues for NEMMCO;
- the analysis oversimplifies the impact on the market and does not consider options to address the issue, therefore the proposal does not fully explain whether it would contribute to the achievement of the national electricity objective (NEO) and the potential impact on those likely to be affected; and

- the proposal places a level of discretion on NEMMCO that appears to be inconsistent with recent Rule determinations made by the AEMC<sup>1</sup> that reduce NEMMCO's operational discretion.

The attached submission discusses NEMMCO's concerns with the implementation and analysis provided in the proposal. NEMMCO's views on market based approaches to addressing the issues raised is briefly discussed.

We look forward to the AEMC's consideration of our submission. NEMMCO appreciates the issues raised in this submission are complex and may require further explanation. As such, we would welcome the opportunity to discuss the matters raised in this submission. If the AEMC wishes to do so please contact Taryn Maroney on (02) 8884 5609.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Brian Nelson', with a long horizontal flourish extending to the right.

Brian Nelson  
Head of Regulatory Affairs and Compliance

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<sup>1</sup> In particular, National Electricity Amendment (Reclassification of Contingency Events) Rule 2008 No.8 and National Electricity Amendment (Setting VoLL Following the Shedding of Interruptible Load) Rule 2008 No.12.

## 1 Implementation Issues

NEMMCO considers the proposal is likely to create significant operational issues in managing the security of the power system following a major disruption. A review of NEMMCO's incident reports since 2006 identified six events that may have required application of the proposed CAPP as set out below.

Date	Incident	Impact
7 February 2006	Lightning strike	Loss of both Farrell – Sheffield transmission circuits, generation constraints, price in Tasmania spiked above Administered Price Cap ( <b>APC</b> )
22 March 2006	Cyclone Larry	Loss of north Queensland load & generation, Queensland price spiked below negative APC
14 July 2006	Crane contacted 330 kV transmission line	Loss of Bayswater – Liddell transmission circuit & an Eraring generating unit (660 MW), prices remained below current APC
16 January 2007	Victorian Bushfires	System separation and load shedding, prices in Victoria & SA above current APC, prices in Tasmania below negative APC
19 April 2007	Fault during restoration of a 132/66 kV transformer and subsequent fault on a 330 kV transformer at Wallerawang (although part of this incident might be considered a distribution network fault)	Loss of Wallerawang Units 7 & 8 (755 MW generation in total), price spike in NSW & Queensland
28 February 2008	330 kV equipment failure at Armidale	Loss of Queensland – NSW Interconnector, prices remained below current APC

From this analysis, NEMMCO observes that:

- candidate incidents are associated with significant disruption to the power system;
- many incidents result in short-term price “spikes”; and
- it is just as likely for an incident to result in large negative prices where an interconnector is constrained.

Following such an event, the power system may not remain in a satisfactory operating state. NEMMCO is usually involved in the following decisions when a major system event occurs:

1. Confirming the power system is in a satisfactory operating state.
2. If not, NEMMCO must restore immediately to a satisfactory state.
3. NEMMCO has 30 minutes to restore the power system to a secure operating state. To achieve this NEMMCO needs to consider striking a balance between:
  - timely and effective response versus inappropriate response due to inadequate analysis; and
  - unnecessary intervention versus continued reliance on normal market mechanisms in circumstances where these are inadequate.
4. Provide information to participants and stakeholders.

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5. If necessary initiate market processes such as intervention pricing, value of lost load (VoLL) override and price review.
6. When the power system is secure and supply capability is available NEMMCO must commence the load restoration process.

NEMMCO's experience is that control room staff are fully occupied during the first 30 minutes following a major system event. Given this, NEMMCO's main concern is that the proposed Rule would require system operators to make a number of determinations regarding the setting of a CAPP following a trigger event when their attention should be focussed on maintaining the security of the power system.

The following sections outline NEMMCO's considerations of the main processes that are the subject of this proposal.

### 1.1 Determining Whether a Trigger Event has Occurred

Under the proposed Rule, in order to determine whether a CAPP should be invoked NEMMCO must first identify if a trigger event has occurred. "A trigger event is any sequence of related events affecting the power system that has the following two characteristics:

- if the events in the sequence of events had occurred simultaneously, it would be regarded as a non-credible contingency event (NCCE) as this is currently defined in the Rules; and
- the sequence of events was not initiated by a failure of generating plant or, if it were, its effects were not contained within a power station site."<sup>2</sup>

The key concept for NEMMCO to consider is whether the events that form the trigger event are "related events". NEMMCO considers this would require consideration of:

- the time interval from the first to last events that form the trigger event;
- the physical proximity of any equipment that may have failed; and
- whether the initial event (such as a plant failure, lightning strike, etc.) has caused the subsequent events.

From discussions with the NGF, NEMMCO understands it intended only timeframes to be relevant in establishing whether a trigger event has occurred. As such, any automation would need to establish the trips that occurred around the same time as the trigger event rather than establishing whether there was a causal link between them. NEMMCO considers that automating the determination of a trigger event would only be possible, if this was the case. The outcomes (whether intended or not) of such an automation process include:

- a generating unit that trips as a result of a failure to meet its performance standards could be part of a valid sequence;
- failures of distribution equipment may or may not be part of a sequence, depending on the level of monitoring of that equipment by NEMMCO;
- it may be unable to distinguish between connection equipment failure of a generating unit and transmission equipment failure for some connection arrangements; and
- coincidental events that have no other relationship could be a trigger event.

This would be inconsistent with the drafting to the extent that:

- distribution equipment failures appear to be excluded in the definition of trigger event;

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<sup>2</sup> NGF, *Physical Market Cap Trigger Rule Change Proposal*, October 2008, p. 8.

- the use of the term “generating plant” in the definition of trigger event requires a knowledge of the location of the connection point;
- the definition of trigger event is broader than just consideration of timeframes; and
- arguably, coincidental events that are related only by time are not related events.

### 1.2 Establishing and Maintaining a List of Events

The Rule proposal requires that NEMMCO must establish and keep an updated list of events that occurred during or following the trigger event that, in NEMMCO’s reasonable opinion, would not occurred if the trigger event had not occurred. This list could include:

- the disconnection of a generating unit from the transmission network that has not synchronised but would in NEMMCO’s opinion be able to do so;
- material network constraint; or
- the outage of a transmission element.

The proposed Rule would give NEMMCO discretion over:

- what is to be published; and
- what events are included on the list.

NEMMCO notes that the elements of the list relating to generating units does not deal adequately with plant that does not “synchronise”, such as wind farms. Further, NEMMCO does not consider it appropriate that NEMMCO forms an opinion as to whether generating plant is able to be returned to service. Instead, this should be a matter for the responsible Registered Participant, with appropriate regulation to ensure the information reflects actual plant capability.

NEMMCO understands that the list includes material network constraints as a result of the trigger event; this implies that only binding constraints are to be included on the list. In practice, NEMMCO would need to invoke constraint equations in central dispatch to manage all relevant contingencies, but understands these would not be “listed” until the constraint equation is (1) binding; and (2) material.

The proposed Rule suggests that NEMMCO must notify Market Participants of its determination of the list of events; however, it is not clear what NEMMCO is meant to do with the list itself. NEMMCO also notes that the list includes capacity information and status of generating units, which is currently confidential information.

NEMMCO does not consider this aspect of the proposal could be automated as a single list. For example, the list of disconnections might need to be part of a manually produced Market Notice, while notification of material constraints may be able to be automated through the dispatch process.

Further, there is a risk that the proposed Rule could result in disputes over what is included in the list. Giving NEMMCO the discretion to determine this in the proposed consultation creates unnecessary risk for NEMMCO.

### 1.3 Determining a Material Impact on Dispatch and Commencement of the CAPP

The proposed Rule requires NEMMCO to determine whether the trigger event has had a material impact on dispatch by assessing whether:

1. one or more scheduled generating units aggregate available capacity exceeds the CAPP threshold for the region; or

2. a material network constraint exists.

Where this occurs, NEMMCO would be required to commence the CAPP.

### *Capp Threshold*

Under the NGF's proposal, a trigger event would only prompt the commencement of a CAPP if it has a material impact on dispatch which exceeds the CAPP threshold in a region. NEMMCO considers that the proposed levels may be low, contrary to the NGF's intention to ensure the CAPP is triggered infrequently. For example, the CAPP threshold could be at least greater than the size of the largest generating unit in a region. The proposed CAPP threshold definition uses the term "average-weather summer *maximum demand*", this should be amended to reflect terms used in the Statement of Opportunities since the NGF has linked these values to this.

### *Assessment of Material Impact on Dispatch*

NEMMCO considers the assessment of the first test is likely to be relatively straight forward. The material network constraint test would be automated by implementing a rerun of dispatch that allows the additional network constraints required by the trigger event to be violated; this would require manual intervention from control room staff. The degree of violation would be compared with the CAPP threshold to determine whether the event is material.

In the event of a major system event, the additional network constraints required to manage the power system may take up to 30 minutes after the event to invoke, particularly if new constraints must be developed for the trigger event. Hence, from a practical view and taking into consideration the likely pressures on control room operators, NEMMCO considers the proposed 30 minute assessment timeframe is unrealistic, inflexible, and may result in inappropriate implementation of the CAPP, which could lead to disputes between affected Generators and NEMMCO.

NEMMCO notes that partial generation outages (where units are restricted in capacity without being forced out of service) do not form part of the list. NEMMCO also notes that under the proposed Rule a CAPP could commence up to 22 hours after the trigger event has been determined since NEMMCO has up to this time to determine whether a material impact on dispatch has occurred. By this time, it is possible that a listed transmission outage may become "material" because of reasons unrelated to the trigger event.

## **1.4 Ending the CAPP**

The proposed CAPP must continue for a minimum of two hours and end within 24 hours after the trigger event. The CAPP can be ended when:

- sufficient generation in a region has returned to service; and
- one or more has occurred:
  - there are no material network constraints
  - there are no remaining outages of transmission elements
  - the remaining outages of transmission elements listed could have been the result of a single credible contingency event.

NEMMCO notes that the CAPP will not cease until sufficient generation is available to be returned to service, regardless of the existence of a material network constraint. Below are some examples that illustrate how the CAPP will end in practice.

### *Tripped Units able to Resynchronise*

Firstly, consider where a trigger event involves tripping of major generating units but there are no transmission outages. The CAPP would end once a sufficient number of the tripped units have come back on-line, or when they should have been reasonably able to come back on-line, so that the capacity of the remaining disconnected units is less than the CAPP threshold.

If the trigger event occurred at the evening peak, by the time the power system had been restored sufficiently demand may have fallen and a Generator may make a commercial decision not to re-commit units that were tripped during the trigger event. However, provided those units were reasonably able to come back on-line, the CAPP would be lifted regardless of the impact on other market participants.

NEMMCO would be required to specify in its operating procedure how it decides whether a unit that has not yet re-synchronised is nevertheless reasonably able to re-synchronise. For example, NEMMCO might decide to consider factors such as the state of the transmission system (can a Generator's connection point be reconnected to the main transmission network; has the power system voltage and frequency stabilised; does the power station have an auxiliary supply?) and the state of the relevant generating plant (was a unit damaged by the trigger event; has the power station operator been able to restabilise the unit in order to commence a start-up process, has sufficient time elapsed to allow that start-up process to be completed?).

### *Transmission Constraint no Longer Material*

Consider the earlier example of a total outage of QNI. This constraint is material as long as the flow on QNI in the absence of the contingency (the "counterfactual flow") would have exceeded the CAPP threshold in the relevant region (either Queensland or NSW).

When the counterfactual flow exceeds the CAPP threshold, the CAPP commences. When the counterfactual flow first falls below the CAPP threshold (assuming that this is more than 2 hours after the CAPP commenced), the CAPP will end.

A trigger event can cause at most one CAPP to be invoked. If the counterfactual flow again rises above the CAPP threshold, there will not be a second CAPP triggered.

### *Multiple Tripped Lines Return to Service*

A trigger event occurs which includes multiple transmission line outages. Now suppose that all but one of these lines has returned to service, but the N-1 constraint associated with the last remaining outage is material.

In this situation, the CAPP will end when the penultimate line returns to service. The rationale for this approach is that, although the N-1 constraint is material, it has the same effect as a credible contingency (i.e. the outage of just the remaining line) and so is a risk that should be managed by generators anyway.

### *Shed Load Restored*

Consider a trigger event which causes a large amount of load shedding, which causes some generating units to be tripped as a result of the resulting over-frequency. Depending on the pattern of remaining generation and any interconnector constraints, it may or may not be possible to re-synchronise the tripped units before restoring the entire load. The ending of the CAPP will be determined by the resynchronisation time, not by the load restoration time.

### *Sustained Damage*

A trigger event causes sustained damage to transmission or generation assets, the material impact on dispatch may continue for a sustained period. In this case, the CAPP will end 24 hours after the time of the trigger event.

### *APP Invoked*

The market disruption caused by the trigger event may lead to sustained high (uncapped) prices, which may in turn trigger an APP.<sup>3</sup> If an APP and CAPP operate concurrently, prices will be capped at the APP as normal.

A CAPP will commence shortly after the event and continue for no more than 24 hours. An APP will only commence, if at all, some hours or even days after the event<sup>4</sup> and will then continue for at least the remainder of the trading day and possibly for longer. Therefore, if there is a sustained, major disruption where both the CAPP and APP are triggered on the same day, then the CAPP will operate first, then the CAPP and APP together and then just the APP, until the disruption ends.

## **1.5 Establishing the Procedure**

The proposed Rule requires that NEMMCO consult with Registered Participants to develop and publish procedures for determining and notifying Market Participants of its determination regarding:

- when the trigger event occurs;
- the list of events;
- the times at which a CAPP commences and ends; and
- the CAPP threshold for each region.

As discussed, this proposed obligation would require NEMMCO to exercise discretion in relation to all but one of these: the CAPP threshold. Given this is proposed to be a Glossary term NEMMCO should not be required to consult on this. Further, NEMMCO questions why only Market Participants should be notified of any determination; presumably, NSPs would be interested in whether a trigger event occurs.

NEMMCO considers that the proposed Rule creates significant scope for Market Participants to challenge decisions made by NEMMCO. As discussed, any developed procedure could be contentious and because full automation is not possible without significant risk, decisions made in real time are likely to be disputed given potentially large amounts of compensation. NEMMCO is concerned that the proposed consultation gives it too much discretion and considers that the majority of the procedures should be included in the Rule.

### *Implementation Time and Costs*

The NGF has assumed that the costs of implementation would be minimal. At this time, NEMMCO has not attempted quantifying the costs of this proposal. After taking into consideration that NEMMCO would be required to consult on the procedure and the software development requirements associated with automating the proposed Rule, it is likely this could be ready for rollout by the winter of 2011.

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<sup>3</sup> Note that the CPT trigger will be based on the uncapped prices, so a CAPP will not affect the triggering of an APP

<sup>4</sup> For example, it may take up to 7 1/2 hours of VoLL prices before the CPT is reached

## 2 Analysis of the Proposal

NEMMCO considers the following areas require further analysis and should be considered before the AEMC decides whether the proposed Rule promotes the NEO.

### *Market Intervention versus Market Based Arrangements*

The NGF proposed significant changes to the operation of the spot market rather than to forward markets on the basis that “introducing FM (force majeure) provisions in forward contracts does not appear to be an efficient, practical or desirable solution to resolving the issue of NCCE related risks in the forward market...”. NEMMCO notes that the proposal concludes forward markets do not, and would not, adequately deal with the impact of these events; it did not address why these risks cannot be handled by alternative market based arrangements. Before regulatory intervention is determined to mitigate the identified risk, NEMMCO considers that alternative arrangements should be explored so that interested parties can explain whether to the market can mitigate the identified risk without central intervention.

Further, before Generators make a decision to participate in the NEM, consideration would be given to the market design including its volatility and the potential risk exposure. It is therefore arguable whether the market and operational risks associated with NCCEs have been factored into Generator’s investment decisions. Effectively, this proposal would allow Generators to transfer the current costs of managing these risks to all Market Participants.

### *Potential Market Distortions*

NEMMCO also notes that capping the market price has significant market consequences, including:

- Distorting price outcomes;
- Reducing investment signals in the short term and the long term; and
- Causing redistributive effects on smaller and marginal generators (such as peaking plant) who are able respond quickly to price signals.

NEMMCO notes that the market price is also an important short-term signal for Generators and the demand side which assists to balance supply and demand and applying a CAPP would distort price signals. For example, on 16 January 2007, underfrequency load shedding disconnected approximately 2100MW of load but virtually no generation. Victorian generators were not constrained from supplying the load as it was restored because Victoria’s transmission network allowed it. The initial excess of generation in Victoria caused the spot price to reduce significantly from its previous high levels. Later in the event, the rate of demand increase was beyond the capability of the available generation. NEMMCO shed some load and set Victoria’s regional reference price (**RRP**) to the VoLL until all load could be restored. The Rule under which the VoLL price was set has since been revoked.<sup>5</sup> Hence, if this event were to occur again, the 2 hour period of forced VoLL price would not have occurred. Instead, prices would have been near VoLL only for the period when the load restoration rate could not be met.

The AEMC should consider whether the benefits of applying a CAPP to limit Generators’ forward contract volume risk outweighs the benefit of allowing the interaction of supply and demand to send price signals which promote appropriate market responses during periods of supply scarcity. It is also important to recognise that in the absence of network contingency events and restrictions, periods of supply scarcity are generally correlated with

<sup>5</sup> AEMC, *National Electricity Amendment (Setting VoLL Following the Shedding of Interruptible Load) Rule 2008*, 20 November 2008.

periods of high demand, when spot market volumes are likely to exceed contracted volumes. These periods lead to 'windfall' gains for Generators through the same contract volume risk characteristic that the Rule proposal seeks to mitigate.

### *Effect on the Settlement Residue Auction*

The NGF only identify Retailers and Generators as “buyers” of the units of a settlement residue auction (**SRA**), the parties that can participate in SRAs include Market Customers (retailers are included in this category of Registered Participant), Generators and Traders. NEMMCO notes that the NGF has not considered the impact that capping the spot market price for trigger events would have on the amount of inter-regional settlement residue (**IRSR**) on Traders. Potentially, this proposed change to market operation would affect the accumulation of IRSR because it would potentially reduce the RRP (by imposing a CAPP) and this may impact inter-regional flows.

### **3 Market Based Approaches**

Generators could set up an insurance fund to pool the risks faced, this would act as an insurance instrument to mitigate the identified risks. This could be collected from all Market Scheduled Generators (since they all face the risk) and could be redistributed to affected parties. Generators could organise this or be included in the Rules and the associated fees collected by NEMMCO. For example, a Generator compensation fund could be established by collecting fees, similar to the operation of the Participant compensation fund. A threshold amount could be established by fees charged calculated using a combination of historical capacity and historical energy scheduled such as was recommended by Allens Consulting for the Participant compensation fund.<sup>6</sup>

Similar to the proposed Rule, Market Scheduled Generators would need to notify NEMMCO and the AEMC of a compensation claim. A three member panel would make recommendations to the AEMC on the matters to be determined. NEMMCO would provide the panel with information regarding whether a trigger event had occurred and the impact on spot prices and the Scheduled Generators affected. The AEMC would determine whether it is appropriate to pay compensation and the appropriate amount.

Under this option, the benefit or cost to the Generator would be calculated as the difference between the “risk capital”<sup>7</sup> and the premium contributed to the fund.

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<sup>6</sup> NEMMCO, *Determination and Report: Structure of Participant Fees under clause 2.11 of the National Electricity Rules*, 14 March 2006, p. 72 and 74.

<sup>7</sup> “Risk capital” as referred to by the NGF refers to the financial amount which covers the risk associated with trigger events.