Applications for Authorisation

Amendments to the National Electricity Code

Dispatching the Market - Interim Arrangements

Date: 7 April 2004

Authorisation Nos:
A90892
A90893
A90894

File no: C2003/1642

Commissioners:
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Glossary

code	National Electricity Code
ACCC	Australian Competition and Consumer Commission
TNSP	Transmission Network Service Provider
NECA	National Electricity Code Administrator
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company
TPA	*Trade Practices Act 1974*
Dispatch engine	National Electricity Market Dispatch Engine
PASA	Projected Assessment of System Adequacy
RHS	Right hand side
LHS	Left hand side
Snowy Hydro	Snowy Hydro Limited
SRA	Negative settlement residues

1. Introduction

On 16 December 2003, the Australian Competition and Consumer Commission (ACCC) received applications for authorisations (Nos A90892, A90893, A90894) of amendments to the National Electricity Code (code) regarding dispatch of the market – interim arrangements. The application was submitted by the National Electricity Code Administrator (NECA) on behalf of the National Electricity Market Management Company (NEMMCO).

NEMMCO proposes a derogation under chapter 8 of the code governing interim arrangements for dispatching the market. NECA is of the view that there is a need to make both short and long-term improvements to the dispatch of the market where existing arrangements are proving ineffective in managing system security, or are resulting in poor utilisation of available transmission capacity.

The proposed derogation is intended to address the inadequacy of the existing arrangements for the dispatch of the market in the short-term. It provides express powers for NEMMCO to manage negative settlement residues and to combine inter and intra-regional limits in the same constraint equations. The derogation also implies that NEMMCO will decide how to dispatch the market consistent with the market objectives, the market design principles set out in chapter 3 of the code, and its own functional and security objectives.

A longer-term solution to improvements in market dispatch will be addressed in the light of progress made on the regulatory and institutional arrangements for transmission. For this reason, the derogation has a sunset clause of the end of December 2004.

Authorisation under Part VII of the *Trade Practices Act 1974* (TPA) provides immunity from court action for certain types of market arrangements or conduct that would otherwise be in breach of Part IV of the TPA.

The ACCC has prepared this draft determination outlining its analysis and views on the applications for authorisation of the code changes. Chapter 2 of this draft determination sets out the statutory test that the ACCC must apply when assessing an application for authorisation. Chapter 3 contains an outline of the ACCC's public consultation process. The ACCC's assessment of the proposed code changes is set out in chapter 4 and the ACCC's draft determination is in chapter 5.

2. Statutory test

The applications were made under sub-sections 88(1) and 88(8) of the TPA.

Applications made under sub-section 88(1) of the TPA are for authorisation to make a contract or arrangement, or arrive at an understanding, a provision of which would have the purpose, or would or might have the effect, of substantially lessening competition within the meaning of section 45 of the TPA; and to give effect to a provision of a contract, arrangement or understanding where the provision is, or may be, an exclusionary provision within the meaning of section 45 of the TPA. Further sub-section 88(6) provides that an authorisation made under sub-section 88(1) has effect as if it were also an authorisation in the same terms to every other person named or referred to in the application.

Applications made under sub-section 88(8) of the TPA are for authorisation to engage in conduct that constitutes, or may constitute, the practice of exclusive dealing in accordance with the provisions of section 47 of the TPA. Further, sub-section 88(8AA) provides that where authorisation has been granted under sub-section 88(8) and this particular conduct is expressly required or permitted under a code of practice, the authorisation applies in the same terms to all other persons named or referred to as a party or proposed party to the code. Authorisations may also apply to any corporation who becomes a party in the future.

The TPA provides that the ACCC shall only grant authorisation if the applicant satisfies the relevant tests in sub-sections 90(6) and 90(8) of the TPA.

Sub-section 90(6) provides that the ACCC shall grant authorisation to arrangements with the purpose or affect of substantially lessening competition or exclusive dealing arrangements (other than third line forcing) only if it is satisfied in all the circumstances that:

- the provisions of the proposed contract, arrangement or conduct would result, or be likely to result, in a benefit to the public
- that benefit would outweigh the detriment to the public constituted by any lessening of competition that would, or would be likely to result from the proposed contract, arrangements or conduct.

Sub-section 90(8) provides that the ACCC shall grant authorisation to exclusionary provisions or third line forcing arrangements only if it is satisfied in all the circumstances that the proposed provision or conduct would result, or be likely to result, in such a benefit to the public that the proposed contract, arrangement, understanding or conduct should be allowed.

In considering whether or not to grant authorisation the ACCC must consider what the position is likely to be in the future if authorisation is granted and what the future is likely to be if authorisation is not granted.

If the ACCC determines that the public benefits do not outweigh the detriment to the public constituted by any lessening of competition, or that the public benefits likely to

result from the proposed conduct or arrangements are not such that the proposed conduct or arrangements should be allowed, the ACCC may refuse authorisation or grant authorisation subject to conditions.

The value of authorisation for the applicant is that it provides protection from action by the ACCC or any other party for potential breaches of certain restrictive trade provisions of the TPA. It should be noted, however, that authorisation only provides exemption for the particular conduct applied for and does not provide blanket exemption from all provisions of the TPA. Further, authorisation is not available for misuse of market power (section 46).

A more expansive discussion about the ACCC's authorisation process and the statutory test that the ACCC applies can be found in: *Guide to authorisations and notifications*, ACCC, November 1995.

3. Public consultation process

The ACCC has a statutory obligation under the TPA to follow a public process when assessing an application for authorisation.

The ACCC received the applications for authorisation of amendments to the derogations on 16 December 2003. Notification of the applications and a request for submissions was placed in *The Australian Financial Review* on Thursday 15 January 2004 and placed on the ACCC's web site. Although not required under the TPA, interested parties were asked to make submissions to the ACCC regarding their views on the issues of public benefit and anti-competitive detriment arising from implementation of the proposed derogation. The ACCC received 1 submission from Snowy Hydro Limited (Snowy Hydro). This submission has been placed on the ACCC's public register and is available on the ACCC's web site.

The ACCC has produced this draft determination outlining its analysis and views of the amendments to the derogations according to the statutory assessment criteria set out in chapter 2. The ACCC invites the applicant and other interested persons to notify whether the applicant or other interested persons wish the ACCC to hold a conference in relation to this draft determination.[1] Alternatively, the applicant or interested parties may make written submissions to the ACCC in relation to this draft determination. Written submissions must be received by Friday 16 April 2004.

If the applicant or an interested party notifies the ACCC in writing within 14 days of 7 April 2004 that it wants the ACCC to hold a conference, the ACCC will hold a conference in Canberra, at a time and place to be notified. The applicant, interested parties who receive a copy of the draft determination and any other interested parties whose presence the ACCC considers appropriate are entitled to participate in the conference.

Following the conference, the ACCC will take into account relevant issues raised at the conference, and any related submissions, and will issue a final determination. If no pre-determination conference is called or written submissions received, then this draft determination will form the basis for the final determination.

A person dissatisfied with the final determination may apply to the Australian Competition Tribunal for its review.

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[1] For the purposes of the conference, an interested person is a person who has notified the ACCC in writing that the person, or a specified unincorporated association of which the person is a member, claims to have an interest in the applications and the ACCC is of the opinion that the interest is real and substantial.

4. The ACCC's assessment

4.1 Background

Market Dispatch

According to clause 3.8.1 of the code, NEMMCO is required to operate a central dispatch process to dispatch scheduled generating units, scheduled loads, scheduled network services and market ancillary services to balance power system supply and demand. In doing so, NEMMCO must use reasonable endeavours to maintain power system security in accordance with Chapter 4 of the code and maximise the value of spot market trading on the basis of dispatch offers and dispatch bids.

In order to maximise the value of spot market trading, NEMMCO must maximise the value of dispatched load. This means maximising dispatch bids less the combined cost of dispatched generation based on generation dispatch offers, dispatched network services based on network dispatch offers and dispatched market ancillary services based on market ancillary service offers. Amongst other things, this objective is met subject to[2]:

- dispatch offers, dispatch bids and market ancillary service offers;
- constraints due to availability and commitment;
- power system security requirements and reliability standards determined as described in Chapter 4 of the code;
- intra-regional network constraints and intra-regional losses;
- inter-regional network constraints and inter-regional losses; and
- constraints imposed by ancillary services requirements.

The National Electricity Market Dispatch Engine (dispatch engine) co-optimises the energy market and frequency control ancillary services through the use of a Linear Programming model. The model minimises an objective function of the cost of dispatched energy, Frequency Control Ancillary Services and reserve, subject to the set of constraints that represent participant bid information, network constraints, regional demand and reserve requirements.[3]

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2 See clause 3.8.1(b) of National Electricity Code.

3 Page 7 of Document Number SO_OP3705, *NEMMCO Operating Procedure*, 25 February 2004.

The dispatch engine will output a dispatch target for all scheduled generation, scheduled network service and scheduled load. NEMMCO will then issue dispatch instructions for each dispatch interval.

Constraints

A necessary input into the dispatch engine is the network constraints which reflect network outages and prevailing system conditions. The dispatch engine output will detail any binding constraints and solution infeasibilities in dispatch and pre-dispatch runs. NEMMCO is required to review the constraint sets used and modify them if necessary, to monitor the physical limit which is being modelled by the binding constraint and consider directing plant or network elements to restore operation within operating limits.[4]

According to the code, NEMMCO must determine any constraints on the dispatch of scheduled generating units, scheduled network services, scheduled loads, ancillary service generating units or ancillary service loads which may result from planned network outages. It must represent intra-regional network constraints and inter-regional network constraints as inputs to the dispatch process in a form that can be reviewed after the trading interval in which they occurred. The process used by NEMMCO to derive the network constraints must be clearly documented and made available to Market Participants.[5]

Constraint formulation

As outlined above, the capability of the network and prevailing system conditions including network outages will impact the market dispatch process. NEMMCO is responsible for the determination and application of generic constraints in the Projected Assessment of System Adequacy (PASA) pre-dispatch processes [6] and the dispatch process itself.

Generic constraints result from network limitations, ancillary services requirements, generator non-conformance and network security violations.[7] In the case of network limitations, when power flowing through a network element or set of elements is limited in order to maintain the security of the network for both pre and post contingent conditions, a network limitation is said to occur. These limitations may be due to

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4 When intra-regional constraints bind for a dispatch interval, the dispatch process automatically re-runs with all intra-regional network constraints removed. This will report the MW quantities which would have been dispatched had there been no intra-regional constraint. These results are communicated to all market participants confidentially and determine whether participant's targets from the original run were impacted upon or not. This information is made publicly available the following day.

5 Clause 3.8.10 of the code.

6 This is in accordance with clause 3.7.2 and clause 3.7.3 on the code.

7 Page 3 of Document Number S0_OP3709, *NEMMCO Operating Procedure – Generic Constraints due to Network Limitations,* 16 December 2003.

network equipment thermal and voltage ratings, network equipment protection settings and network stability limitations.

A mathematical equation is used to represent a generic constraint. This may be applied to the dispatch process so that network limits are not exceeded. The formulation of the constraint equations therefore rely on network equipment ratings which are provided to NEMMCO by each Transmission Network Service Provider (TNSP). NEMMCO controls the loading on the transmission network to within secure operating limits by using the modified generator target outputs produced by the dispatch engine.[8]

Given a network condition, such as a network outage, a constraint set may be required. A constraint set is comprised of a number of constraint equations and is invoked if a particular network condition eventuates.[9]

The constraint equation is comprised of a right hand side (RHS), the value of which may be positive or negative. It may be dynamic or static depending on whether continuous or short-term ratings are used in the formulation of the constraint equation.[10] Each constraint equation will have up to four RHS values, one each for short-term PASA, medium-term PASA, pre-dispatch and dispatch. This allows for more detailed information to be incorporated by the dispatch engine in determining optimal dispatch.

The constraint equation is also comprised of a left hand side (LHS), which represents the sum of terms, including generation and load terms that may be varied to minimise the cost of supply at any point in time.[11]

Binding Constraint Equations

Any network constraint can potentially affect the market, but only on the condition that the constraint equation becomes binding. When the constraint equation becomes binding, the power flow between locations is limited by the constraint. This may also influence the spot price as generators may be dispatched at higher levels than their offers may indicate, to keep the network within operating limits.

The situation arises where a generating plant may be constrained-off, or constrained-on with respect to the regional reference price. In such instances the spot price may not be

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[8] Generation sensitivities are required to be able to vary generation output. A factor is assigned to each generator that is related to the ability of the generator to change the loading on the overloaded part of the network and relieve particular transmission network overload. There is also a rate of change limitation associated with the ability of interconnectors to relieve overloaded parts of the network.

[9] See document *Constraint Naming Guidelines.*

[10] Page 13 of Document Number S0_OP3709, *NEMMCO Operating Procedure – Generic Constraints due to Network Limitations,* 16 December 2003.

[11] Different constraints also have different Constraint Violation Penalty (CVP) factors which will impact on the cost of imposing a particular set of constraint equations. In general, the higher the CVP price, the greater is the importance that the LP solver associates with complying with that Constraints RHS limit. *Dispatch Constraint Violation Penalty Factors* – Version 4, 7 March 2002.

consistent with dispatch for participants if their plant is constrained by a binding intra-regional network constraint.[12]

Management of Network Limitations

During the latter part of 2002, NEMMCO encountered some difficulty in controlling the flows between Murray and Upper Tumut switching stations in the Snowy region to within the required secure limits. NEMMCO imposed discretionary constraints on interconnector flows and generation whenever the problem arose.[13] NEMMCO determined that a more effective interim approach was required whilst a longer-term solution would be developed as a separate process.

In December 2002, NEMMCO advised the market of a revised proposal to use an alternative ('option 4') formulation for the constraint equation across the Murray and Upper Tumut switching stations. This approach keeps generators and interconnector terms on the LHS of the equation affirming both terms to be varied in setting the conditions impacting on the dispatch process.

Feedback was received from market participants in response to NEMMCO's 'option 4' formulation and in March 2003, NEMMCO subsequently released a draft report that developed the initial proposal to an overall policy to ensure similar interim issues were dealt with consistently. A final report was released on 3 July 2003 detailing further comments from participants and NEMMCO's final position that:

- NEMMCO will establish a framework in order to make consistent decisions on whether a given constraint should be considered to be materially effective;
- If a constraint is judged ineffective, NEMMCO will reformulate the constraint as an 'option 4' type with both intra-regional generation and interconnection terms on the LHS;
- NEMMCO will put in place a consistent process to minimise any negative residues that might arise when network constraints bind through a combination of pre-emptive action based upon pre-dispatch forecasts or prompt action if such negative residues arise without warning.

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[12] Clause 5.5(f) of the code provides for potential negotiated arrangements between participants and Network Service Providers for compensation in such instances. *National Electricity Market Intra-Regional Constraint – Market Operations*, 8 September 1998.

[13] These types of constraints are for use at the discretion of NEMMCO control room staff to meet any requirements that results in the need to limit power flow on major network components. These may be used with routine planned outages where a constant limit on power flow is required, but can also be used as a post-contingent response to reduce or limit network power flow or at any time that a system security issue arises and control of power on a single network element is required. Page 46 of Document Number S0_OP3709, *NEMMCO Operating Procedure – Generic Constraints due to Network Limitations,* 16 December 2003.

NEMMCO stated that it would apply this interim policy to the Murray -Tumut Network limitation with the aim of implementing required changes in accordance with this policy by end of October 2003. In addition NEMMCO would apply the test developed in its report to the Bayswater- Liddell and Tarong network limitations to determine whether or not changes to the constraint formulation were justified. NEMMCO was of the view that its proposed actions were consistent with the code. It acknowledged that other participants had expressed contrary views. For this reason NEMMCO sought a derogation to put beyond doubt its right to take such action.

An alternative approach and the 'option 1' constraint formulation

Responses to the consultation undertaken by NECA on the draft derogation sought by NEMMCO were split between those who supported NEMMCO's proposal and those who favoured an alternative approach put forward by the New South Wales generators. This revised approach is termed the 'option1' approach and would place all of the interconnector terms on the RHS of the constraint equation. This implies that the interconnector terms are *not* co-optimised with the generator terms. Intra-regional generation would be constrained to manage flow on a critical network element.

4.2 Issues for the ACCC

In assessing these applications for authorisation, the ACCC must consider whether the public benefits arising from the improved ability of NEMMCO to manage system security and better utilise available transmission capacity outweigh the detriments associated with inefficient market dispatch of generation and reduced competition that may occur.

4.3 What the applicant says

NECA acknowledges a need to make both short and long term improvements to the dispatch of the market where the existing arrangements are proving ineffective in managing system security or are resulting in poor utilisation of available transmission capacity. NECA also acknowledges the inadequacy of the current code provisions in providing a specific framework for governing dispatch.

NECA has proposed a way forward intended to address the inadequacy in the short term, by providing express powers to NEMMCO to manage negative settlement residues and to combine inter and intra-regional limits in the same constraint equations. This compromise solution is neutral between the two alternatives initially proposed since those elements are common to both. Further, NECA's proposal was endorsed by all those attending NECA's consultation meeting. The derogation has a sunset clause which means it will cease to have effect at the end of December 2004. This is intended to represent a trigger to re-address the issues following any changes to the regulatory and institutional arrangements for transmission.

4.3 What the interested parties say

Snowy Hydro supports NECA's proposed derogation relating to dispatching the market – interim arrangements, but opposes the use of the 'option 1' type constraint formulations on the grounds that the use of the 'option 1' constraint formulation will result in the following deficiencies:

- inefficient market dispatch of generation;
- significant impacts on the value of spot trading to the market; and
- reduced competition by eliminating Tumut generation from the NSW region bid stack and hence, reduced market efficiency.

Snowy Hydro is also concerned that without an appropriate regional boundary definition for the Snowy region, incorrect pricing and inefficient dispatch of Tumut generation will prevail.

4.5 ACCC's considerations

A Combined Approach

The ACCC understands that NEMMCO is seeking to adopt an interim approach for the management of network limitations where the current formulations are found to be ineffective.[14]

The derogation allows NEMMCO to use the 'option 4' approach to constraint formulation if a constraint has bound for more than 10 hours over the past year, or trends indicate that the constraint will bind for more than 10 hours over a year. NEMMCO will seek to change the constraint formulation if it is found to be ineffective in maintaining power flows within the required limits or ineffective in utilising the available transmission capacity.

This is the case with the Snowy limitation presented in figure one below:

[14] NEMMCO defines an ineffective constraint equation according to the tests outlined on page 31 of *Management of network limitations within the Snowy Region and constraint formulation in the NEM – interim action*s – Final Report, 3 July 2003. These tests refer to the ability of the current constraint formulation to maintain flows within network limits, to require overly conservative safety margins and which lead to inefficient utilisation of network capability.

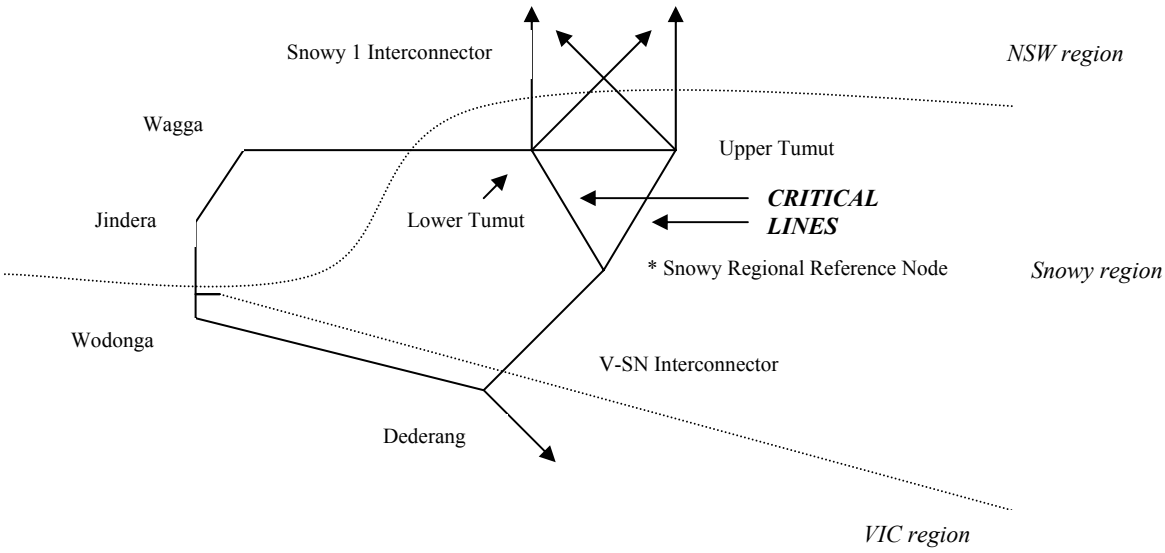

Figure 1: Snowy Limitations showing critical elements.

The derogation also allows NEMMCO to use the 'option 4' approach if the pre-NEM constraint formulation is significantly out of alignment with current NEM practice, as is the case with intra-regional constraints in southern New South Wales.

The ACCC also understands the derogation sets out that when NEMMCO assesses that counter-price flows will lead to the accumulation of negative settlement residues (SRAs), NEMMCO will use an 'option 1' approach to stop this accumulation. This implies that any interconnectors associated within a constraint formulation will be dispatched first, as opposed to generation and interconnection being co-optimised under the 'option 4' formulation. This process will minimise the effect of counter-price flows and the accumulation of negative settlement residues.

Pragmatic interim response

The options presented under the derogation are ultimately 'second-best' solutions which will impact on participants in the market. Snowy Hydro states that the 'option 1' approach would reduce market efficiency as it excludes Tumut generation from the New South Wales bid stack, due to the intra-regional constraint in the Snowy Region. The same argument can be used for generation in southern Queensland.

The ACCC's view is that regardless of the approach taken here, a 'first-best' solution would involve appropriate locational pricing so that productive and dynamic efficiencies are met, generators are dispatched according to bids, and competition assures efficiency. The ACCC notes that the Ministerial Council of Energy is pushing

forward with work on the review of the regional boundaries with the hope of a potential 'first best' solution.

The approach outlined in the proposed derogation is therefore a pragmatic approach, which has associated with it, a sunset clause which seeks to provide the impetus for further reforms. The ACCC notes that NEMMCO already incorporates the proposed formulation in its arrangement of network limitations, thus minimising the costs of implementing the derogation.

Firmness of SRA's

As outlined above, the use of the 'option 1' approach when the potential for counter-price flows lead to the accumulation of negative settlement residues will favour interconnectors compared to intra-regional generation. Although this is not necessarily competitively neutral, there is benefit in the form of increased firmness in SRA's.

SRA's are used to manage the risk associated with inter-regional trade in the NEM. Inter-regional trade to some extent decreases the potential of local market power through the facilitation of a national market for generation. The firmness of the SRA's is therefore an important objective to an appropriate mechanism for NEMMCO to manage constraints. The proposed derogation maintains positive and thus firmer SRA's. The ACCC considers that on balance the benefits associated with firm SRA's outweighs any detriment associated with favouring interconnectors over intra-regional generation in the dispatch process. Further, the ACCC believes that the benefits associated with firm SRAs are such that the code changes should be authorised.

System Security under 'option 1'

The 'option 4' approach provides a greater security threshold given that the co-optimisation of interconnector and generation terms provides NEMMCO with more 'levers' than optimising generation alone as would be the case under the 'option 1' approach.

Overall

The ACCC considers that 'option 1' will only be used under certain circumstances, and provided that the secure operating state of the network is a given under the code, the value of firm SRA's to facilitate inter-regional trade is a benefit to the entire market. On balance, this benefit outweighs the potential detriment of a reduced increment of capacity under the 'option 1'approach.

It is also envisaged that an increase in transparency and consistency of any mechanism to manage network limitations would provide for the greater use of dynamic limits during times of constrained optimisation. The ACCC sees benefits flowing from this increased use, although NEMMCO must ultimately monitor the overall affect and compare system security against the benefits outlined here.

5. Draft Determination

On 16 December 2004, the ACCC received applications for authorisations (Nos A90892, A90893, A90894) of amendments to the code. The application was submitted by NECA, on behalf of NEMMCO.

NEMMCO proposed a derogation intended to give effect to proposals for the management of network limitations within the Snowy region and constraint formulation in the NEM. NEMMCO's report proposed to adopt an approach to the formulation of constraints involving what it termed optimal dispatch based on bids and offers. This proposal also gave NEMMCO express powers to manage counter-price flows, and therefore the negative settlement residues.

The applications were made under sub-sections 88 (1) and 88 (8) of the *Trade Practices Act 1974* (the TPA) to:

- Make or give effect to a contract or arrangement, or arrive at an understanding, where a provision of that proposed contract, arrangement or understanding would be, or might be, an exclusionary provision within the meaning of section 45 of the TPA (Form A);

- Make or give effect to a contract or arrangement, or arrive at an understanding, a provision of which would have the purpose, or would or might have the effect, of substantially lessening competition within the meaning of section 45 of the TPA (Form B); and

- Engage in conduct that constitutes or may constitute the practice of exclusive dealing, within the meaning of section 47 of the TPA (Form E).

For the reasons outlined in Section 4 of this determination, the ACCC proposes, subject to any pre-determination conference requested pursuant to section 90A of the TPA, to grant authorisation to applications A90892 and A90893 pursuant to subsection 88(1) of the TPA and to grant authorisation to application A90894 pursuant to subsection 88(8) of the TPA. The period of authorisation is to 31 December 2004.