



# **Generator Performance Standards Consultation Paper**

## **Documents under consultation:**

- **Network Technical Code 4.0**
- **System Control Technical Code v6.0**
- **Secure System Guidelines v4.1**

18 December 2018

Submissions due by 8 February 2019

## **Consultation authorisation**

Ms Djuna Pollard

As Network Operator on behalf of Power and Water Corporation as Network Licence holder

Mr Malcolm Conway

As System Controller on behalf of Power and Water Corporation as System Control Licence holder

# Contents

|  |    |
|--|----|
| Consultation Paper .....                             | 1  |
| Contents of NTC consultation paper .....             | 2  |
| Consultation Process .....                           | 3  |
| Who is conducting the consultation .....             | 3  |
| Power to consult .....                               | 3  |
| Documents under consultation .....                   | 3  |
| Invitation to make a submission .....                | 3  |
| Summary of NTC revision process .....                | 5  |
| Summary of SCTC amendment process .....              | 6  |
| Consultation questions .....                         | 7  |
| Network Technical Code .....                         | 7  |
| System Control Technical Code .....                  | 7  |
| Attachments .....                                    | 8  |
| References .....                                     | 8  |
| Appendix A .....                                     | 9  |
| Definitions .....                                    | 9  |
| Abbreviations .....                                  | 9  |
| Appendix B .....                                     | 10 |
| About this Consultation Paper .....                  | 10 |
| About the Network Operator .....                     | 10 |
| About the Network Technical Code .....               | 10 |
| About the Network Planning Criteria .....            | 10 |
| About the System Controller .....                    | 10 |
| About the System Control Technical Code .....        | 10 |
| About the Secure System Guidelines .....             | 11 |
| About the Utilities Commission .....                 | 11 |
| Duration of consultation .....                       | 11 |
| Submissions .....                                    | 11 |
| Appendix C .....                                     | 12 |
| Network Technical Code changes .....                 | 12 |
| Impacts on Users .....                               | 12 |
| Proposed Code Amendment .....                        | 14 |
| List of Code amendments .....                        | 15 |
| Appendix D .....                                     | 19 |
| System Control Technical Code changes .....          | 19 |
| Impacts on System Participants & Network Users ..... | 19 |
| Proposed Code Amendments .....                       | 22 |
| Secure System Guidelines .....                       | 23 |
| Incident Reporting Guideline .....                   | 23 |
| List of Code amendments .....                        | 24 |

# Consultation Process

## Who is conducting the consultation

Power and Water holds the network operator and system controller licences for the NT. The following people have a role in the consultation process on behalf of the organisation:

- Ms Djuna Pollard, as Network Operator.
- Mr Malcolm Conway, as System Controller.
- Ms Jodi Triggs, as Market Operator.

The Market Operator is conducting the consultation process on behalf of the Network Operator and the System Controller.

## Power to consult

The power to consult on the Network Technical Code ('NTC') is derived from the Electricity Reform Act, clause 66A(5).

The power to consult on the System Control Technical Code ('SCTC') is also derived from the Electricity Reform Act, clause 38(1), and the Electricity Reform (Administration) Regulations, clause 5A(3). The System Controller is publishing the amended SCTC and Secure System Guidelines ('SSG') in accordance with obligations contained in clause 1.8.2 of the SCTC.

## Documents under consultation

The following documents are under consultation:

1. The Network Technical Code. The revised NTC will have significant implications for System Participants, Network Users and Power and Water, as its modifications reflect upgraded technical connection requirements.
2. The System Control Technical Code. The revised SCTC will have minimal implications for System Participants, Network Users who not System Participants (un-licensed Network Users), and Power and Water. This is because its amendments reflect either requirements currently imposed by the NTC or are unrelated editorials which have been included to improve readability of the document. In total there are approximately 20 clauses and 15 Glossary definitions impacted by this revision (excluding multiple instances of a common term).
3. Secure System Guidelines. The revised SSG has no impact for System Participants, Network Users and Power and Water. This is because it merely involves adding the term 'technical envelope' to the definitions, and changing that term, as used in the body of the document, to italic format.

## Invitation to make a submission

Consistent with the requirement to consult:

- the Network Operator seeks to involve all relevant parties in the revision process, including all System Participants, Users and other interested people. Consequently, submissions are invited from all parties who have an interest in the document.
- the System Controller seeks to involve all relevant people in the amendment process, including System Participants, Network Users who are not System Participants, and other interested people. Consequently, submissions are invited from all parties who have an interest in the document.

A single submission should be provided to the Market Operator in response to this Consultation Paper by:

**2pm, Friday 8 February 2019.** Earlier submissions are welcome.

The submission should be sent electronically in pdf format. Please contact the Market Operator if an alternate

method of delivery is required. For the avoidance of doubt, comments on the NTC revisions should be included within the same document as any comments on the SCTC amendments so that only one submission for both documents under consultation is presented to the Market Operator.

Enquiries on any aspect of the NTC modifications should be addressed to:

**Network Operator**

Power and Water Corporation  
Attention: Djuna Pollard  
Executive General Manager Network Services  
Email: [market.operator@powerwater.com.au](mailto:market.operator@powerwater.com.au)

Enquiries on any aspect of the SCTC modifications should be addressed to:

**System Controller**

Power and Water Corporation  
Attention: Mr Malcolm Conway  
General Manager System Control  
Email: [market.operator@powerwater.com.au](mailto:market.operator@powerwater.com.au)

Upon receipt of the submission, a confirmation of receipt will be issued. It is the submitter's responsibility to ensure successful delivery of its submission should a receipt not be received.

Following receipt of submissions, representatives of the Network Operator and the System Controller will review the comments provided and prepare a summary report detailing all submissions, the final decisions and outcomes. The summary report will be sent to each person who made a submission as well as being published on the Power and Water Corporation's website<sup>1</sup>. Power and Water reserves the right to include the NTC, SCTC and SSG summary details in the one report, or to provide individual summary reports for the NTC and SCTC.

The revised NTC will be packaged with the amended SCTC and SSG, along with the Feedback Report(s) and submitted to the Utilities Commission for approval.

---

<sup>1</sup> The summary report will be published on the Market Operator page.

## Summary of NTC amendment process

The NT Government is undertaking a suite of reforms to promote renewable energy in the NT electricity supply industry, and to accommodate the growing number of proponents who have expressed interest in connecting to the NT power systems. The NT Government recognised that an alignment of regulatory arrangements with those operating in the National Electricity Market, where possible, will reduce the barriers to entry for investors. The transition path to a commercial market will occur as the market develops, bringing further changes to the NTC and SCTC – those changes have been excluded from the documents under review in this round of consultation.

One of the short-term actions is to modify the network connection process to accommodate the characteristics of large-scale renewable technologies and increasing penetration of renewable energy while maintaining power system security and reliability. This action was specified in 4(c) of the NT Government's Renewable Energy and Electricity Market Reform Implementation Plan 2018-2020. Power and Water was assigned this action.

Among the key principles of the NT Government's Roadmap to Renewables is a requirement to maintain energy security, reliability and stability during the transition to renewable energy. In supporting these principles, the Network Operator and System Controller, together, have applied a "do no harm" approach in setting the performance requirements for new generators. In simple terms, new generators that enter the NT market that displace existing generators will need to provide some of the performance attributes of generators displaced. This approach is similar to that taken by the Australian Energy Market Commission (AEMC) in its suite of recent rule changes that support the increasing penetration of renewable energy. Hence, the proposed approach is to adopt new generator performance standards that are largely based on the National Electricity Rules (NER) Chapter 5 Schedule 5.2 except where adoption may impose unnecessary or unjustified costs that may be borne by consumers. In the case of the latter, adaptation of the NER equivalent standard was applied to suit NT circumstances in particular the scale of the power system compared to the NEM. This approach of modifying the provisions of Schedule 5.2 where the costs of adoption may outweigh the benefits and to reflect Territory circumstances is intended to ensure consistency with the Territory's approach to applying the NER to ensure it provides a fit-for-purpose regulatory framework for the Territory.

Consequently, Power and Water, as the Network Operator, is revising the NTC:

1. to incorporate the Generator Performance Standards as specified in Action 4(c) of the NT Government's Renewable Energy and Electricity Market Reform Implementation Plan 2018-2020. The Generator Performance Standards are largely based on the NER Schedule 5.2 'Conditions for Connection of Generators' (also referred to as Generator Connection Requirements).
2. by removing duplication and simplify regulations across the two codes (NTC & SCTC);
3. to ensure alignment of the Network Technical Code with the NER requirements that will be progressively adopted; and
4. in readiness for further changes to the electricity market in the Northern Territory.

The changes in the NTC are concentrated around clauses 3.3 'Requirements for connection of generators', 4.0 'Power System Security', and 9.0 'Operation of Generators connected to the Network'. The changes impact on Users in the Darwin-Katherine, Tennant Creek and Alice Springs power systems. This Consultation Paper outlines the material changes that have been made to the NTC.

The current NT electricity network connection process is found in the Power and Water document 'Network Technical Code and Network Planning Criteria', version 3.1 dated December 2013. The Government's Implementation Plan action has progressed by Power and Water to the point where the generator performance standards can now be incorporated in a revised NTC.

For the short term the Government proposes to use the existing regulatory framework, primarily the NTC as the legal instrument to accommodate connections that recognise the contributions and constraints of renewable technologies above a capacity (as specified in Section 19 of the SSG) which must be registered with

the System Controller.

Consequently, the Network Operator proposes to:

- update the overall generator performance standards in Section 3.3 of the NTC to those used in the NEM, where possible; and
- remove overlap and duplication between the NTC and System Control documents.

It is noted that the material on 'Network Planning Criteria' has not been changed, other than one minor editorial in clause 16.3.

The NTC will continue to be used as the regulatory instrument to manage network connections to the regulated power systems until it is superseded by Chapter 5 of the Northern Territory National Electricity Rules.

In this revision, some elements of the NTC will be transferred to the SCTC and/or the SSG, requiring consultation on those documents to allow the modified elements to be formally adopted in their new home. Accordingly, the amended SCTC and SSG will be circulated as part of the NTC consultation package.

## Summary of SCTC amendment process

The System Controller is amending the SCTC:

1. to assist in removing duplication and inconsistency during the NTC revision, including providing clarity around the obligations on Users who connect to the electricity network but are not required to be licenced to operate at that connection point by the Utilities Commission;
2. making editorial changes to the Plant Numbering, Nomenclature and Drawings clause (clause 6.14) to align more clearly with the Glossary definition of nomenclature; and
3. making a few minor editorial changes to improve reading clarity.

No change has been made to the current arrangements for the Interim Northern Territory Electricity Market (I-NTEM) in the Darwin-Katherine power system. No change is proposed to the current arrangements for the Tennant Creek and Alice Springs power systems.

This Consultation Paper outlines the changes that have been made to the SCTC and the SSG. The changes made to the SCTC are detailed in Appendix D. Because they have arisen as a result of the revision of the NTC, the changes need to be viewed in the context of that document.

Note 1: The Secure System Guidelines have been modified (to a minor extent) alongside the SCTC as part of the NTC revision. Whilst it has been included in the consultation package at this time for completeness and transparency. The changes are explained below in Appendix D. Further changes (which will trigger a formal consultation process) will be made to the SSG once the changes to the SCTC are approved.

Note 2: a further two revisions of the SCTC are expected to be conducted during 2019. One is to cater for changes to the I-NTEM to transition the market towards the NTEM. The second is to address editorials that the System Controller considers need attention but would distract from consultations that were driven by the NTC and NTEM updates. The sequence of these two additional consultations will be subject to timing considerations.

Note 3: the SCTC will continue to be used as the regulatory instrument to implement the electricity market arrangements at least in the short term. However, no market arrangements have been altered in the SCTC to support the NTC consultation process.

# Consultation questions

## Network Technical Code

In forming responses to the proposed NTC amendments stakeholders are invited to view them against the information that has been transferred to the SCTC, as well as the existing SCTC provisions. Stakeholders are particularly invited to comment on whether:

- the proposed changes to the NTC (that are largely based on the National Electricity Rules (NER) Chapter 5 Schedule 5.2), are appropriate for the Territory and where they are different to the NER, whether this is appropriate and why;
- the proposed changes to the NTC are likely to provide the least cost to Territory end use customers while meeting the objectives of the NT Roadmap to Renewables of increasing the level of renewable energy while maintaining energy security, reliability and stability;
- the provisions that have been transferred from the NTC to the SCTC have been adequately stated in the SCTC;
- the provisions in the NTC that have been deleted (that is, not relocated in the SCTC, or earmarked for location in another System Control document), are no longer required;
- any duplication between the NTC and the SCTC remains;
- any inconsistency between the NTC and the SCTC is evident;
- any gaps have arisen in the transfer of information to the SCTC, or in its deletion; and
- the proposed NTC provisions can be expressed in a more user-friendly manner.

## System Control Technical Code

In forming responses to these proposed SCTC amendments stakeholders are invited to view them in the context of the NTC revision. Stakeholders are particularly invited to comment on whether:

- any duplication between the NTC and the SCTC remains;
- the provisions transferred from the NTC have been adequately stated in the SCTC if they are still relevant;
- any gaps have arisen in the transfer (or lack of transfer) of information to the SCTC; and
- the proposed SCTC provisions can be expressed in a more user-friendly manner.

In particular, the following question is aimed to guide the responses for this consultation process:

1. Issue: The NTC makes extensive use of the term 'User'. This term doesn't integrate easily within the current version of the SCTC. An approach has been taken by reworking clause 3.3.3 of the SCTC to retain the use of the term System Participant as the key entity to which the System Controller has a direct relationship with (as per the Act and the Regulations). Noting that the Network Operator is a System Participant, and that party also has a contract (access agreement) with Users, and in particular un-licenced users, the Network Operator can act as an interface between the System Controller and this classification of User. Refer also to the note in clause 3.3.1(s).

Questions:

- (a) do the changes in SCTC clause 3.3.3 and the note in clause 3.3.1(s) adequately reflect the current range of requirements (for example, where it is stated that the System Controller can direct a User) laid out in the NTC?
- (b) As a result of the changes to clauses 3.3.1(s) and 3.3.3, do the provisions of the SCTC work as intended for relevant un-licenced Network Users.

## Attachments

The following attachments are provided with this Consultation Paper:

- Network Technical Code, revision 4 dated December 2018, as amended by the proposed changes. This version includes the network technical code (Part B) and the network planning criteria (Part C).
- System Control Technical Code, version 6.0 dated December 2018, as amended by the proposed changes.
- Secure System Guidelines version 4.1, published December 2018.

## References

- NT Electricity Reform Act.
- NT Electricity Networks (Third Party Access) Act and its embedded Electricity Networks (Third Party Access) Code.
- Network Technical Code and Network Planning Criteria, revision 3.1, approved by the Utilities Commission in 2013. It can be found on the Power and Water website at:  
[https://www.powerwater.com.au/networks\\_and\\_infrastructure/power\\_networks/power\\_networks\\_network\\_connection\\_technical\\_code\\_and\\_planning\\_criteria](https://www.powerwater.com.au/networks_and_infrastructure/power_networks/power_networks_network_connection_technical_code_and_planning_criteria)
- System Control Licence, issued to Power and Water, as varied 03 April 2015. It can be found on the Utilities Commission web site at:  
<http://www.utilicom.nt.gov.au/Publications/Registers/Pages/Registry-of-Electricity-Licences-and-Exemptions.aspx>
- System Control Technical Code, version 5.0 dated May 2015, approved by the Utilities Commission in 2015. It can be found on the Utilities Commission web site at:  
<http://www.utilicom.nt.gov.au/Electricity/Technical/SystemAndMarketOperation/Pages/default.aspx>
- Secure System Guidelines version 4, published in July 2017. It can be found on the Power and Water website at:  
[https://www.powerwater.com.au/networks\\_and\\_infrastructure/system\\_control/secure\\_system\\_guidelines](https://www.powerwater.com.au/networks_and_infrastructure/system_control/secure_system_guidelines)

Alternatively, a copy of the current Secure System Guidelines, version 4 (excluding participant-specific sections), may be obtained directly from the System Controller.



# Appendix A

## Definitions

The following definitions are provided from convenience. A full Glossary of definitions can be found in the NTC and the SCTC.

|                     |   |
|---------------------|---|
| Network Access Code | the Electricity Networks (Third Party Access) Code set out in the Schedule to the Electricity Networks (Third Party Access) Act. [NTC]  |
| Network Operator    | A body defined as a ‘ <i>network provider</i> ’ in the <i>Electricity Networks (Third Party Access) Act</i> . The Network Operator provides <i>access services</i> in respect of Power and Water’s <i>electricity network</i> . |
| Network User        | a person who has been granted access to the electricity network by the network provider in order to transport electrical energy to or from a particular point. [Electricity Reform Act]   |
| User                | a person, <u>whether a load User or a Generator User</u> , who has been granted access to the electricity network by the Network Operator in order to transport electrical energy to or from a particular point. [NTC]          |
| System Participant  | a person or body, licenced by the Utilities Commission, who inputs, transports, controls, operates or takes electricity from any part of a <i>power system</i> . [SCTC]   |

## Abbreviations

|                   |  |
|-------------------|--|
| NTC               | Network Technical Code, otherwise titled ‘Network Technical Code and Network Planning Criteria’ and published by Power and Water.  |
| I-NTEM            | Interim Northern Territory Electricity Market  |
| NTEM              | Northern Territory Electricity Market (end-state of market design)   |
| NEM               | National Electricity Market  |
| SCTC              | System Control Technical Code published by Power and Water.  |
| SSG               | Secure System Guidelines published by Power and Water.   |
| System Controller | An abbreviation for the term Power System Controller which is used in the NTC and SCTC. The abbreviation represents the definition as prescribed in the Electricity Reform Act for the purpose of this Consultation Paper (other than when a clause in the SCTC is being discussed). It is expected that the term Power System Controller will be replaced by System Controller when the NTC is replaced by an equivalent Chapter of the NT NER. |

# Appendix B

## About this Consultation Paper

The Power and Water Corporation ('Power and Water') is conducting consultation on its document titled 'Network Technical Code and Network Planning Criteria' (also known as the 'Network Technical Code', and for this paper the 'NTC') and the System Control Technical Code ('SCTC') as outlined in this Consultation Paper and detailed in Appendix C (for the NTC) and Appendix D (for the SCTC).

The focus of the consultation is on changes to the NTC version 3.1 dated December 2013. The Network Operator is responsible for this document. The NTC contains two parts, a network technical code and a network planning criteria. Material changes have only been made to the network technical code content. In making the changes, some minor technical matters impacted on the SCTC version 5 dated May 2015. The System Controller is responsible for this document. The SCTC is supported by the Secure System Guidelines (SSG).

The consultation package contains the NTC, the SCTC and the SSG. The minor technical changes to the SCTC have provided an opportunity to make some other changes to the SCTC which are editorial in nature to improve reader clarity. The change to the SSG is of an administrative nature and only requires awareness, not formal consultation.

### About the Network Operator

Power and Water is licenced by the Utilities Commission to operate three regulated electricity networks and a number of non-regulated electricity networks. The Licence allows Power and Water to perform the functions of the Network Operator in those networks. The Network Operator's role is to provide access services to parties who request to connect to the Power and Water networks.

### About the Network Technical Code

The Network Technical Code is prepared in accordance with clause 66A(2) of the Electricity Reform Act. It consists of two constructions, the network technical code and the network planning criteria. In this Consultation Paper, the term Network Technical Code ('NTC') refers to both constructions.

Part B 'network technical code' of the NTC contains the requirements for access to Power and Water's electricity network.

### About the Network Planning Criteria

Part C 'network planning criteria' of the NTC specifies the criteria to be used for assessing plant and equipment performance and response to power system events. The network criteria covers matters such as plant and network performance to support frequency events, voltage events, stability events, system reserve, reliability of supply and quality of supply.

### About the System Controller

Power and Water is licenced by the Utilities Commission to perform the functions of the System Controller. The System Controller's functions are established under section 38 of the Electricity Reform Act. The System Controller is responsible for the SCTC and the SSG. The System Controller's role is to monitor and control operation of regulated power systems in the Northern Territory to achieve safety, security, reliability and efficiency of power system operations for the associated communities.

### About the System Control Technical Code

The System Control Technical Code ('SCTC') is prepared in accordance with section 38(1) of the Electricity Reform Act and clause 15 of the System Control Licence. The SCTC is a document that sets out operating protocols, arrangements for security and dispatch, arrangements for disconnection, and any other matters relating to monitoring, operation and control of regulated power systems, which the System Controller

considers appropriate for the reliable, safe, secure and efficient operation of the power systems.

### **About the Secure System Guidelines**

Established under clause 3.5 of the SCTC, the Secure System Guidelines set out the principles and details for determining whether the power system is in a secure state. The document is sectionalised, including a section devoted to overarching power system parameters, and participant-specific sections for potentially commercial-in-confidence or ring-fenced information. The participant-specific sections are developed on an as-needs basis.

The System Controller may amend, vary or replace the Secure System Guidelines at any time, and shall consult with participants when doing so.

### **About the Utilities Commission**

The Utilities Commission has advised it intends to conduct parallel consultation on these changes and may refer to this document.

### **Duration of consultation**

The consultation for both documents opens on Tuesday 18 December 2018 and closes at 2:00 pm NT time on Friday 8 February 2019. Submissions received after this date may not be considered in this round of consultation, at the discretion of the Network Operator or the Power System Controller, as appropriate.

### **Submissions**

Submissions on both the NTC and SCTC are to be combined into one document.

The submission is to be in electronic pdf unless otherwise requested. The submissions are to be sent to the following email address:

[market.operator@powerwater.com.au](mailto:market.operator@powerwater.com.au)

# Appendix C

## Network Technical Code changes

### Impacts on Users

The impact on the Network Operator and Users:

- Users: the impact on the User occurs in clauses 3.3 'Requirements for connection of Generators', with minor changes to clause 1.7.3 'Obligation on Generator Users', 2.6.1 'Transient rotor angle stability', 3.2 'Requirements for all network Users', chapter 4.0 'Power system operation support', chapter 9.0 'Operation of Generators connected to the network', and clause 16.3 'Frequency stability criteria'.
- Network Operator: the impact on the Network Operator occurs in Chapters 4.0 'Power system operation support' and 9.0 'Operation of Generators connected to the network'.

The purpose of clause 3.3 is to set out details of requirements and conditions that new Generators or generators modifying existing plant must satisfy as a condition of connection of a generating system to the power system. The clause has been rewritten to follow as close as possible the structure of the NER Schedule 5.2. For example, paragraph (a) of clause 3.3.1 'Outline of requirements' of the NTC mirrors the provision in paragraph (a) of Schedule 5.2.1 'Outline of requirements' of the NER.

The impacts associated with clause 3.3 where there is an increase in requirements or a new requirement to meet in regard to the connection of new or modification to existing generators can be summarised as follows:

- General requirements:
  - Clause 3.3.5 – a new description that describes the circumstances and process for proposing a negotiated access standard in lieu of meeting the automatic access standard.
  - Clause 3.3.5.1 - a common requirement for all generator technologies for reactive power capability.
  - Clause 3.3.5.16 – a new requirement for generators to not adversely affect system strength and be responsible for any remedial costs if there is an adverse impact.
  - Clause 3.3.5.14 – references to non-scheduled and semi-scheduled generators have been removed as the intention is for all new generators connecting under clause 3.3 to be classified as scheduled. This is explained further in the SCTC amendments.
- Requirements that generators must remain in continuous operation:
  - Clause 3.3.5.4 – an increased voltage – time withstand capability
  - Clause 3.3.5.6 – a new requirement to withstand voltage quality at the connection point as outlined in clauses 2.4.1, 2.4.2 and 2.4.3.
- Requirements regarding the support to the power system that generators need to provide during and post network contingency events:
  - Clause 3.3.5.5 – a new requirement for generators to provide reactive current to support power system voltage levels during contingency events of 2 times maximum power rating for asynchronous generators and 2.5 times for synchronous generators.
  - Clause 3.3.5.11 – a new requirement for generators to be capable of providing measurable amounts of frequency control ancillary services (FCAS).
  - Clause 3.3.5.15 – a new requirement for generators to provide inertia or contingency FCAS or

a combination of both.

The impacts associated with Chapters 4 and 9 can be summarised as follows:

- Chapter 4: largely no overall material impact on the Network Operator and User, mainly because many of the provisions are duplicated in the SCTC, where they are better represented – this allowed the NTC provision to be deleted. Specific impacts on the entities are as follow:
  - Clause 4.3.2 ‘Network Operator’. Paragraph (f). The Network Operator is required to consult with the relevant user “...and as applicable, the Power System Controller...”
  - Clause 4.3.2 ‘Network Operator’. Paragraph (g). The Network Operator “in conjunction with the Power System Controller” is required to arrange controls, monitoring and secure communication systems ....
  - Clause 4.3.4 ‘Network Users’. Paragraph (d). Users are to be informed of their interruptible load blocks by the Power System Controller rather than the Network Operator.
  - Clause 4.5.1 ‘Network Voltage Control’. Paragraph (e) added (new) to require the limits specified in paragraph (c) to be recorded in the SSG.
  - Clauses 4.6 & 4.7. modified in the NTC to focus on un-licenced Users.
  - Clause 4.9 ‘Nomenclature standards’. The full provision has been transferred to SCTC clause 6.14, with the provision replaced by a cross-reference to the obligations in the SCTC. There is no overall impact on the Network Operator or the User.

In other instances, the current NTC provision is retained in the NTC, largely unaltered.

- Section 9: There are no impacts on Users as a result of the deletion of the provision in clauses 9.1.2 and 9.1.3.

#### Status quo Code provisions

The revised NTC makes no change to the provisions in the following sections and clauses:

- Part A ‘Legislative Requirements’. No changes are introduced.
- Part B ‘Network Technical Code’:
  - Sections 1 ‘Application’. No changes, except for a minor editorial to clause 1.7.3 ‘Obligations on Generator Users’.
  - Section 2 ‘Network Performance Standards’. No changes, except for deletion of clause 2.6.1 ‘Transient rotor angle stability’, which is superseded by clause 3.3.5.5.
  - Section 3 ‘Technical Requirements for Equipment Connected to the Network’. No changes, except for clause 3.3 ‘Requirements for connection of Generators’, which has been replaced.
  - Section 4 ‘Power System Operation Support’. No changes to those provisions not detailed in ‘Table 1: Amendments to NTC’.
  - Section 5 ‘Testing of Plant and Equipment’. No changes.
  - Section 6 ‘Control and Protection Settings’. No changes.
  - Section 7 ‘Commissioning and Testing Procedures’. No changes.
  - Section 8 ‘Disconnection and Reconnection of Plant and Equipment’. No changes.
  - Section 9 ‘Operation of Generators Connected to the Network’. No changes, except for deletion of clauses 9.1.2 & 9.1.3.
  - Section 10 ‘Metering Requirements’. No changes, other than to state that the section will be superseded by Chapter 7A of the NT NER on 1 July 2019.

- Part C 'Network Planning Criteria'. No changes, except for a minor editorial to clause 16.3 'Frequency stability criteria'.
- Part D 'Attachments'. No changes.

A full list of changes is recorded in 'Table 1: Amendments to NTC'

### **Proposed Code Amendment**

It is proposed that the NTC be amended in the manner marked up in the attached draft version 4, as summarised in the following way:

#### **Connection of Generators**

Clause 3.3 of the NTC has been entirely replaced by the provisions in NER clause S5.2. These provisions specify the automatic standards for generators connecting to the regulated networks in the NT. The previous clauses 3.3.1 to 3.3.6 have been replaced with clauses 3.3.1 to 3.3.16, as included in Table 1.

#### **Power System Operational Support**

Clause 4 of the NTC has been substantially reduced for the following reasons:

- Some of the provisions have been transferred to System Control documents (SCTC, SSG and / or Guidelines) in full or in part or by intent. These provisions have been deleted from the NTC.
- Some of the provisions are currently adequately accommodated in System Control documents and hence represent a duplication. These provisions have been deleted from the NTC.
- Some of the provisions have been retained in the NTC with modifications to better address current arrangements.
- Some of the provisions have been retained in the NTC without any modification.

The effect on each sub-clause is as shown in Table 1.

#### **Operation of Generators**

Clause 9 of the NTC has been mildly reduced for the following reasons.

- One provision was transferred to the SCTC in part. This provision have been deleted from the NTC.
- One provision has been deleted as it is no longer relevant.
- The balance of the provisions have been retained in the NTC without any modification.

The effect on each sub-clause is as shown in Table 1.

#### **Metering**

Clause 10 of the NTC has been ear-marked as being superseded by Chapter 7A of the NT NER on 1 July 2019.

#### **Other amendments**

A few editorial amendments have been made to other NTC clauses as listed in Table 1.

## List of Code amendments

Sections of the Code where amendments are proposed are listed below with a brief comment on the nature of the amendments and in some instances how they implement features of the I-NTEM design described earlier.

**Table 1 – amendments to NTC**

| NTC Clause            | Description of proposed amendment  |
|-----------------------|--|
| 1.7.3(a)(1)           | <b>Obligations of Generator Users:</b> Editorial – reference to clause 3.2 deleted.  |
| 2.6.1                 | <b>Transient rotor angle stability:</b> Transferred to clause 3.3.5.5  |
| 3.2 opening paragraph | <b>Requirements for all network Users:</b> new paragraph added. Excludes generator Users that are captured under clause 3.3.   |
| 3.3 (modified)        | <b>Requirements for connection of Generators:</b> Provisions replaced by those in NER Schedule 5.2 ‘Conditions for connections of generators’. Opening paragraphs (a) to (f) replaced by a single summary paragraph. |
| 3.3.1 (modified)      | <b>Outline of Requirements:</b> Existing opening paragraphs (a) to (e) and sub-clause 3.3.1.1 on ‘Protection requirements’ replaced by the material provisions in NER S5.2.1.  |
| 3.3.2 (modified)      | <b>Application of settings:</b> Existing opening paragraphs (a) to (e) and sub-clauses 3.3.2.1 to 3.3.2.11 on ‘Technical characteristics’ replaced by the material provisions in NER S5.2.2.                         |
| 3.3.3 (modified)      | <b>Technical matters to be co-ordinated:</b> Existing sub-clauses 3.3.3.1 to 3.3.3.6 on ‘Monitoring and control requirements’ replaced by the material provisions in NER clause S5.2.3.                              |
| 3.3.4 (new)           | <b>Provision of information:</b> Existing clause 11.3 ‘Information to be provided by Users with Generators’ transferred to this location with suitable editorial adjustments to align with NER clause S5.2.4.        |
| 3.3.5 (new)           | <b>Technical requirements:</b> Incorporate the provisions of NER clauses S5.2.5 & 5.3.4A (b1) & (b2) as new opening paragraphs.  |
| 3.3.5.1               | <b>Reactive Power Capability:</b> Incorporate the provisions of NER clause S5.2.5.1 with suitable amendments for the NT to incorporate existing NTC average power factor ranges..                                    |
| 3.3.5.2               | <b>Quality of Electricity Generated:</b> Incorporate the provisions of NER clause S5.2.5.2 with suitable amendments for the NT.  |
| 3.3.5.3               | <b>Generating Unit Response to Frequency Disturbance:</b> Incorporate the provisions of NER clause S5.2.5.3 with suitable amendments for the NT.   |
| 3.3.5.4               | <b>Generating System Response to Voltage Disturbances:</b> Incorporate the provisions of NER clause S5.2.5.4 with suitable amendments for the NT.  |
| 3.3.5.5               | <b>Generating System Response to Disturbances Following Contingency Events:</b> Incorporate the provisions of NER clause S5.2.5.5 with suitable amendments for the NT.   |
| 3.3.5.6               | <b>Quality of Electricity Generated and Continuous Uninterrupted Operation:</b> Incorporate the provisions of NER clause S5.2.5.6 with suitable amendments for the NT.   |
| 3.3.5.7               | <b>Partial Load Rejection:</b> Incorporate the provisions of NER clause S5.2.5.7 with suitable amendments for the NT.  |

| NTC Clause        | Description of proposed amendment  |
|-------------------|--|
| 3.3.5.8           | <b>Protection of Generating Units from Power System Disturbances:</b> Incorporate the provisions of NER clause S5.2.5.8 with suitable amendments for the NT.           |
| 3.3.5.9           | <b>Protection Systems that Impact on Power System Security:</b> Incorporate the provisions of NER clause S5.2.5.9 with suitable amendments for the NT.                 |
| 3.3.5.10          | <b>Protection to Trip Plant for Unstable Operation:</b> Incorporate the provisions of NER clause S5.2.5.10 with suitable amendments for the NT.                        |
| 3.3.5.11          | <b>Frequency Control:</b> Incorporate the provisions of NER clause S5.2.5.11 with suitable amendments for the NT.  |
| 3.3.5.12          | <b>Impact on Network Capability:</b> Incorporate the provisions of NER clause S5.2.5.12 with suitable amendments for the NT.   |
| 3.3.5.13          | <b>Voltage and Reactive Power Control:</b> Incorporate the provisions from NTC clauses 3.3.3.5 & 3.3.3.6 with suitable amendments.                                     |
| 3.3.5.14          | <b>Active Power Control:</b> Incorporate the provisions of NER clause S5.2.5.14 with suitable amendments for the NT.   |
| 3.3.5.15<br>(new) | <b>Inertia and fast contingency FCAS:</b> New clause requiring new generator users to provide a minimum level of inertia or contingency FCAS or a combination of both. |
| 3.3.5.16<br>(new) | <b>System Strength:</b> New clause to incorporate the provisions of NER clause 5.3.4B with suitable amendments for the NT.   |
| 3.3.6<br>(new)    | <b>Monitoring and Control Requirements:</b> Place marker only  |
| 3.3.6.1           | <b>Remote Monitoring:</b> Incorporate the provisions from NTC clauses 3.3.3.1 & 3.3.3.2 with suitable amendments.  |
| 3.3.6.2           | <b>Communications Equipment:</b> Incorporate the provisions from NTC clause 3.3.3.1 with suitable amendments.  |
| 3.3.7             | <b>Power Station Auxiliary Supplies:</b> Incorporate the provisions of NER clause S5.2.7 with suitable amendments for the NT.  |
| 3.3.8             | <b>Fault Current:</b> Incorporate the provisions of NER clause S5.2.8 with suitable amendments for the NT.   |
| 4                 | <b>POWER SYSTEM OPERATIONAL SUPPORT:</b> Change in title from 'Power System Security' to remove clash with this title in the SCTC                                      |
| 4.1               | <b>Introduction:</b> Delete clause.  |
| 4.1.1             | <b>Purpose and application of clause 4:</b> Delete clause.   |
| 4.2               | <b>Power system security principles:</b> Delete clause.  |
| 4.2.1             | <b>Power system operating state:</b> Delete clause.  |
| 4.2.2             | <b>Technical envelope:</b> Delete clause.  |
| 4.2.3             | <b>General principles for maintaining power system security:</b> Delete clause.  |
| 4.3               | <b>Power system security obligations and responsibilities:</b> Rework for reduced content.   |
| 4.3.1             | <b>Time for undertaking action:</b> Delete clause – adequately covered in SCTC.  |
| 4.3.2             | <b>Network Operator:</b> Retain paragraphs (a) to (d). Modify paragraphs (f) & (g).  |



| NTC Clause | Description of proposed amendment  |
|------------|--|
| 4.3.3      | <b>Power System Controller:</b> Delete clause – adequately covered in SCTC.  |
| 4.3.4      | <b>Network Users:</b> Delete paragraph (a), retain paragraphs (b) & (c) in NTC.  |
| 4.4        | <b>Power system frequency control:</b> Rework for reduced content.   |
| 4.4.1      | <b>Power system frequency control responsibilities:</b> Delete clause – adequately covered in SCTC.  |
| 4.4.2      | <b>Operational frequency control requirements:</b> Delete clause – adequately covered in SCTC.   |
| 4.5        | <b>Control of network voltages:</b> Rework for reduced content.  |
| 4.5.1      | <b>Network voltage control:</b> new paragraph (e) added to ensure that the limits in paragraph (c) are recorded in the SSG.  |
| 4.5.2      | <b>Reactive power reserve requirements:</b> Delete clause – adequately covered in SCTC & SSG.  |
| 4.6        | <b>Power system operating procedures:</b> Place marker only.   |
| 4.6.1      | <b>Network operations:</b> Delete paragraph (a). Retain paragraphs (b) & (c) in NTC.   |
| 4.6.2      | <b>Switching of reactive power facilities:</b> Delete paragraph (a). Retain paragraph (b) in NTC with suitable editorial amendments.   |
| 4.6.3      | <b>Generation limits:</b> Retain in NTC.   |
| 4.7        | <b>Power system security operations:</b> Delete clause – adequately covered in SCTC.   |
| 4.7.1      | <b>Users' advice:</b> Delete clause – adequately covered in SCTC.  |
| 4.7.2      | <b>Protection or control system abnormality:</b> Delete clause. Transfer provision to new SCTC clause 6.7.4  |
| 4.7.3      | <b>Power System Controller advice on power system emergency conditions:</b> Delete clause. Transfer paragraph (a) to new SCTC paragraph 7.5(b) with suitable modifications. Transfer paragraph (b) to System Control Incident Reporting Guideline. |
| 4.7.4      | <b>Managing a power system contingency event:</b> Delete clause – adequately covered in SCTC.  |
| 4.7.5      | <b>Managing electricity supply shortfall events:</b> Delete paragraphs (a)(1), (a)(2) & (c). Retain paragraphs (a)(3) and (b) with suitable modifications to focus on un-licensed Users.   |
| 4.7.6      | <b>Directions by the Power System Controller affecting power system security:</b> Retain paragraphs (a) & (b) with suitable modifications to focus on un-licensed Users.   |
| 4.7.7      | <b>Disconnection of Generation Units and/or associated loads:</b> Delete paragraph (a). Retain paragraph (b) in NTC with suitable editorial amendments.  |
| 4.7.8      | <b>Emergency black start-up facilities:</b> Retain provision on NTC.   |
| 4.7.9      | <b>Black system procedures:</b> Delete clause – adequately covered in SCTC.  |
| 4.7.10     | <b>Black system start-up:</b> Delete paragraphs (a), (c), (d) & (e). Retain paragraph (b) in NTC.  |
| 4.7.11     | <b>Review of operating incidents:</b> Delete clause – adequately covered in SCTC.  |
| 4.8        | <b>Power system security support:</b> Rework for reduced content.  |

| NTC Clause    | Description of proposed amendment  |
|---------------|--|
| 4.8.1         | <b>Remote control and monitoring devices:</b> Retain provision on NTC.   |
| 4.8.2         | <b>Operational control and indication communication facilities:</b> Retain provision on NTC.   |
| 4.8.3         | <b>Power system voice/data operational communication facilities:</b> Delete clause – adequately covered in SCTC.                                   |
| 4.8.4         | <b>Records of power system operational communication:</b> Delete clause – adequately covered in SCTC.  |
| 4.8.5         | <b>Agent communications:</b> Retain provision in NTC with suitable modifications to give the primary role to the Network Operator.                 |
| 4.9           | <b>Nomenclature standards:</b> Replace provision with a single paragraph to cross-reference SCTC. Transfer all paragraphs to the SCTC clause 6.14. |
| 9.1.2         | <b>Commitment of Generation Units:</b> Delete clause. Provision no longer relevant to the SCTC or the NTC.   |
| 9.1.3         | <b>De-commitment, or output reduction, by Users requiring standby power:</b> Delete clause. SCTC suitably modified to accommodate this provision.  |
| 10            | <b>METERING REQUIREMENTS:</b> note placed on tile to advise that this Section would be superseded by Chapter 7A of the NT NER.                     |
| 11.3          | <b>Information to be provided by Users with Generators:</b> Transferred to clause 3.3.4  |
| 16.3(b) & (c) | <b>Frequency stability criteria:</b> Added RoCoF (rate of change of frequency) regional objectives. Clauses (b) replaced and (c) new.              |

# Appendix D

## System Control Technical Code changes

### Impacts on System Participants & Network Users

Except for a couple of instances, there is no overall additional impact on System Participants from the changes to the SCTC that have been made to accommodate the revision of the NTC.

- One instance applies to a new clause 6.7.4 'Protection and Control System Abnormality'.
- Another instance applies to clause 6.14 'Plant Numbering, Nomenclature and Drawings'.

The impact for both of these instances is briefly explained in the dedicated paragraph 'Three NTC induced changes of interest'.

A few changes have been made to the SCTC to accommodate and clarify requirements of the NTC that are imposed on Network Users when transferred to the SCTC. Whilst there are no overall impacts on these parties, their roles need to be more clearly prescribed. This explanation is provided in the dedicated paragraph 'Network User (and the synonymous term User)'.

A couple of changes impact on System Participants that are not directly associated with the NTC revision.

- One instance applies to the Glossary term 'semi-scheduled generating unit'. This impact is explained separately in its dedicated paragraph below.
- Another instance applies to a new Glossary term 'performance issue outage'. This impact is explained separately in its dedicated paragraph below.

Also, some changes have been made to improve the reading of a clause, tidy-up definitions or correct a typo. These changes are briefly mentioned in the dedicated paragraph 'non-material changes'.

### Network User (and the synonymous term Users)

It is noted that clause 38(2) of the Electricity Reform Act provides the System Controller with a power to direct an electricity entity (known as a System Participant in the SCTC). That power would extend to those Network Users who coincidentally were licenced (that is, generators and the network operator) – these parties would have a direct relationship with the System Controller under the electricity entity definition. However, the power to direct would not extend to Network Users who were un-licenced (that is, most customers). For these Network Users, the System Controller would not have a direct relationship with an un-licenced Network User. Some other entity would need to be the interface between the System Controller and the un-licenced Network User.

The definition and source of the terms used in the above paragraph are provided for the purpose of clarity as follows:

- **Electricity entity (Act):** means a person licensed under Part 3 [of the Act] to carry on operations in the electricity supply industry and includes (where the context requires) a person who has been licensed to carry on operations in the electricity supply industry under that Part whose licence has been suspended or cancelled or has expired.
  - The operations in the electricity supply industry for which a licence is required are:
    - generation of electricity;
    - owning or operating an electricity network;
    - selling electricity;

- system control over a power system; or
- other operations for which a licence is required by the Regulations.
- **Network User (Act):** means a person who has been granted access to the electricity network by the network provider in order to transport electrical energy to or from a particular point.
- **User (NTC):** A person, whether a load User or a Generator User, who has been granted access to the electricity network by the Network Operator in order to transport electrical energy to or from a particular point.
- **System Participant (SCTC):** A person or body, licensed by the Utilities Commission, who inputs, transports, controls, operates or takes electricity from any part of a *power system*.
- **Customer (Act):** means a person who receives, or wants to receive, a supply of electricity for final consumption and includes:
  - (a) the occupier for the time being of a place to which electricity is supplied;
  - (b) where the context requires – a person seeking an electricity supply; and
  - (c) a person of a class declared by the Regulations to be customers.
- **Customer (SCTC):** A person who purchases electricity supplied through a *network*.

From these definitions the following observations can be made:

- An 'electricity entity' is represented in the SCTC as a 'System Participant'.
- A System Participant is a licenced entity.
- An entity who generates electricity is both a System Participant and a Network User.
- An entity who sells electricity is a System Participant and could be a Network User.
- The term User is synonymous with the term Network User.
- An entity or person who has been granted access to the electricity network for the purpose of transporting electricity into the network is a licenced entity.
- An entity or person who has been granted access to the electricity network for the purpose of transporting electricity out of the network for the purpose of retailing is a licenced entity, and for the purpose of consuming is not a licenced entity – that is, it is an un-licenced entity.
- A customer is an un-licenced entity.

The above observations are summarised as:

- A Network User consists of licenced entities and un-licenced entities.
- A licenced Network User is identical to a System Participant.
- An un-licenced Network User is identical to a 'customer'.

The impact on the SCTC (from the above explanation) occurs because the NTC is constructed around the term 'User' (which is synonymous with 'Network User') and the SCTC is constructed around the term 'System Participant'. This means that transferring an NTC provision into the SCTC has to take into account the fact that the System Controller's powers can't be applied to an un-licenced Network User in the same way as they can be applied to a licenced Network User.

Rather, for an un-licenced Network User to have a working relationship with the System Controller, a System Participant has to act as intermediary.

The solution arising from a closer study of the NTC is to have the Network Operator, who is a System Participant, take on the role of intermediary between the System Controller and the un-licenced Network User. In this way, the System Controller can direct the Network Operator to engage with the un-licenced

Network User in a way that facilitates an effective relationship between the two entities. This will allow the System Controller to have a working relationship with the un-licensed Network User and consequently fulfil its responsibilities in regard to power system security. This role for the Network Operator is clarified in the amendments to clause 3.3.3 'Responsibilities of the Network Operator', and in clause 3.3.1(s) 'Responsibilities of the Power System Controller'.

The changes to these clauses in the SCTC do not change the overall impact on the Network Operator and the un-licensed Network Users because these requirements are currently prescribed in the NTC.

It is noted that the right of the Network Operator to facilitate an effective relationship between the System Controller and un-licensed Network Users must be stated in the NTC. The access agreement between those parties becomes the mechanism to formalise that relationship – it must contain the necessary consent from both parties to perform their required roles. Hence, the NTC must retain sufficient provisions going forward to specify adequate content that must be included in access agreements between these parties.

### Three NTC induced changes of interest

Three other NTC induced changes of interest occur in SCTC clauses 6.7.4 and 6.14.

The clause 3.11.1 change is to include generation capability forecasts in addition to production forecasts, and to clarify the type of information to be provided to the Power System Controller.

The 6.7.4 change is to adopt the operating protocol as the mechanism for recording planned actions in the event of protection or control system abnormalities. This represents a tidy-up of NTC clause 4.7.2 into the SCTC when taken in conjunction with clause 3.3.3 (f).

The 6.14 change is a verbatim relocation of the provisions of NTC clause 4.9 into the SCTC, with a tidy-up of the Glossary definition of nomenclature standards.

The overall impact on System Participants and Network Users hasn't changed as a result of these changes.

### Semi-scheduled generating units

This term has been removed from the SCTC because its classification is not supported in the NT. The System Controller requires all generating units at or above a certain output capability to be classified as a scheduled generating units.

This is because all generating units that contribute to the dispatch stack for the Darwin-Katherine power system (merit order for Alice Springs and Tennant Creek power systems) must provide daily (or more frequent for some technologies) production forecasts to the System Controller and contribute to the control of frequency and voltage. The Power System Controller will not undertake daily plant production forecasting.

The changes appear in Section 3 of the SCTC. The detailed clauses are provided Table 1.

### Plant outages due to performance issues

An amendment has been made to SCTC 6.5.1 to:

- (a) introduce a new outage classification to deal with performance issues; and
- (b) prescribe that either the System Participant or the System Controller have a role in identifying outage types and informing the other party of that observation.

These amendments have been introduced to restrict a generating unit who is not able to perform in accordance with the parameters in the NTC or STC at a particular instance in time, to be left out of the scheduling process, or if in service, to be taken out of service until the performance issue is fixed.

The definition of 'outage' has been modified, and a new term 'performance issue outage' has been added.

The term 'performance issue outages' has been defined as "*Power System Controller or System Participant required outages to address performance issues such as forecasting errors, insufficient ancillary service contributions, auxiliary equipment performance, and any other performance issues that might impact on the secure operation of the power system.*"

### Non-material impacts

Non-material changes (detailed below) have no impact on System Participants and Network Users.

### Proposed Code Amendments

It is proposed that the SCTC be amended in the manner marked up in the attached marked-up version 6, as summarised in the following way. A list clauses affected are listed in Table 2: Amendments to SCTC.

#### Network Operator

Clause 3.3.3 'Responsibility of the Network Operator' has been amended to more clearly state the relationship between the System Controller, the Network Operator and those Network Users who are not licenced.

It is proposed to clearly state that the Network Operator has a role, similar to an intermediary, in facilitating a working relationship between the System Controller and an un-licenced Network User.

A further note of clarification has been added to clause 3.3.1(s) 'Responsibility of the Power System Controller' to cross-reference clause 3.3.3 and minimise any doubt on how the Power System Controller and un-licenced Network Users interact.

#### Load forecasts

Clause 3.11.1 'System Participants / Customers forecasts' has been amended to clarify the types of forecast information to be provided, and to include forecasts of capability in addition to forecasts of production. This amendment has been made in a general manner to accommodate intermittent generation technologies. The timing of those forecasts will be included in the Power System Controller's operating protocols, rather than being prescribed in the SCTC.

#### Plant outages and forced outages

Clause 6.5.1 'Types of outages' has been amended, firstly to minimise any doubt that the need for a plant outage can be identified by either the System Participant or the Power System Controller. In addition, a new type of outage, the 'performance issue outage' has been added to cater for matters that may impose a limitation on managing power system security. A new Glossary term 'performance issue outages' has been added, and the definition of 'outage' has been amended to refer to performance issue outages.

This amendment has flowed into clause 6.6 'Forced Outages', with a change in the title and in the opening paragraph.

#### Protection and control system abnormalities

A new clause 6.7.4 has been added to pick up when these abnormalities occur on Network User protection or control system equipment. The provision is a relocation of NTC clause 4.7.2 of the same title, with suitable editorial changes to reflect the context and rely on the operating protocol mechanism in conjunction with the Network Operator clause 3.3.3(f).

#### Nomenclature

Clause 6.14 'Plant Numbering, nomenclature and Drawings' has been amended to adopt the principles specified in the NTC clause 4.9. This is because nomenclature standards are a crucial contribution to power system operations and security and must be endorsed by the System Controller. Hence, oversight of these standards are better located in the SCTC.

In making this change, the Glossary definition of nomenclature has been streamlined to better interact with clause 6.14. No change of intent has been introduced in the relocation. Clause 4.9 of the NTC has been suitably adjusted to refer to the SCTC for the nomenclature principles.

No change to the responsibility of the Network Operator has been made when compared to the NTC.

#### Semi-scheduled generating units

This change reflects a change to the Generator Performance Standards of the NTC, where this term has been removed. This is because the default position is that all generators must provide sufficient commitment

information to satisfy the classification of 'scheduled generating unit'. For example, solar and wind generators must provide their production output forecast on at least a daily basis.

Consequently, the term 'semi-scheduled generating unit' has been removed from the SCTC (Section 3).

### Non-material impacts

The following non-material changes have been made:

1. The deletion of the Glossary term 'Technical Code' when referring to the SCTC, and instead relying only on the Glossary term 'Code'.
2. Defining the term 'Network Technical Code' to replace a common usage expression.
3. Defining the reference document Ring Fencing Guidelines, as it is a source to be relied on.
4. Tidying up the paragraph 1.3(f) 'Application', which currently is difficult to understand.
5. Reworking clause 1.7.4(a) 'Obligation of the Power System Controller' to represent more accurately the provision in the Electricity Reform Act.
6. Definition of embedded generator, where the current definition incorrectly specified the defined term 'Generator', which in all cases requires a licence to operate.

### SCTC Glossary

The Glossary (Appendix 1) has been modified in the following ways:

- Seven terms have been modified;
- Six new terms have been added;
- Two terms have been deleted.

A description of these changes is contained at the end of Table 2.

### Secure System Guidelines

The Secure System Guidelines, as part of the NTC revision, have been modified as follows.

1. The definition of 'technical envelope' has been added to the SSG definitions; and
2. The term technical envelope has been italicised throughout the document.

These changes address in part the requirements specified in NTC clauses 4.2.2 & 4.3.3.

Once the changes to the SCTC have been approved, it is proposed to record the limits referenced in NTC clause 4.5.1(c) in the Secure System Guidelines, amongst other matters.

### Incident Reporting Guideline

The Incident Reporting Guideline, as part of the NTC revision, will be developed to cover the following matters.

1. A new SCTC paragraph 7.5(b) will be added to pick up the intent of NTC clause 4.7.3(a) in regard to advising Network Users promptly of supply related circumstances that might adversely affect those Users.
2. SCTC clause 7.3.4 will be altered from 'may develop and maintain a guideline' to 'shall develop and maintain a guideline' to reflect the change introduced in SCTC clause 7.5(b).
3. Examples of the circumstances that must instigate advice to Network Users are proposed to be transferred from NTC clause 4.7.3(b) to the Incident Reporting Guideline. This transfer will be effected once the SCTC amendments are approved.
4. The first paragraph of SCTC clause 7.3.4 has been modified to capitalise the expression Incident Reporting Guideline.
5. The last paragraph of SCTC clause 7.4.1 has been modified at the end by adding phrase "in accordance

with any conditions specified in the Incident Reporting Guideline”.

6. The provision in NTC clause 4.7.11(e) is proposed to be transferred to the Incident Reporting Guidelines.

## List of Code amendments

Sections of the Code where amendments are proposed are listed below with a brief comment on the nature of the amendments.

**Table 2 – amendments to SCTC**

| Clause                | Description of proposed amendment  |
|-----------------------|--|
| 1.1 opening paragraph | <b>Authorisation:</b> Editorial. Delete term ‘Technical’, and in all other similar references throughout the Code.   |
| 1.2(e)                | <b>Statement of Purpose:</b> Editorial. Change ‘Network Technical Code’ to italics font, and in all other similar references throughout the Code. Define in the Glossary.  |
| 1.3(f)                | <b>Application:</b> Editorial. Rework to clarify intent and improve understanding.   |
| 1.4(d)                | <b>Interpretation:</b> Editorial. Change ‘Ring Fencing Code’ to italics font. Define in the Glossary.  |
| 1.7.4(a)              | <b>Obligations of the Power System Controller:</b> Editorial. Modify the presentation of paragraph (a) to align its intent with clause 38 of the Electricity Reform Act.   |
| 3.1(c)(4)             | <b>Purpose:</b> Remove the reference to semi-scheduled generating units. The Power System Controller does not cater for this classification of generating unit.  |
| 3.2.3(b)(2)           | <b>Generation components of a power system:</b> Delete reference to semi-scheduled generating units. The Power System Controller does not cater for this classification of generating unit.  |
| 3.3.1(d)              | <b>Responsibilities of the Power System Controller:</b> NTC revision. Change <i>Network</i> to read <i>System Participant</i> , as this is the correct name of the entity.   |
| 3.3.1(h)              | <b>Responsibilities of the Power System Controller:</b> Remove the reference to semi-scheduled generating units. The Power System Controller does not cater for this classification of generating unit.  |
| 3.3.1(s)              | <b>Responsibilities of the Power System Controller:</b> NTC revision. Add Note for the avoidance of doubt on how the System Controller interacts with un-licensed Network Users. The note is intended to reinforce the changes made to clause 3.3.3.   |
| 3.3.3                 | <b>Responsibilities of the Network Operator:</b> NTC revision. Modify to introduce the un-licensed Network User and to ensure that the Network Operator is responsible as the intermediary between the Power System Controller and that entity.  |
| 3.11.1                | <b>System Participants / Customers Forecasts:</b> The paragraph has been amended into an opening paragraph and two indented paragraphs. Paragraph (a) has been added. Paragraph (b) has been extracted from the original paragraph. The opening paragraph has been amended to clarify examples of the type of forecast information to be provided. |
| 6.5.1                 | <b>Types of outages:</b> Opening paragraph added. New paragraph (d) ‘performance issue outages’ added.   |
| 6.6                   | <b>Forced Outages:</b> Title and opening paragraph changed to reflect changes to clause 6.5.1.   |



|          |  |
|----------|--|
| 6.7.4    | <b>Protection or control system abnormality of Network User equipment:</b> NTC revision. New clause added to enable the intent of current NTC clause 4.7.2 'Protection or control system abnormality' to remain unchanged in the SCTC.   |
| 6.14     | <b>Plant numbering, nomenclature and Drawings:</b> NTC revision. The wording from the definition of 'nomenclature' has been added clause 6.14 as the opening paragraph. The principles, in paragraphs (a) to (j), have been extracted from NTC clause 4.9 'Nomenclature standards'. The NTC clause 4.9 has been removed from the NTC. The definition has been streamlined.   |
| 7.3.4(d) | <b>Incident Reporting Guideline:</b> Opening paragraph. Change 'Power System Controller may' to read 'Power System Controller shall'. At the end of that paragraph, add '(the Incident Reporting Guideline)'.  |
| 7.4.1    | <b>Notification of a reportable incident:</b> Second paragraph. At the end of the paragraph, add 'in accordance with any conditions specified in the Incident Reporting Guideline'.  |
| 7.5      | <b>Public Reporting:</b> Mark the existing paragraph as (a) and add new paragraph (b) to enable the requirement of NTC clause 4.7.3(a) 'Power System Controller advice on power system emergency conditions' to remain unchanged.  |
| Glossary | <p><b>Terms amended:</b></p> <p><b>Code:</b> The full name has been added. Reference to the relevant clause in the Act has been added.</p> <p><b>Dispatch instruction:</b> 'de-synchronise' as been added to the definition.</p> <p><b>Embedded generator:</b> the defined term '<i>Generator</i>' has been replaced with the common usage word 'generator'.</p> <p><b>Nomenclature:</b> Streamlined, with the full text relocated to the opening paragraph of clause 6.14.</p> <p><b>Network energy losses:</b> 'exit point' placed in italics font.</p> <p><b>Network User:</b> 'exit supply' changed to read 'exit point' and placed in italics font.</p> <p><b>Outage:</b> at the end, add the phrase '<i>inclusive of performance issue outages</i>'</p> <p><b>Terms added:</b></p> <p><b>Network Technical Code:</b> added to reference its source and formalise its status in the SCTC.</p> <p><b>Performance issue outages:</b> added to assist in identifying instances where plant may need to be taken out of service or left out of service.</p> <p><b>Ring Fencing Guidelines:</b> added to formalise its status in the SCTC.</p> <p><b>Secure System Guidelines:</b> added to formalise its status in the SCTC.</p> <p><b>Unit commitment:</b> added to clarify how this term is integrated within the SCTC.</p> <p><b>Unit de-commitment:</b> added to clarify how this term is integrated within the SCTC.</p> <p><b>Terms deleted:</b></p> <p><b>Semi-scheduled generating unit:</b> deleted to reflect Power System Controller facilities.</p> <p><b>Technical Code:</b> deleted as its use is outdated and causes confusion with the NTC for new readers.</p> |