Loy Yang Marketing Management Company Pty. Ltd.

Southern Hydro Pty. Ltd.

International Power (Hazelwood, Synergen, Pelican Point, Loy Yang B and Valley Power)

TRUenergy Pty. Ltd.

NRG Flinders Pty. Ltd.

Hydro Tasmania

and **NEMMCO** (for the purposes of satisfying S.91 (6) the New National Electricity Law)

27 October 2005

Mr Anthony Englund
Director, Market Rules
AEMC
Level 16, 1 Margaret St,
SYDNEY 2001

By email: anthony.englund@aemc.gov.au

Dear Anthony

RE: DEROGATION – MANAGEMENT OF NEGATIVE SETTLEMENT RESIDUES IN THE SNOWY REGION

The above group of generators (who represent the bulk of the generation capacity south of the Snowy region) and NEMMCO request the AEMC to make a participant derogation to the Rules as described in this letter to address the negative settlement residues that arise as a consequence of loop flows in the Snowy region.

In December 2004 NECA began a consultation on a proposal by Snowy Hydro for a constraint support pricing and contracting trial in the Snowy region. This was proposed as an addition to the NEMMCO Constraint Formulation derogation in the National Electricity Code (NEC). The original NEMMCO derogation in the NEC addressed the requirement for the alternative formulation of network constraints to manage counter price flows which create negative settlement residues which NEMMCO has no means to fund. The options available to NEMMCO to limit the accumulation of negative residues generally result in the distortion of otherwise efficient dispatch or by artificially constraining flow. The constraint support pricing and contracting proposal provides a pseudo regional boundary between the Tumut and Murray nodes, improves efficiency of dispatch for Tumut generation, and obviates the need for NEMMCO to manage negative settlement residues on the Snowy to NSW inter-connector.

On the 21st of January 2005, in response to the consultation some of the above group of generators proposed a further addition to the derogation to manage negative settlement residues on the Victoria to Snowy inter-connector, which can arise under efficient dispatch conditions from counter price flows, as a consequence of network loops in the Snowy region. This proposal obviates the need for NEMMCO to distort efficient dispatch to minimise negative settlement residues. The loop flow issue, while arising from the same network limits as the issues addressed by the constraint support pricing and contracting trial, is separate in its effects and is not resolved by the trial. NECA considered that the issue of negative settlement residues on the Vic to Snowy inter-connector was a separate issue to the addition proposed by Snowy and did not include this further addition to the derogation; however NECA noted that this was a suboptimal outcome.

As a consequence on the 10 May 2005, this group of generators forwarded to NECA a proposed modification to the addition to the derogation to address the adverse effect on competitive dispatch of the current provisions for managing negative settlement residues on the Vic-Snowy inter-connector.

Since that submission was made the following changes have occurred:

- the responsibility for the consideration of Rule changes has been transferred from NECA to the AEMC,
- the New National Electricity Law has come into effect,
- the constraint support pricing and contracting trial has come into effect and the formulation of the change in the Rules is different to that originally proposed by Snowy Hydro, and
- the Rules require proponents to demonstrate that the change meets the market objective.

The submission has been revised to address those changes.

This group proposes additional provisions be included in the NEMMCO derogation in the Rules; Chapter 8A Part 8 - Network Constraint Formulation. Because this proposal was lodged prior to the commencement of the National Electricity (South Australia) (New National Electricity Law) Amendment Act 2005 on 1 Jul 2005, it was transitioned from a Code change under the old regime to the AEMC's new rule making processes. To overcome any procedural inconsistencies associated with the transitional issues, NEMMCO has agreed to be formally joined for this request with the registered participants who are signatories to this letter, This is intended to satisfy the new requirements of section 91 (6) and to allow the proposal to be consulted and considered on its merits. NEMMCO notes that it may elect to make a separate submission on the proposed derogation to the AEMC during the consultation process.

The proposed derogation

In order to manage the market impacts associated with loop flows, including counter-price flows and consequent negative settlement residues we have developed a concept, which is a method of dealing with these issues. This method is detailed in **Appendix 1**, and addresses the negative residue created by efficient dispatch around a network loop in which one link is constrained, by funding the settlement deficit created on one inter-connector, from the related surplus available on the other inter-connector. This proposal can be considered as an alternative to the current problematic approaches to managing settlement residues. **Appendix 1** also includes an evaluation of this proposal against current practice.

In **Appendix 2** it is demonstrated that it is possible to fund the negative residue when it occurs on the Vic-Snowy or the Snowy-NSW link (as the case may be) by the positive residues on the other link. This mechanism has been called the "Negative Settlement Payment".

Appendix 3 sets out the proposed changes to the Rules in Chapter 8A Part 8 - Network constraint Formulation.

It is noted that the proposal is drafted as an addition to the Rule changes made for the constraint support pricing and contracting trial even though its operation is not logically dependent on that change.

Meeting the NEM objective

The Nem objective is:
"The national electricity market objective is to promote efficient investment in, and efficient use of, electricity services for the long term interests of consumers of electricity with respect to price, quality, reliability and security of supply of electricity and the reliability safety and security of the national electricity system."

It is understood that the term "efficient investment" is to be interpreted by the AEMC as meaning "economically efficient investment" and that changes that are in the long-term interest of consumers will not impose efficiency costs on the market.

This proposal addresses an issue that arises from the fact that with efficient dispatch, when the Snowy constraint binds, the flow on the Victoria to Snowy interconnector is contrary to the price difference because the constraint is within a network loop. The proposal is not related to distorted incentives (the issue that the constraint support pricing and contracting trial addresses).

This "counter-price" flow is not, of itself, a problem and is an economically efficient outcome. However, because the Rules do not provide an adequate means of fund the resulting "negative residue", NEMMCO intervenes in the market to prevent the negative residue, by distorting efficient dispatch.

Intervention by NEMMCO can prevent the accumulation of negative residues, when the intra-regional constraint binds for northward flows either by:

- clamping or constraining the flow from Victoria to Snowy to reduce negative residues. This is the approach currently employed, or
- re-orienting the intra-snowy constraint towards Dederang. This removes the negative residues by ensuring that the price at Murray is never lower than the Dederang price. NEMMCO carried out a detailed consultation on this alternative means of managing these negative settlement residues. They concluded that while this solution removes the negative residue, it also results in a mis-pricing of the Murray node. This can result in inefficiency due to newly created distorted incentives and NEMMCO therefore determined not to proceed with the re-orientation.

Both of the alternative mechanisms result in a distortion of efficient dispatch and thus degrade the performance of the market in relation to the objectives. This distortion arises either from artificially constraining the flow on an interconnector or settling a generator at a price higher than its marginal value of supply, thus providing an incentive to bid below marginal cost to maximise volume. Both alternatives have a detrimental impact on inter-regional competition and reduce the value of the settlement residue stream that would otherwise be available to hedge transfers between the Victorian and Snowy regions.

The proposal presented here is designed to fund the negative residues from positive residues that can result from either northward or southward flows, so that NEMMCO can schedule efficient dispatch without these undesirable interventions.

The ACCC, in considering the addition to the Code derogation proposed by Snowy, commissioned a report from a relevant expert, Mr Darryl Biggar. Mr Biggar, in his report to ACCC also considered this proposal, which was then foreshadowed by the group as an alternative to NEMMCO intervention.

We note that he concluded that this proposal can be funded as we have indicated below, at least for the case when the Snowy proposed derogation applies (see para 122 of Mr Biggar's report to the ACCC). In addition to noting that the proposal can be funded, Mr Biggar concluded in Table 3 (para 123) that with our proposal the "Current Snowy proposal would resolve the pricing distortion". In other words, the combination of the two proposals was seen by him as resolving pricing distortions that would otherwise apply.

This proposal is superior to either of the above alternatives because it;

- retains accurate locational marginal pricing for generation at the Snowy regional reference node as per the intent of Clause 3.9.2 (Marginal value of supply at the regional reference node);
- does not provide incentives for generators receiving the Snowy region price to bid at prices below marginal cost to maximise volume;
- avoids causing market disturbance by NEMMCO intervention, upon prediction of negative residues;
- ensures efficient use of the Dederang-Wagga-Tumut-Murray-Dederang transmission loop, maximising the transmission capacity for inter-regional transfers;
- increases interregional trade because the total amount of settlement residues available to support settlement residue instruments will remain greater than either of the NEMMCO intervention mechanisms, despite the depletion of some Snowy to NSW residue.

This proposal will result in economically efficient pricing signals by eliminating the significant problems created by the action taken by NEMMCO to avoid negative settlement residues in the Snowy region and improve the efficiency of dispatch for Murray and Victorian generation, and will also increase the reliability of supply to NSW for northward flows and Victoria for southward flows and hence meets the market objective.

Further development

This proposal is made in a similar spirit to the constraint support pricing and contracting trial, ie as a specific response to an acute problem in the National Market implementation. We expect that over time a more general measure may replace this specific one.

We wish to note one difference. The issue addressed by the constraint support pricing and contracting trial relates to intra-regional transmission constraints, and provides a means to deal with them without increasing the number of regions. Over time a decision may be made to increase the number of regions and reduce or eliminate the need for this "Snowy" Rule change.

In contrast, the proposal presented here relates to an interconnector itself and the physical network configuration that it comprises. If the number of regions were increased, then the number of interconnectors would increase, and consequently the risk that an interconnector will include a loop will also increase.

The incidence of interconnectors with looped network may also increase as the network is augmented.

Thus the proposal presented here in relation to a specific instance may need to be generalised and extended as either the number of regions increases, or as the network is augmented.

We believe that the experience gained if this proposal is implemented will lay the groundwork for subsequent elaboration when necessary.

This proposal in combination with the constraint support pricing and contracting trial will ensure that all generation in the Snowy region is paid its correct regional price. Whilst the current constraint support pricing and contracting trial only addresses Tumut prices, this additional proposal will increase the benefits by allowing more efficient dispatch, increased competition, improvement in pricing signals and transparency to aid prospective investment which will ultimately lead to greater benefits for consumers. In particular as increased competition leads to efficiency gains the primary long-term beneficiaries will be NSW customers.

Sunset

Our derogation is designed to sit neatly within Chapter 8A Part 8 clauses of the Rules. Thus its sunset would align with sub clause (e), ie on the earliest of 31st July 2007, the implementation of the first boundary review by the AEMC, or as otherwise determined by the AEMC.

As stated above, please note that the issues addressed by this derogation are separate to those addressed by the change to the constraint support pricing and contracting trial and may continue to exist at the sunset. However, before it could be extended, the mechanism proposed will require at least some inconsequential amendment upon the sunset of the current derogation, particularly if that sunset is triggered by regional boundary change. Therefore it was considered best to align the duration of this derogation with the current derogation.

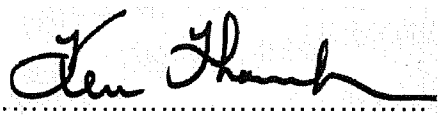
The AEMC should nevertheless note that it may be appropriate for the proponents to submit an extension request in a form that achieves the same substantive effect as the sunset date approaches.

Proponents

The proponent list is unchanged from the original proponent group of 10 May 2005, except that as a result of merger, TRUenergy Pty. Ltd., has replaced Yallourn Energy Pty. Ltd. and SPI Electricity Pty. Ltd, and NEMMCO has agreed to be included so that S.91(6) of the National Electricity Law does not preclude this submission being considered by the AEMC.

If you have any questions in relation to this proposal, please call Roger Oakley on 03 9612 2211.

Yours faithfully

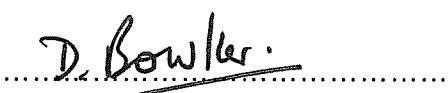


Ken Thompson
General Manager
Loy Yang Marketing Management Company Pty. Ltd.

Robert Jackson
Manager Market Development & Regulation
Southern Hydro Pty. Ltd.

Carlo Botto
Executive Director Corporate Strategy & Risk
TRUenergy Pty. Ltd.

Stephen Orr
Commercial Director
International Power



David Bowker
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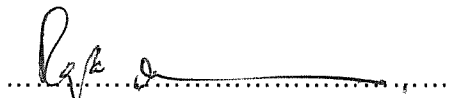
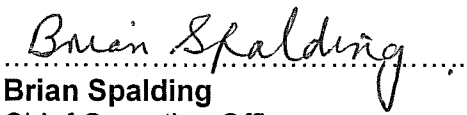


Reza Evans
Manager Regulation & Market Development
NRG Flinders



Brian Spalding
Chief Operating Officer
NEMMCO

Appendix 1

Loop Flows and Negative Settlement Residues

The current market settlement process in the NEM is based on certain implicit assumptions, and has been found to distort competition in the market when these assumptions are not satisfied in practice.

The CRA proposal is designed to deal with the distortion of competition that occurs when an intra-regional transmission constraint leads to a value in dispatch for a scheduled plant which is materially different from the value expressed through the region-based market settlement process. This leads to a distortion of the bid or offer formation process by market participants, unless corrective action, such as that proposed by CRA, is introduced (or the regions changed to eliminate intra-regional constraints as the Rules envisage)

This proposal is designed to deal with another distortion of competition that arises from the market settlement process. The Rules implicitly assume that virtually every interconnector flow will result in a positive settlement residue, since the means to deal with negative residues are suitable only for occasional and trivial deficits.

This limitation in the market settlement process compels NEMMCO to avoid material negative settlement residues on interconnectors, since they have not been provided with a workable funding mechanism.

But the reality is that significant and sustained negative residues are a natural consequence of certain physical arrangements of the transmission network. In particular the reaching of a flow limit within a network loop will result in power flows contrary to the price difference. If this coincides, as it does at Snowy, with an interconnector, then negative settlement residues on the interconnector will occur.

It is important to stress that these negative settlement residues are due to the nature of the physical network through its effect on efficient dispatch, and hence cannot be eliminated without creating dispatch inefficiency.

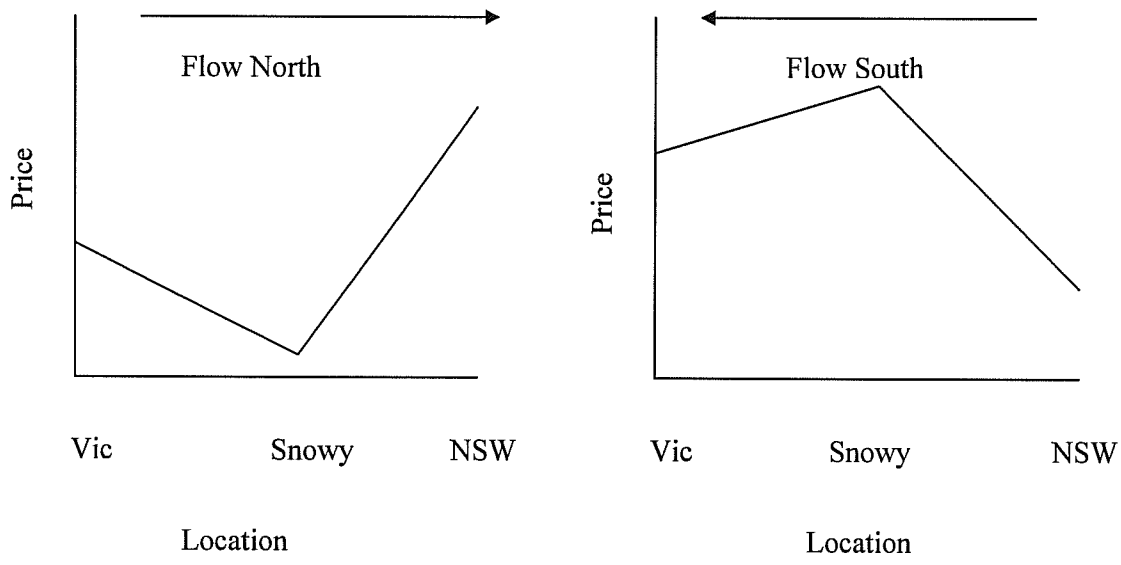
Nevertheless, NEMMCO is currently forced to somehow eliminate the negative residue. NEMMCO's practice includes two techniques –

- The application of wholly artificial constraints in dispatch, unrelated to the capability of the transmission network, to eliminate the economically efficient, but financially troublesome power flow, or
- The introduction of a deliberate calculation error into the pricing for one region so that the flow that is actually, and correctly, counter-price appears to be in accordance with the price difference.

The problem is not the negative settlement residue on the interconnector in itself, but the anti-competitive measures that NEMMCO is forced to adopt because of the deficiencies of the settlement process in relation to negative settlement residues.

It should also be noted that the anti-competitive restriction of flow in spot market dispatch has flow-on consequences in the related derivative markets, where the risk of artificial restrictions on interconnector flow affects both generator's ability to dispatch generation to manage the risk of inter-regional contracts, and also reduces the value of SRA units that are relevant to managing inter-regional price risk.

While the counter-price flow is a problem for the current settlement process, which considers each interconnector in isolation, we believe that taking a wider view allows the settlement process to be adapted successfully to this situation. To illustrate this wider view we show schematically, for the case of the Snowy region, the pricing patterns that lead to negative settlement residues.



It is characteristic of these cases that, as shown in these schematic diagrams, the counter-price flow that occurs between Victoria and Snowy when the Snowy constraint is affecting dispatch is associated with a larger price difference in the direction that supports the flow on the Snowy - NSW inter-connector. This is consistent with the economic dispatch of the flow through the Snowy region, between Victoria and NSW.

From this general description it can be seen that the negative settlement residue on Vic-Snowy can potentially be funded from the larger positive settlement residue on Snowy-NSW. This qualitative case is supported by a quantitative assessment that is reported in **Appendix 2**. This payment mechanism is termed "Negative Settlement Payment".

Comparison with alternatives

Having established that an alternative settlement process is feasible, we now consider its merits relative to the current approaches.

The primary role of the electricity market is to economically dispatch the available generation sources (and dispatchable load changes), and to derive prices consistent with this dispatch.

The provision of settlement residues, while desirable for degree of protection they can afford market participants from basis risk that they chose to incur, are not a primary outcome of the market. Rather, they arose as a by-product of efficient dispatch and have proved extremely useful in facilitating inter- regional trade.

We contend that the desire to manage negative settlement residues should not be allowed to take precedence over efficient dispatch.

Our proposal is compared below with both NEMMCO current practices.

	Artificial network constraint	**Deliberate price error**	**Funding deficit from other inter-connector surplus (Negative Settlement Payment)**
Accuracy of market prices	Prices across the affected inter-connector are separated more than is efficient by the constraint	One region price is arbitrarily changed from its efficient value	Efficient prices are not affected by this approach
Commercial discipline on market participants	Reduced by artificial flow limit	Distorted by mismatch between value in dispatch and price in settlement	Not affected in dispatch, but possible indirect effect through reduced basis risk management
Objectivity of market	NEMMCO discretion in application of artificial constraint	NEMMCO discretion in introducing deliberate pricing error	Defined, objective process without need for NEMMCO discretion

Opportunity for basis risk management in inter-regional trade	Artificial reduction in flow at NEMMCO discretion	Improved but not efficient due to price error	Satisfactory for "through" buyers. May be an issue for intermediate region, but under the Snowy proposal, most Snowy generation is effectively in NSW for northward flow limit conditions.

On the basis of the primacy of market dispatch and pricing, we see the funding of settlement negative residues as the most satisfactory alternative.

APPENDIX 2

DEMONSTRATION THAT SUFFICIENT FUNDS ARE AVAILABLE FOR THE NEGATIVE SETTLEMENT PAYMENT

The Negative Settlement Payment avoids the need for anti-competitive interventions by NEMMCO by allowing negative settlement residues to be incurred and funded by transfer from the related positive settlement residue.

In order to support the introduction of the concept, this appendix demonstrates that sufficient funds will be available to make these payments.

This demonstration will, for simplicity, rely only on the surplus due to a binding transmission constraint, thus ignoring the additional surplus due to the use of marginal loss factors. Thus in practice the coverage of the negative residue will be more secure than calculated here.

The demonstration relies on the relationship between region prices that occurs when the Snowy constraint is binding. For discussion of this relationship see the NEMMCO paper "Management of network limitations within the Snowy region and constraint formulation in the NEM - interim actions" of 3 March 2003.

In section 6 of this report, three alternative representations of this relationship are given. For this discussion the form used will be –

Snowy Price = 4/3 × Vic price - 1/3 × Tumut/NSW price

The demonstration assumes the nominal value of the Tumut to Murray transfer capability at 1350MW and the nominal capacity for the NSW to Snowy inter-connector is 800MW and also uses limits to power flow between Victoria and Snowy that apply because of limitations other than the Snowy constraint. The Values used are – To Vic = 1900 MW, To Snowy = 1100 MW.

In practice lower flow limits (and hence lower potential negative residues) often apply.

1. Northward flow

The critical condition for northward flow is where the Vic to Snowy flow is greatest (ie maximum settlement deficit) and the Snowy to NSW flow is least (ie minimum settlement residue).

The maximum Vic to Snowy is 1100 MW.

With the Snowy constraint binding at an assumed 1350 MW, the minimum Snowy to NSW flow (with no Tumut generation) is 1350 MW.

Vic → Snowy deficit is $1100 \times (P_v - P_s)$

Substituting for P_s gives $1100 \times (P_v - 4/3 \times P_v + 1/3 \times P_n)$
$= 1100 \times 1/3 \times (P_n - P_v)$

Snowy → NSW surplus is $1300 \times (P_n - P_s)$

Substituting for P_s gives $1350 \times (P_n - 4/3 \times P_v + 1/3 \times P_n)$
$= 1350 \times 4/3 \times (P_n - P_v)$

Since the surplus is clearly larger than the deficit to be funded, the adequacy of the funding in this case is demonstrated.

(Note that the surplus would, in the general case, be affected by a Constraint Support Payment, but this is zero in this case of minimum residue because Tumut is not generating. The addition of Tumut generation would result in a CSP but would increase the residue by a corresponding amount)

2. Southward flow

The critical condition for southward flow is where the Snowy to Vic flow is greatest (ie maximum settlement deficit) and the Snowy to NSW flow is least (ie minimum settlement residue).

The maximum Snowy to Vic is 1900 MW.

With the Snowy constraint binding at an assumed 1350 MW, the minimum NSW to Snowy flow (with all of the constrained flow provided from Tumut generation) is 0 MW.

Vic → Snowy deficit is $1900 \times (P_s - P_v)$

Substituting for P_s gives $1900 \times (4/3 \times P_v - 1/3 \times P_n - P_v)$
$= 1900 \times 1/3 \times (P_v - P_n)$
$= 633 \times (P_v - P_n)$

NSW → Snowy settlement residue available after CSP/CSC transactions is
(1-CSC allocation factor) x $(P_n - P_s)$ x 1350 {from NER 8A 8(o)}

CSC allocation factor = 550/1350

Substituting for P_s gives $(800/1350) \times 1350 \times (P_n - 4/3 \times P_v + 1/3\ P_n)$
$= 800 \times 4/3 \times (P_n - P_v)$

$= 1067 \times (P_N - P_v)$

Since the surplus is clearly larger than the deficit to be funded, the adequacy of the funding in this case is demonstrated in this case also.

3. General Comment

We note that the proposal requires the diversion of settlement residue from one interconnector to another and that the TNSPs that receive these funds are different and in relation to this provide the following comments.

- The creation of settlement residues is not an intended output from the market, but rather an unintended by-product of efficient dispatch and pricing,
- The residues are not "owned" by the TNSPs but rather held in trust for end-use customers, who we believe are more effectively benefited by our proposed arrangement to increase competition in the market, rather than by receiving the current amounts of these residues.
- The allocation of funds from a settlement residue is not unique to this proposal, but is also proposed under the CSP/CSC regime proposed by CRA,
- The distribution of settlement residues via TNSPs contains significant risks of perverse incentives, and should be reviewed; thus this proposal should not be rejected because it fails to accord with an existing but clearly unsatisfactory process,
- The distribution of settlement residues between regions, as currently practiced, has effects that are difficult to justify and the alternative of a market-wide distribution should be considered; again, this proposal should not be considered adversely because it fails to conform to an existing but unsatisfactory regime.

The discussion above demonstrates that it is possible to use this proposed funding mechanism in the Snowy context to allow competitive dispatch despite the consequences of the looped network configuration. A further consideration is the availability of basis risk protection through settlement residue auctions (SRAs) or similar mechanisms.

The following observations from the above analysis demonstrate this continuing capability.

- For northward flow the remaining residue, after funding the negative residue is 1433 x (P_n - P_v); this is sufficient for full basis risk protection in the 1100 MW Victorian export capability, and leaves some surplus for Snowy basis risk management. It should be noted that under the Snowy proposal assumed in this analysis the majority of Snowy capability can receive NSW price and hence needs no basis risk protection.

- For southward flow the remaining residue is 433 x (Pv - Pn) which is sufficient to cover the majority of the basis risk on the 600 MW NSW export capability. Note that in this case a major part of Snowy generation can receive the Snowy price which exceeds the Victorian price. Therefore Snowy has excess basis risk protection which it could market to NSW/Queensland participants.

APPENDIX 3

DRAFT DEROGATION

The proposed additions to Part 8 of Chapter 8A of the Rules are highlighted below.

Part 8 – Network Constraint Formulation

(a) Despite any other provision of the *Rules* to the contrary, including without limitation clauses 3.6.4(a), 3.6.4(a1), 3.6.4(b), 3.7.2(c)(3), 3.7.3(d)(3), 3.8.1(b)(5), 3.8.1(b)(6), 3.13.4(o) and 3.13.8(a)(5), *network* limitations may occur which impact on both *intra-regional* and *inter-regional* power flows.

(b) *NEMMCO* must determine and represent *network constraints* in *dispatch* which may result from limitations on both *intra-regional* and *inter-regional* power flows.

(c) If the use of a *network constraint* in *dispatch* developed under clause (b) substantially creates, in *NEMMCO's* reasonable opinion, a significant *inter-regional* power flow from a *region* with a *dispatch price* that is greater than the *dispatch price* of the importing *region* (a 'significant counter price power flow'), *NEMMCO* must, without prejudicing its obligations to maintain *power system security*, use reasonable endeavours to apply an alternative formulation for that *network constraint* for the expected duration of the significant counter price power flow. That alternative form of the *network constraint* must apply for the expected period of the significant counter price power flow if the original formulation of the *network constraint* were used.

(c1) Clause (c) must not apply to the use of a *network constraint* referred to in the 'Murray/Tumut constraint list' developed pursuant to clause (f).

(d) *NEMMCO* must develop and *publish* a procedure for determining when an *inter-regional* power flow referred to in clause (c) is considered to be significant for the purposes of that clause.

(e) This *participant derogation* will cease to apply on:

(1) 31 July 2007;

(2) the implementation of the first regional boundary review by the *AEMC*; or

(3) as otherwise determined by the *AEMC*.

(e1) Clauses (f) to (p) commence on 1 October 2005.

(f) *NEMMCO* must determine and *publish* a list of *network constraints* (the 'Murray/Tumut constraint list') developed pursuant to clause (b) that relate directly to managing power flows in either a northward or southward direction between the *network* nodes to which the following *power station*s are directly connected:

(1) Lower Tumut;

(2) Upper Tumut;

(3) Murray; and

(4) Guthega.

(g) For the purpose of clauses (f) to (p), constraint "k" in the Murray/Tumut constraint list must be expressed in the following generic form:

$$\alpha_k \times LT + \beta_k \times UT + \delta_k \times MURR + \lambda_k \times GUTH + \gamma_k \times V\text{-}Sn + \eta_k \times Sn\text{-}NSW \leq RHS_k$$

Where:

LT is the *dispatch* target for MW from Lower Tumut *power station*;
UT is the *dispatch* target for MW from Upper Tumut *power station*;
MURR is the *dispatch* target for MW from Murray *power station*;
GUTH is the *dispatch* target for MW from Guthega *power station;*
Sn-NSW is the *dispatch* target for MW flow on the Snowy to NSW *interconnector*;
V-Sn is the *dispatch* target for MW flow on the Victoria to Snowy *interconnector*; and
RHS includes a line rating term with an effective coefficient of 1.

(h) (1) Subject to clause (h)(3), if in any *dispatch interval* of a *trading interval* any of the *constraints* in the Murray/Tumut constraint list have bound, then congestion fund payments must be determined for Lower Tumut and Upper Tumut *power station*s pursuant to clauses (i) to (o).

(2) If in any *trading interval* clause (h) (1) does not apply, then no congestion fund payments need be determined pursuant to clauses (i) to (o) for that *trading interval.*

(3) If in any *trading interval* an *administered price period* is declared pursuant to clause 3.14.2, in any one of the Victorian, Snowy or NSW *regions*, no congestion fund payments are to be determined for that *trading interval* pursuant to this *participant derogation.*

(i) If congestion fund payments must be determined for Lower Tumut and Upper Tumut *power station*s pursuant to clause (h)(1) then, for each relevant *trading interval*, *NEMMCO* must determine power flows between Murray and Tumut as either northwards or southwards as follows.

Let:

X be, for each *dispatch interval* in a *trading interval*, the sum of the absolute value of all RHS values of binding *constraints* in the Murray/Tumut constraint list where the *constraint* has bound on flows in the direction from Tumut to Murray; and

Y be, for each *dispatch interval* in a *trading interval*, the sum of the absolute value of all RHS values of binding *constraints* in the Murray/Tumut constraint list where the *constraint* has bound on flows in the direction from Murray to Tumut.

If:

X < Y then power flows for the *trading interval* between Murray and Tumut must be determined as northwards and congestion fund payments must be determined for Lower Tumut and Upper Tumut *power station*s pursuant to clause (n); and

X ≥ Y then power flows for the *trading interval* between Murray and Tumut must be determined as southwards and congestion fund payments must be determined for Lower Tumut and Upper Tumut *power station*s pursuant to clause (o).

(j) In any *trading interval* where any of the *constraints* in the Murray/Tumut constraint list have bound for one or more *dispatch intervals*, *NEMMCO* must perform the following calculation for every *dispatch interval* in the relevant *trading interval*:

$SPd_p = [DP_{Snowy} \times TLF_p] - [\Sigma_k (CSPa_k \times Coeff_{p,k})]$ for p = Lower Tumut and Upper Tumut

Where:

SPd_p is the substitute price for each *dispatch interval* for *generation* from *power station* "p";

DP_{Snowy} is the *dispatch price* that applies to the Snowy *region* for the relevant *dispatch interval*;

TLF_p is the *transmission loss factor* for *power station* "p";

$CSPa_k$ is the *constraint* marginal value ($/MWh) as determined by the *dispatch* engine for each *dispatch interval* of relieving binding *constraint* "k" by a marginal amount; and

$Coeff_{p,k}$ is the coefficient (α, β, δ, λ, γ or η) assigned to element "p" in *constraint* "k" from the Murray/Tumut constraint list developed pursuant to clause (g),

and subject to the following:

(1) if the SPd_p determined pursuant to this clause is calculated as an amount less than the *market floor price* it must be deemed to be equal to the *market floor price*; and

(2) if the SPd_p determined pursuant to this clause is calculated as an amount greater than *VoLL* it must be deemed to be equal to *VoLL*.

(k) A substitute price (SP) for each *trading interval* must be determined by *NEMMCO* for generation from *power station* "p" as follows:

SP_p is the substitute price being the arithmetic average for a *trading interval* of each relevant *dispatch interval* of SPd_p; and

SPd_p is as determined pursuant to clause (j).

(l) *NEMMCO* must determine for each relevant *trading interval* an *energy* value differential (EVD) as follows:

$$EVD_p = SP_p - (TLF_p \times RRP_{Snowy}) \text{ for p = Lower Tumut and Upper Tumut}$$

Where:

EVD_p	is the per unit *energy* value differential for a *trading interval* for *power station* "p";
TLF_p	is the *transmission loss factor* for *power station* "p";
SP_p	is the substitute price determined pursuant to clause (k); and
RRP_{Snowy}	is the *regional reference price* for a *trading interval* that applies to the Snowy *region*.

(m) A CSC allocation factor is determined as follows:

$$\text{CSC allocation factor} = (A - B) / A$$

Where:

A	is nominal *transmission* limit between Murray and Tumut which is to be taken as 1350 MW for the purpose of this *participant derogation*; and
B	is nominal *interconnector* capacity from the NSW *region* to the Snowy *region* which is to be taken as 800 MW for the purpose of this *participant derogation*.

In clauses (n) and (o), the following conventions apply:

- **a "trading amount" (TA) is a payment to or from a *Market Participant* or inter-regional settlement residue fund;**
- **if TA > 0, then this represents a payment *to* the *Market Participant* or inter-regional settlement residue fund as appropriate;**
- **if TA < 0, then this represents a payment *from* the *Market Participant* or inter-regional settlement residue fund as appropriate.**

(n) If power flows between Murray and Tumut for a *trading interval* have been determined as northwards pursuant to clause (i), *NEMMCO* must determine the following amounts:

(1) An *energy* value adjustment determined as follows:

$$EVA_N = \sum_p (AGE_p \times EVD_p) \text{ for p = Lower Tumut and Upper Tumut}$$

Where:

EVA_N is the *energy* value adjustment for northward flows between Murray and Tumut that is to be applied to the determination of the trading amount pursuant to this clause (n);

AGE_p is the adjusted gross *energy* for a *trading interval* for *generation* from *power station* "p"; and

EVD_p is the *energy* value differential determined pursuant to clause (l) for *generation* from *power station* "p";

(2) *Trading amounts* determined as follows:

$$TA_1 = \text{Min} (EVA_N, IRSR_{Sn\text{-}NSW})$$
$$TA_7 = -1 \times \text{Min} (0, IRSR_{Vic\text{-}Sn})$$
$$TA_2 = -1 \times TA_1 - TA_7$$

Where:

TA_1 is a *trading amount* for Snowy Hydro Limited;

$IRSR_{Sn-NSW}$ is the inter-regional settlement residue allocated to flows **from the Snowy *region* to the NSW *region*** for the relevant *trading interval*;

$IRSR_{Vic-Sn}$ is the inter-regional settlement residue allocated to flows **from the Victorian *region* to the Snowy *region*** for the relevant *trading interval*;

TA_2 is a *trading amount* for the inter-regional settlement residue allocated to flows **from the Snowy *region* to the NSW *region*/** and

TA_7 is a *trading amount* for the inter-regional settlement residue allocated to flows **from the Victorian *region* to the Snowy *region***

(o) If power flows between Murray and Tumut for a *trading interval* have been determined as southwards pursuant to clause (i), *NEMMCO* must determine the following amounts:

(1) A *trading amount* determined as follows:

$$TA_3 = \Sigma_p (AGE_p \times EVD_p) \text{ for p = Lower Tumut and Upper Tumut}$$

Where:

TA_3 is a *trading amount* for Snowy Hydro Limited;

AGE_p is the adjusted gross *energy* for a *trading interval* for *generation* from *power station* "p"; and

EVD_p is the *energy* value differential determined pursuant to clause (l) for *generation* from *power station* "p";

(2) A *settlements residue trading amount* determined as follows:

$$TA_4 = -1 \times IRSR_{Sn-NSW}$$

Where:

TA_4 is a *trading amount* for the inter-regional settlement residue allocated to flows **from the Snowy *region* to the NSW *region***; and

$IRSR_{Sn-NSW}$ is the inter-regional settlement residue allocated to flows **from the Snowy *region* to the NSW *region*** for the relevant *trading interval*;

(3) A *trading amount* to determined as follows:

$$TA_5 = (IRSR_{NSW-Sn} - TA_3 - TA_4) * \text{CSC allocation factor}$$

Where:

TA_5 is a *trading amount* for Snowy Hydro Limited;

$IRSR_{NSW-Sn}$ is the inter-regional settlement residue allocated to flows **from the NSW *region* to the Snowy *region*** for the relevant *trading interval*; and

CSC allocation factor is the CSC allocation factor determined pursuant to clause (m).

(4) A *settlements residue trading amount* determined as follows:

$$TA_6 = (-1 \times TA_3) - TA_4 - TA_5 + Min(0 , IRSR_{Sn-Vic})$$

Where:

TA_6 is a *trading amount* for the inter-regional settlement residue allocated to flows **from the NSW *region* to the Snowy *region***; and

$IRSR_{Sn-Vic}$ is the inter-regional settlement residue allocated to flows **from the Snowy *region* to the Victorian *region*** for the relevant *trading interval*.

(5) A *settlements residue trading amount* determined as follows:

$$TA_8 = -1 \times Min(0, IRSR_{Sn-Vic})$$

Where:

TA_8 is a *trading amount* for the inter-regional settlement residue allocated to flows **from the Snowy *region* to the Victorian *region***; and

$IRSR_{Sn-Vic}$ is the inter-regional settlement residue allocated to flows **from the Snowy *region* to the Victorian *region*** for the relevant *trading interval*.

(p) *NEMMCO* must *publish* all *trading amounts* arising from application of this *participant derogation* (if any) using the current settlement cycle.