IRPC

Inter Regional Planning Committee

Final Determination: Criteria for Assessing Material Inter-Network Impact of Transmission Augmentations

Prepared by: Material Inter-network Impact Working Group

Version No: 1.3

FINAL

TABLE OF CONTENTS

Abbreviations

ACCC	Australian Competition and Consumer Commission
IRPC	Inter-Regional Planning Committee
NEC	National Electricity Code
NECA	National Electricity Code Administrator
NEMMCO	National Electricity Market Management Company
TNSP	Transmission Network Service Provider

1. Introduction

The national grid in Australia includes a number of transmission networks loosely interconnected together. As a result of the interconnections between regions there is potential for changes in transmission networks in one region to affect materially the capability and/or performance of other transmission networks.

In the Network and Distributed Resources code changes gazetted on 8 March 2002, the potential for transmission augmentations to have material impact is recognised through changes to processes for establishment of new transmission assets. The changes to the establishment processes for New Small Network Assets, New Large Network Assets and Funded Augmentations require material inter-network impact to be assessed.

The Code requires the IRPC to develop and publish criteria by which material inter-network impact is assessed for transmission network augmentations taking into account Objectives and Guiding Principles developed by NECA. The purpose of this document is therefore, to identify issues associated with determination of material inter-network impact and present a set of criteria, together with NECA's guidelines, for consideration, in accordance with Code consultation procedures.

1.1 Code Requirements for IRPC to Develop Objective Criteria

Under Clause 5.6.3 (i) of the National Electricity Code the Inter Regional Planning Committee is required to develop and publish criteria for the assessment of whether or not a proposed transmission system augmentation is reasonably likely to have a material inter-network impact.

In developing the objective set of criteria referred to in this clause, the Inter-regional Planning Committee must have regard to the relevant guiding objectives and principles provided by NECA in accordance with clause 5.6.3(n).

A material inter-network impact is described by the NEC as a material impact on another Transmission Network Service Provider's network, including (without limitation) consideration of whether, at the time the proposed transmission network augmentation is brought into service, the augmentation will:

(a) impose power transfer constraints within another Transmission Network Service Provider's network; or

(b) adversely impact on the quality of supply in another Transmission Network Service Provider's network.

2. Background

2.1 New Large and Small Network Assets and Funded Augmentations

The assessment of material impact is required under planning and approvals processes for augmentations including New Large Network Assets, New Small

Network Assets and Funded augmentations. Actual definitions may be found in Appendix 4, but in essence, New Large Network Assets are assets that are estimated to have a cost exceeding $10 million, while New Small Network Assets are assets with costs estimated to be in the range $1 million to $10 million, unless the ACCC determines other criteria. Funded augmentations are augmentations for which the TNSP is not entitled to receive regulated income. While the planning approval processes for these different classes of asset are different, in each case the part of the procedure involving assessment of material impact is similar. Figure 1 shows a flow chart for planning and approval of small network assets, based on Clause 5.6.2A. It has two paths depending on whether material impact is implied, and whether consent for the transmission network augmentation has been obtained from affected TNSPs. If there is the possibility of material impact and consent has not been obtained the initiating TNSP must request the IRPC to provide an Augmentation Technical Report. Similar references to material inter-network impact for New Large Network Assets and Funded Augmentations may be found in Clauses 5.6.6 and 5.6.6B respectively (listed in Appendix 4).

2.2 Augmentation Technical Report

The IRPC is required, upon receiving a request for an Augmentation Technical Report (Clause 5.6.3j(1)) to undertake a review of all matters referred to it by the Transmission Network Service Provider in order to assess the augmentation proposal and determine:

(i) the performance requirements for the equipment to be connected;

(ii) the extent and cost of augmentations and changes to all affected transmission networks; and

(iii) the possible material effect of the new connection on the network power transfer capability including that of other transmission networks.

2.3 Schedule 5.1

Schedule 5.1 of the Code describes the planning, design and operating criteria that must be applied by Network Service Providers to the networks they manage. Criteria from Schedule 5.1 pertinent to this discussion include:

- Network service levels;
- Voltage control;
- Quality of supply (voltage fluctuations, harmonics, voltage unbalance);
- Stability.

Planning and Approval of New Small Network Asset Code Clause 5.6.6A

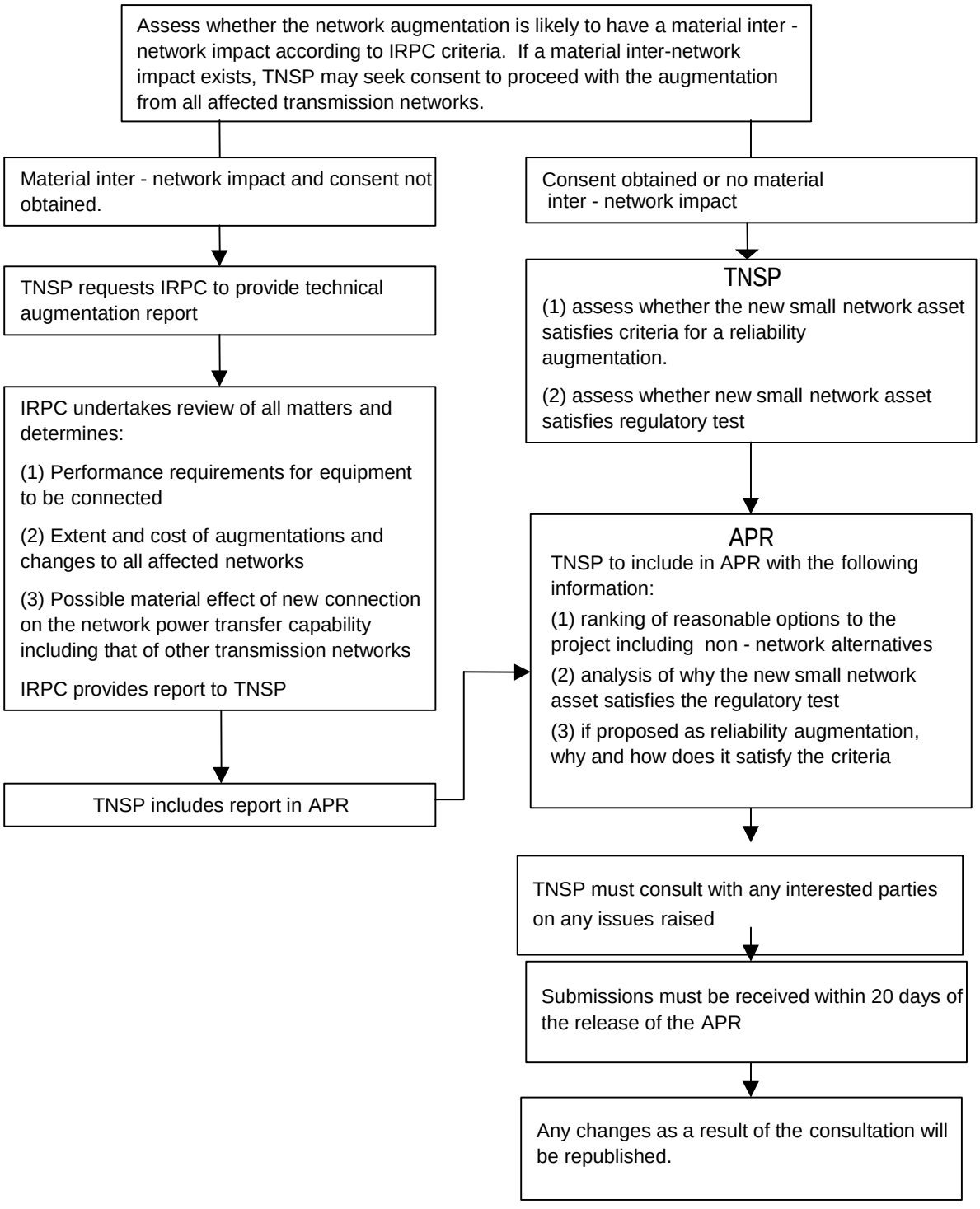

Figure 1 Planning and approvals process for small network assets [1]

The material impacts on transmission network performance can be related to the network performance standards outlined in Schedule 5.1.

3. Guiding Principles

Clause 5.6.3(n) of the Code requires NECA in consultation with NEMMCO to develop a set of guiding principles to assist the IRPC in its formulation of criteria:

NECA must, in consultation with NEMMCO, provide the Inter-regional Planning Committee with guiding objectives and principles for the development by the Inter-regional Planning Committee of the criteria for assessing whether a proposed transmission network augmentation is reasonably likely to have a material inter-network impact and/or is a reliability augmentation under clauses 5.6.3(i) and 5.6.3(l) respectively.

In accordance with this clause a set of Guiding Principles has been developed and is listed in Appendix 1.

4. Issues

4.1 Pre-initial Consultation

An Issues Paper was published as the basis for the initial industry consultation [2]. This document raised a number of issues for the consideration of interested parties:

4.1.1 Extent of Application of Material Impact

The IRPC MINI working group discussed the extent of application of the material impact clauses, in particular whether they were intended to apply to impacts on the transmission network from distribution augmentations. The glossary definition of material inter-network impact specifies impacts from transmission augmentations, but may also apply to impacts from other causes. However, the requirement to develop criteria appears to be tied specifically to transmission augmentations.

4.1.2 Objective criteria

The Guiding Principles stress the need for transparency and objectivity in the criteria to be developed. Therefore effort has been made to ensure that the criteria developed are able to be assessed using tools available to the TNSP and information that can reasonably be expected to be obtained.

4.1.3 Increase in power transfer limits

Some members of the IRPC indicated concern about the inclusion in NECA's Guiding Principles of the following statement, expressing that it is outside the scope of material inter-network impact as defined in the Code:

> 'Material inter-network impact is implied if increases to the inter-network power transfer capability arising from the augmentation constitute any part of the justification of the augmentation passing the regulatory test'.

4.1.4 Generation reserve level criterion

There was discussion as to whether the following criterion should be included:

> 'material impact for a transmission augmentation occurs if a reduction in transfer limit causes a reduction in generation reserve of more than 50 MW in any region'

In particular debate covered the following aspects:

- Is this a transmission issue?
- Is it possible to have a reduction in generation reserve level as a result of transmission network augmentation without a corresponding decrease in power transfer capability that would be captured under the 50 MW or 3% clause?
- If a reduction in reserve level results from connection of a new load (with a transformer augmentation, for example), would this constitute material impact?

4.1.5 Choice of threshold for power transfer capability

Material inter-network impact is inferred if there is a significant change in power constraints across network boundaries. For objectivity, a threshold is required for assessing that a material inter-network impact has occurred.

The IRPC has selected the minimum of 50 MW and 3% of the maximum transfer capability as the threshold for reduction of power transfer capability. For reductions in transfer capability greater than this value, material inter-network impact is implied. These parameters were chosen with considering:

- the change in the transfer limit must be distinguishable/measurable compared with the tolerance on the calculated limit from the simulation process;
- the change in the transfer limit must be greater than the standard error of the limit equation derived from regression technique; and
- the threshold must take into account the size of the transfer capability

4.1.6 Choice of threshold for reduction in damping of electro-mechanical modes of oscillation

The selection of 0.3 nepers/s is based on National Electricity Code requirement (clause S5.1.8) that planning damping levels not exceed a 5 second halving time, which is equivalent to 0.139 nepers/s. This level of damping is the limit of acceptability and any electromechanical mode of oscillation with damping near this limit requires significant analysis to prove compliance. At damping levels more than approximately twice the Code limit, the nomination of 0.3 nepers/s, any change to damping levels is considered not to impose a threat to system security. Changes to

damping where the mode of oscillation is below 0.3 nepers/s become significant and will therefore require more detailed analysis to evaluate the true impact of the augmentation.

4.1.7 Screening to determine where material impact needs to be assessed

The IRPC considered that under some circumstances it should be possible to apply simple rules to determine that material impact was unlikely. In this instance it would not be necessary to assess every criterion. The development of such a screening process would be consistent with NECA guidelines which state that the "application of the criteria by TNSPs should aim to improve transparency and minimise risks without unnecessarily complicating or delaying the assessment of projects". A recommended screening process is listed in Appendix 3.

4.2 Issues Raised during the Initial Consultation

Issues raised in submissions following the release of the initial consultation document are examined below.

4.2.1 Should the IRPC in its development of criteria for material inter-network impact broaden its focus to include the impact of general power system augmentations?

Origin Energy suggests that the IRPC broaden the scope outlined in the Issues Paper to incorporate the material inter-network impact of distribution, load and generation projects, rather than focusing mainly on transmission system augmentation. Origin Energy believes under current Code provisions, IRPC can broaden its Issues scope, as material changes to distribution, load and generation systems will require augmentation of the transmission network, although if this is to prove inadequate, Origin supports Code change for inclusion of changes to the Code.

Powerlink believes that the Issues Paper contains discrepancies that may lead to conclusions that material inter-network impacts can occur in instances other than as a result of an augmentation. Powerlink raises NECA's definition of material inter-network impacts resulting from transmission system augmentation.

IRPC View:

The Issues Paper discussing the issues of material inter-network impacts of network augmentation is published in accordance with the National Electricity Code (5.6.3(i)) where it states that:

"The Inter-regional Planning Committee must develop and publish, and may vary from time to time, an objective set of criteria for assessing whether or not a proposed transmission network augmentation is reasonably likely to have a material inter-network impact, in accordance with the Code consultation procedures."

Whilst the IRPC recognises the inter-network impacts of load and generation projects, the obligations of the IRPC under Clause 5.6.3(i) relate specifically to development of criteria for assessing the material inter-network impact of transmission network augmentations.

However, consequential impacts are captured, to some extent, by these provisions. For example if a transmission augmentation reduces the impedance between a source of flicker and a load centre in another transmission network service provider's network, this will be captured. Likewise, if a transmission augmentation related to a new generator results in an increase in fault level in another TNSP's area (which might result in equipment needing to be upgraded), this will also be captured.

4.2.2 Should increase of inter-network transfer capability in the justification of the regulatory test infer a material inter-network impact?

Hydro Tasmania agrees that if an increase in inter-network power transfer capability is used as the justification for a transmission augmentation under the Regulatory Test this implies that the network augmentation has a material inter-network impact.

Powerlink however believes the criteria stating, "A material impact is inferred if increases to the inter-network power transfer capability arising from the augmentation constitute any part of the justification of the augmentation passing the regulatory test" is out of scope with the Code's definition of material inter-network impacts, and argues that the IRPC should not introduce a linkage between technical inter-network impacts and economic evaluations of a transmission network augmentation.

Powerlink argues that a TNSP who claims an increase in transfer limit is part of the justification for a project but fails to take into account constraints in another TNSP's region, will bear the regulatory risk if the increase cannot be achieved in practice. However, this does not result in another TNSP being required to undertake work, and therefore there is no material impact on another TNSP's network.

Powerlink recognises that the criterion addresses one of NECA's guiding principles, but believes this principle is not addressed by the Code's definition of material inter-network impacts, and therefore requests NECA to review the guiding principle.

IRPC View:

The views presented in submissions to the consultation represent largely opposing positions, and also reflect differences of opinion within the IRPC on this issue.

The IRPC would like to propose, as a compromise, that the link between increased transfer capability and the regulatory test be broken, and that the criterion be included as:

A material inter-network impact is inferred if there is an increase in power transfer capability between transmission networks of more than the minimum of 3% of maximum transfer capability and 50 MW, as a result of a transmission augmentation.

The reasoning behind this proposal is as follows:

If a material impact is assessed, there are two courses of action. One is that the TNSP obtain consent of affected TNSPs and the other is that the IRPC is requested to produce an Augmentation Technical Report. Therefore, if a consultative approach is taken by TNSPs the chances of a TNSP rejecting a transmission augmentation that increases transfer limits is probably very slim. It is arguable then that the consequences of including such a criterion are not significant.

The 50 MW / 3% change is consistent with the wording of the decrease in transfer capability criterion, previously included in the criterion set.

Arguably, there are some augmentations, particularly those relating to interconnectors, that do have a material impact – in that they cause TNSPs to undertake work. An example could be the Special Protection Scheme being implemented in Tasmania as a result of Basslink. The fact that interconnectors are necessarily joint projects supports the assertion that the consequence to TNSPs of including this criterion would not be significant.

Further more the Basslink example shows a limitation to the principle proposed by NECA: There is no economic justification under the Regulatory test for Basslink despite the fact that it clearly increases inter-regional transfer capability, because it is a Market Network Service.

The proposed wording is not in conflict with NECA's guiding principles, as listed in Appendix 1. The proposed wording encompasses those augmentations for which an increase in transfer limits is part of the justification of the project under the Regulatory Test.

It is noted also that there is a link in the Code between Material inter-network Impact and the need for inter-network tests (Clause 5.7.7). Material inter-network tests are commonly undertaken to verify increases in transfer limits. Thus, for consistency, it is useful to include an increase in transfer capability as a material inter-network impact in the criteria set.

4.2.3 How should the screening process outlined in Appendix 3 be applied?

Hydro Tasmania suggests that the screening process for material inter-network impact of transmissions system augmentations should include consideration of the impact of inter-regional power transfer. This is on the basis that it is better to identify any impact, in broad terms, at an early stage, and a review of inter-regional constraints will be necessary anyway.

Powerlink believes that the screening process should not form an integral part of defining material inter-network impacts of network augmentations. Powerlink agrees with the screening approach detailed in the Issues Paper.

IRPC Views:

The IRPC considers that the screening test as formulated in the issues paper is adequate to cover the situation of decreased transfer limits, using the proposed small signal stability assessment. The IRPC agrees that the present screening test may not be adequate to accommodate an increase in transfer limits criterion. It has also been determined that the wording of the screening test, as presented in the issues paper will not capture material impacts resulting from sub-synchronous resonance.

Therefore it is proposed to modify the screening test to incorporate wording that will cover both increases in transfer capability and sub-synchronous resonance. The new wording may be found in Appendix 3.

4.2.4 Should the criterion "material impact for a transmission augmentation occurs if a reduction in transfer limit causes a reduction in generation reserve of more than 50 MW in any region" be included?

Powerlink does not agree with the inclusion of the statement in the Issues Paper, believing such a criteria is covered in 50 MW / 3% criteria (power transfer capability reduction in section A2.1 of the Issues Paper), and the methodologies for calculating reserve margins lack 'prescription and uniformity',

Thus Powerlink believe such a criterion may give rise to disputation and does not add value to the technical criteria of material inter-network impacts of transmission system augmentation.

Hydro Tasmania also suggests the generation reserve level criterion proposed in section 4.4 of the Issues Paper be removed for simplicity, believing it does not add any value nor cause a problem.

IRPC View:

The IRPC have considered Powerlink's and Hydro Tasmania's suggestions, and agree to remove the reserve reduction criterion as it is adequately covered by the transfer capability criterion.

4.2.5 How should the fault level increase criterion be defined to imply material inter-network impact of a transmission augmentation?

Hydro Tasmania believes the trigger of fault level increase of over 10 MVA be applied to <u>any</u> substation in other TNSP's network to avoid problems arising from the definition of 'electrically closest' substation (section A2.2 of the Issues Paper).

IRPC View:

The IRPC agrees with Hydro Tasmania that the use of 'any substation' rather than 'electrically closest substation' is clearer. Therefore for the fault level increase criterion, 'electrically closest substation shall be replaced by 'any substation', thus ensuring that the correct substations accruing high fault level increases are identified.

5. Development of Criteria for Assessment of Material Inter-network Impact

Consideration has been given to making sure the criteria developed are objective, and precisely defined.

The IRPC has used the guiding principles as a basis for developing criteria for assessing material impact. Table 1 summarises the linkages between controlling principles from Appendix 1 and criteria associated with them from Appendix 2. Criteria should be applied taking into account the full descriptions including footnotes, as outlined in Appendix 2.

Table 1 Principles for determining Material Inter- Network Impact and Criteria for Assessment

Principle	Criterion
it is likely that another TNSP will need to take some action or commit resources as a result of the transmission augmentation	the transmission augmentation results in an increase of more than 10 MVA in fault level at any substation in another TNSP's network, unless it has been determined, by consultation with the affected TNSP that there is no material impact.
there is a significant change in power constraints across network boundaries or in other networks	the transmission augmentation results in a reduction of power transfer capability between transmission networks or within another TNSP's network of more than the minimum of 3% of maximum transfer capability and 50 MW
increases to the inter-network power transfer capability arising from the augmentation constitute any part of the justification of the augmentation passing the regulatory test	the transmission augmentation results in an increase of power transfer capability between transmission networks of more than the minimum of 3% of maximum transfer capability and 50 MW
there is a significant change to voltage or any power quality measures at the network boundary	as a result of a transmission augmentation, for steady state voltage conditions and reasonable generation patterns, the steady-state voltage of any transmission plant in another TNSP's network is changed by more than 1% unless it has been determined, by consultation with the affected TNSP that there is no material impact. In assessing this criterion, transformers should be allowed to change tap position, but reactive plant, in another TNSP's network should not be switched.
	as a result of a transmission augmentation, under system intact conditions , changes in voltage associated with switching of reactive plant exceed ±3 percent in another TNSP's network

Table 1 Principles for determining Material Inter- Network Impact and Criteria for Assessment	
Principle	**Criterion**
	as a result of a transmission augmentation, under situations of contingent loss or prior outage of any primary plant element, switching of reactive plant results in a sudden voltage change of more than ±5 percent in another TNSP's network
	as a result of a transmission augmentation, under situations of contingent loss or prior outage of any primary plant element, switching of primary plant results in a sudden voltage change of more than ±10 percent in another TNSP's network
	as a result of a transmission augmentation, voltage fluctuations contributions exceed (in another TNSP's network): • 0.35 for short term flicker severity (99^{th} percentile) or • 0.25 for long term flicker severity (99^{th} percentile)
	a transmission augmentation results in an increase in harmonic voltage distortion, in another TNSP's network, of more than 10% of the maximum allowable level under Clause S5.1.6 of the Code, considering both system intact and single contingency conditions
	a transmission augmentation results in an increase in voltage unbalance in another TNSP's network, by more than 25% of the level permitted under the S5.1.7 of the Code
the transmission augmentation is likely to lead to a reduction in the stability of the power system and, in particular, is likely to affect critical or near critical modes of instability	as a result of a transmission augmentation, for any inter-area mode of oscillation within 0.3 nepers/s of being unstable prior to the proposed transmission augmentation, there is a reduction of greater than 0.01 nepers/s in damping

Table 1 Principles for determining Material Inter- Network Impact and Criteria for Assessment	
Principle	**Criterion**
the transmission augmentation introduces issues of sub-synchronous resonance	If a transmission augmentation involves either • installation of a new series capacitor or • modification of the network impedance in the vicinity of an existing series capacitor then it has the potential to create sub-synchronous resonance and hence material inter-network impact is implied.

6. Review of Criteria

The IRPC may review these criteria when:

- there are changes to National Electricity Code which may affect the operation of these criteria;
- the guiding principles on which they are based change; or
- experience in their use demonstrates a need for reconsideration.

7. References

[1] NEMMCO, 2002 “Statement of Opportunities”, p10-10

[2] IRPC, 2004, “Issues Paper Vs 1.1” May 2004

Appendix 1. Guiding principles for the development by the IRPC of objective criteria for the identification of transmission augmentation projects that have a material inter- network impact

The national grid consists of a number of linked networks developed and operated by different service providers. This raises a number of challenges in ensuring the ongoing safe, efficient, secure and reliable development of the national grid. Meeting these challenges requires coordination between the various network service providers and an aim of chapter 5 of the Code is "to establish processes to ensure ongoing compliance with technical requirements of this chapter of the Code to facilitate management of the national grid."

Recognising these aims, the criteria developed should allow any transmission network service provider to determine, as definitely as possible, whether a transmission augmentation under consideration is likely to have a material impact on another network service provider.

The application of the criteria by TNSPs should aim to improve transparency and minimise risks without unnecessarily complicating or delaying the assessment of projects.

A material impact is inferred if:

- there is a need for information of the type developed in an augmentation technical report;
- it is likely that another TNSP will need to take some action or commit resources as a result of the augmentation, or
- increases to the inter-network power transfer capability arising from the augmentation constitute any part of the justification of the augmentation passing the regulatory test, or
- there is a significant change in power constraints across network boundaries or in other networks, or
- there is a significant change to voltage or any power quality measures at the network boundary, or
- the augmentation is likely to lead to a reduction in the stability of the power system and, in particular, is likely to affect critical or near critical modes of instability, or
- the augmentation introduces issues of sub-synchronous resonance.

The objective criteria should be capable of being applied using analytical tools readily available to all TNSPs.

The requirements determined under the objective criteria are not to the exclusion of any other obligations that might exist, including those in connection agreements or under any duty of care the network service provider might have to other parties.

NECA may modify these guiding principles and will review these when requested by the IRPC. The objective criteria should make provision for review and possible change when the guiding principles are modified, there are changes to the Code which might impact on these responsibilities and after a period of experience.

Appendix 2. Criteria for Determining Material Inter- network Impact

These criteria apply to transmission augmentations. Assessments of Material Inter-network Impact must take into account the equipment on the NEM that will exist at the time the augmentation is brought into service and also those projects committed at the time of the assessment being made.

Existing derogations for particular regions or connection agreements may override the values specified in these criteria. Derogations will therefore need to be examined when making assessments of material inter-network impact. Where connection agreements vary technical requirements in Schedules of Chapter 5 of the Code, these are required to be reported to NEMMCO annually. NEMMCO is required to provide this information to Network Service Providers, under Clause 5.2.3(c).

A2.1 Power Transfer Capability Criteria

Material inter-network impact for a transmission augmentation occurs if

- there is a decrease in power transfer capability between transmission networks or in another TNSP's network of more than the minimum of 3% of maximum transfer capability and 50 MW or
- there is an increase in power transfer capability between transmission networks of more than the minimum of 3% of maximum transfer capability and 50 MW or
- for any inter-area mode of oscillation within 0.3 nepers/s of being unstable prior to the proposed augmentation, there is a reduction of greater than 0.01 nepers/s in damping.

A2.2 Fault level increase criterion

Material inter-network impact for a transmission augmentation occurs if the augmentation will result in an increase in fault level of more than 10 MVA at any substation in another TNSP's network, unless it has been determined, by consultation with the affected TNSP, that there is no material impact.

A2.3 Sub-synchronous resonance criterion

Material inter-network impact for a transmission augmentation occurs if an augmentation involves either:

- installation of a new series capacitor or
- modification of the network impedance in the vicinity of an existing series capacitor.

Either of these has the potential to create sub-synchronous resonance.

A2.4 Quality of Supply Criteria

Steady State Voltage

A material inter-network impact occurs if, as a result of the transmission augmentation, for steady state voltage conditions and reasonable generation patterns, the steady-state voltage of any transmission plant in another TNSP's network is changed by more than 1%, unless it has been determined, by consultation with the affected TNSP that there is no material impact. In assessing this criterion, transformers should be allowed to change tap position, but reactive plant in another TNSP's network should not be switched.

Sudden voltage changes for regular switching of plant

A material inter-network impact occurs if, as a result of the transmission augmentation:

- under system intact conditions, changes in voltage associated with switching of reactive plant exceed ±3 percent in another TNSP's network;
- under situations of contingent loss or prior outage of any primary plant element, switching of reactive plant results in a sudden voltage change of more than ±5 percent in another TNSP's network;
- under situations of contingent loss or prior outage of any primary plant element, switching of primary plant results in a sudden voltage change of more than ±10 percent in another TNSP's network.

Voltage fluctuations

A material inter-network impact occurs if as a result of a transmission augmentation, voltage fluctuations contributions exceed (in another TNSP's network):

- 0.35 for short term flicker severity (99th percentile)
- 0.25 for long term flicker severity (99th percentile)

Harmonics

A material inter-network impact occurs if a transmission augmentation results in an increase in harmonic voltage distortion, in another TNSP's network, of more than 10% of the maximum allowable level under Clause S5.1.6 of the Code, considering both system intact and single contingency conditions.

Unbalance

A material inter-network impact occurs if a transmission augmentation results in an increase in voltage unbalance in another TNSP's network, by more than 25% of the level permitted under the S5.1.7 of the Code.

Appendix 3. Screening Process

Under some circumstances it is possible to determine that assessment of the criteria listed in Appendix 2 is not required, and that there is a low probability of material impact in another TNSP's network. Accordingly the following recommended screening process has been developed. Other screening processes are possible, and in some cases it may be possible to exercise professional judgement that there will not be a material impact. However, if any level of doubt exists then a screening process should be applied.

The recommended screening process is based on performing a limited set of studies, including fault level studies.

To screen for material inter-network impact for a change in transfer capability, a small but representative set of studies, representing boundary operating conditions, shall be undertaken. Assessment against the criteria in Appendix 2 is required if studies show a change in transfer limit more than the minimum of 3% of maximum inter-network transfer capability and 50 MW.

Fault level studies are also required. If a proposed transmission augmentation will result in an increase in the fault level by more than 10 MVA at any substation in another TNSP's network, it triggers the need for an assessment against the criteria listed in Appendix 2, unless in consultation with the affected TNSP, it is determined that there is no material impact.

Assessment of material inter-network impact against criteria in Appendix 2 is also required if the transmission augmentation involves either a series capacitor or modification in the vicinity of an existing series capacitor.

Appendix 4. Code references to material inter-network impact

The following clauses and definitions from the National Electricity Code make reference to material inter-network impact, or are relevant to the discussion on material inter-network impact.

A4.1 Definitions

augmentation

Works to enlarge a network or to increase the capability of a network to transmit or distribute active energy.

material inter-network impact

A material impact on another Transmission Network Service Provider's network, including (without limitation) consideration of whether, at the time the proposed transmission network augmentation is brought into service, the augmentation will:

- impose power transfer constraints within another Transmission Network Service Provider's network; or
- adversely impact on the quality of supply in another Transmission Network Service Provider's network.

new large network asset

An asset of a Transmission Network Service Provider which is an augmentation and in relation to which the Network Service Provider has estimated it will be required to invest a total capitalised expenditure in excess of $10 million, unless the ACCC publishes a requirement that a new large network asset will be distinguished from a new small network asset if it involves investment of a total capitalised expenditure in excess of another amount, or satisfaction of another criterion. Where such a specification has been made, an asset must require total capitalised expenditure of excess of that amount or satisfaction of those other criteria to be a new large network asset.

new small network asset

An asset of a Transmission Network Service Provider which is an augmentation and:

- in relation to which the Transmission Network Service Provider has estimated it will be required to invest a total capitalised expenditure in excess of $1million, unless the ACCC publishes a requirement that an asset will be a new small network asset if it involves investment of a total capitalised expenditure in excess of another amount, or satisfaction of another criterion. Where such a specification has been

made, an asset must require total capitalised expenditure in excess of that amount or satisfaction of those criteria to be a new small network asset

- is not a new large network asset.

funded augmentations

A transmission network augmentation for which the Transmission Network Service Provider is not entitled to receive a charge pursuant to Chapter 6.

A4.2 Relevant Clauses

5.6.2A Annual Planning Report

…

(b) The Annual Planning Report must set out:

(4) for all proposed augmentations to the network the following information, in sufficient detail relative to the size or significance of the project and the proposed operational date of the project:

…

(v) whether the proposed solution will have a material inter-network impact. In assessing whether an augmentation to the network will have a material inter-network impact a Transmission Network Service Provider must have regard to the objective set of criteria published by the Inter-regional Planning Committee in accordance with 5.6.3(i) (if any such criteria have been published by the Inter-regional Planning Committee);

(5) for all proposed new small network assets:

…

(ii) an augmentation technical report prepared by the Inter-regional Planning Committee in accordance 5.6.3(j) if, and only if, the asset is reasonably likely to have a material inter-network impact and the Transmission Network Service Provider has not received the consent to proceed with the proposed solution from all transmission networks materially affected by the new small network asset. In assessing whether a new small network asset is reasonably likely to have a material inter-network impact, an applicant must have regard to the objective set

of criteria published by the Inter-regional Planning Committee in accordance with 5.6.3(i) (if any such criteria have been published by the Inter-regional Planning Committee);

5.6.6 Applications to establish new large network assets

…

(b) An applicant who proposes to establish a new large network asset must consult all Code Participants and interested parties about the proposed new large network asset in accordance with clause 5.6.6. The applicant must make available to all Code Participants a notice (an 'application notice') which must set out:

….

(4) an augmentation technical report prepared by the Inter-regional Planning Committee in accordance with 5.6.3(j) if, and only if, the asset is reasonably likely to have a material inter-network impact and the applicant has not received the consent to proceed with such construction from all transmission networks materially affected by the new large network asset. In assessing whether a new large network asset is reasonably likely to have a material inter-network impact, an applicant must have regard to the objective set of criteria published by the Inter-regional Planning Committee in accordance with 5.6.3(i) (if any such criteria have been published by the Inter-regional Planning Committee);

5.6.6B Construction of Funded Augmentations

…

(b) A Transmission Network Service Provider who proposes to construct a funded augmentation must make available to all Code Participants a notice which must set out:

(3) an augmentation technical report prepared by the Inter-regional Planning Committee in accordance with 5.6.3(j) if, and only if, the funded augmentation is reasonably likely to have a material inter-network impact and the Transmission Network Service Provider has not received consent to proceed with construction from all transmission networks materially affected by the funded augmentation. In assessing whether a funded augmentation is reasonably likely to have a material inter-network impact, an applicant must have regard to the objective set of criteria published by the Inter-regional Planning Committee in accordance with 5.6.3(i) (if any such criteria have been published by the Inter-regional Planning Committee).

5.6.3 Inter-regional planning committee

….

i) The Inter-regional Planning Committee must develop and publish, and may vary from time to time, an objective set of criteria for assessing whether or not a proposed transmission network augmentation is reasonably likely to have a material inter-network impact, in accordance with the Code consultation procedures. In developing the objective set of criteria referred to in this clause, the Inter-regional Planning Committee must have regard to the relevant guiding objectives and principles provided by NECA in accordance with clause 5.6.3(n).

…

(m) Should the objective set of criteria referred to in clauses 5.6.3(i) and (l) be changed after an application notice has been made available to Code Participants, in the case of a new large network asset, or the publication of the Annual Planning Report, in the case of a new small network asset, then the applicant is able to choose whether their application should be assessed under the new criteria or under the criteria that existed at the time the application was made or the Annual Planning Report was published.

(n) NECA must, in consultation with NEMMCO, provide the Inter-regional Planning Committee with guiding objectives and principles for the development by the Inter-regional Planning Committee of the criteria for assessing whether a proposed transmission network augmentation is reasonably likely to have a material inter-network impact and/or is a reliability augmentation under clauses 5.6.3(i) and 5.6.3(l) respectively.

5.6.6 Applications to establish new large network assets

…

(h) Code Participants and interested parties may dispute the contents, assumptions, findings or recommendations of the final report prepared under clause 5.6.6(f) with respect to:

…

(2) whether the new large network asset will have a material inter-network impact;

…

(i) Where a dispute is referred to the Adviser in accordance with clause 5.6.6(h), clause 8.2 applies generally to the dispute except to the extent that the following provisions apply to the dispute:

…

(5) The DRP may determine whether the new large network asset will have a material inter-network impact and/or is a reliability augmentation. In doing so, the DRP must take into account the

Inter-regional Planning Committee's objective set of criteria for assessing whether the new large network asset is reasonably likely to have a material inter-network impact or whether it is a reliability augmentation (if any such criteria had been published by the Inter-regional Planning Committee at the time of preparation of the final report under clause 5.6.6(f)).