

## Stage 02: Industry Consultation

National Electricity Transmission System Security  
and Quality of Supply Standard (NETS SQSS)

# GSR015 Normal Infeed Loss Risk

What stage is this  
document at?

01 Workgroup  
Report

02 Industry  
Consultation

03 Report to the  
Authority

This proposal seeks to modify the NETS SQSS definitions of Normal Infeed Loss Risk and Infrequent Infeed Loss Risk to address an inconsistency with the definition of Unacceptable Frequency Conditions

This proposed NETS SQSS Modification is open for Industry Consultation. Any interested party is able to make a response in line with the guidance set out in Section 5 of this document.

**Published on:** 11 November 2013  
**Length of Consultation:** 20 Working Days  
**Responses by:** 06 December 2013



***The SQSS Review Panel recommends:***

That GSR015 should be implemented as it better facilitates applicable NETS SQSS objectives (i) and (ii).



***High Impact:***

System Operator



***Medium Impact:***

None identified



***Low Impact:***

Large Generators, Medium Generators, BM Participants, Generators undertaking OTSDUW, Interconnector Owners

## Contents

1	Executive Summary.....	3
2	Why Change?.....	4
3	Solution .....	7
4	Impact & Assessment .....	8
5	Consultation Responses.....	10
	Annex 1 - Proposed Legal Text .....	11

## About this document

This Industry Consultation outlines the information required for interested parties to form an understanding of a defect within the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) and seeks the views of interested parties in relation to the issues raised by this document.

Parties are requested to respond by **06 December 2013** to [box.sqss@nationalgrid.com](mailto:box.sqss@nationalgrid.com)

## Document Control

Version	Date	Author	Change Reference
0.1	14 October 2013	National Grid	Internal Draft
0.2	26 October 2013	National Grid	Draft for SQSS Review Panel
1.0	11 November 2013	National Grid	Final Industry Consultation
1.1	05 December 2013	National Grid	e-mail address correction



### Any Questions?

Contact:

**James Cooper**  
Code Administrator



[James.Cooper3@nationalgrid.com](mailto:James.Cooper3@nationalgrid.com)



01926 656 019

Proposer:

**Graham Stein**  
National Grid Electricity  
Transmission plc



[Graham.Stein@nationalgrid.com](mailto:Graham.Stein@nationalgrid.com)



07785 950 722

GSR015 Industry  
Consultation

11 November 2013

Version 1.0

Page 2 of 11

## 1 Executive Summary

- 1.1 The Normal and Infrequent Infeed Loss Risk definitions in the NETS SQSS were modified by GSR007<sup>1</sup>, increasing them to 1320MW and 1800MW respectively from 1st April 2014. The change was made because the increased operational costs of catering for larger losses were assessed to be outweighed by the benefits of facilitating access to the transmission system.
- 1.2 The Normal Infeed Loss Risk is set to 1000MW until 31st March 2014. From April 1st 2014, it is set to 1320MW. The Normal Infeed Loss Risk definition makes reference to frequency response by stating "*That level of loss of power infeed risk which is covered over long periods operationally by frequency response to avoid a deviation of system frequency by more than 0.5Hz.*"
- 1.3 The SQSS Review Panel believes that the way the definition is drafted means it is inconsistent with the definition of Unacceptable Frequency Conditions, and that it could be interpreted to place an obligation on National Grid Electricity Transmission (NGET) as System Operator to ensure frequency does not fall below 49.5Hz for all power infeed loss risks above 1000MW from 1<sup>st</sup> April 2014 onwards. The Panel believes that acting on this interpretation this would incur unnecessary cost with no commensurate benefit as there will have been no significant change in the incidence of infeed losses above the current limit of 1000MW by this date.
- 1.4 The Panel therefore recommends that the NETS SQSS is modified to clarify that the definition of Normal Infeed Loss Risk serves to limit the maximum level of loss of active power infeed to be applied to certain aspects of the design and operation of the National Electricity Transmission System but does not dictate that additional frequency response is procured in the absence of any additional risk. The effect of this modification is that the frequency control policy applied to the Main Interconnected Transmission System (MITS) will remain unchanged.
- 1.5 The Panel further recommends the definition of Infrequent Infeed Loss is changed. This change has no material impact but maintains consistency between the Infeed Loss definitions in the NETS SQSS.
- 1.6 The Panel wishes to highlight that the proposals described in this consultation do not seek to change the criteria applicable to the design of the networks. Furthermore, they do not change the size of Infrequent Loss Risk which is set at 1800MW from April 1<sup>st</sup> 2014.
- 1.7 The Panel also notes that it may be necessary to review the frequency control criteria in the NETS SQSS as European Codes are developed and proceed through Comitology.
- 1.8 Views are invited upon the proposals outlined in this consultation, which should be received by **06 December 2013**. Further information on how to submit a response can be found in section 5.

---

<sup>1</sup> GSR007 Reports are available here:

<http://www.nationalgrid.com/uk/Electricity/Codes/gbsqsscode/LiveAmendments/>

## 2 Why Change?

### Background

2.1 The Normal and Infrequent Infeed Loss Risk definitions in the NETS SQSS were last modified by GSR007, increasing their values to 1320MW and 1800MW respectively from 1st April 2014. The change was made because the increased operational costs of catering for 1800MW losses were outweighed by the benefits of facilitating access to the transmission system.

2.2 The Normal Infeed Loss Risk is defined as:

*"That level of loss of power infeed risk which is covered over long periods operationally by frequency response to avoid a deviation of system frequency by more than 0.5Hz. Until 31st March 2014, this is 1000MW. From April 1st 2014, this is 1320MW."*

2.3 The Infrequent Infeed Loss Risk is defined as:

*"That level of loss of power infeed risk which is covered over long periods operationally by frequency response to avoid a deviation of system frequency outside the range 49.5Hz to 50.5Hz for more than 60 seconds. Until 31st March 2014, this is 1320MW. From April 1st 2014, this is 1800MW."*

2.4 The Infrequent Infeed Loss Risk limit is considered in the design of Onshore Generation Connections (NETS SQSS Chapter 2). Both Infrequent and Normal Infeed Loss Risks are considered in the design of Offshore Generation Connections (NETS SQSS Chapter 7). This means that the definition of Normal Infeed Loss Risk affects the design of Offshore Transmission Systems but does not affect the design of Onshore Transmission Systems.

2.5 Chapter 5 (Onshore) and Chapter 9 (Offshore) stipulate that Unacceptable Frequency Conditions must not occur for a Secured Event. The list of secured events includes infeed loss risks. Chapter 5 and Chapter 9 do not refer to normal and infrequent loss risks.

2.6 Unacceptable Frequency Conditions are defined in the NETS SQSS in the following way:

*"These are conditions where:*

*i) the steady state frequency falls outside the statutory limits of 49.5Hz to 50.5Hz; or*

*ii) a transient frequency deviation on the MITS persists outside the above statutory limits and does not recover to within 49.5Hz to 50.5Hz within 60 seconds.*

*Transient frequency deviations outside the limits of 49.5Hz and 50.5Hz shall only occur at intervals which ought reasonably be considered as infrequent. It is not possible to be prescriptive with regard to the type of secured event which could lead to transient deviations since this will depend on the extant frequency response characteristics of the system which NGET shall adjust from time to time to meet the security and quality requirements of this Standard."*

## Issue

- 2.7 The NETS SQSS definition of Unacceptable Frequency Conditions stipulates how deviations outside the limits of 49.5Hz and 50.5Hz should be considered where it refers to a "transient frequency deviation". However, the definition of a Normal Infeed Loss Risk (see Paragraph 2.2) could be interpreted to suggest that a limit of -0.5Hz should be applied for losses in this category, and could therefore be seen to conflict with the definition of Unacceptable Frequency Conditions.
- 2.8 The impact of applying a limit of -0.5Hz to infeed loss risks in the range of greater than 1000MW to 1320MW is that additional frequency response would be required, despite there being no change in infeed risks. This is because infeed loss risks in the range of greater than 1000MW to 1320MW which already exist would be re-categorised.
- 2.9 The amount of frequency response which is required to meet frequency containment criteria depends on system conditions. NGET takes generation and demand characteristics into account when determining its frequency response requirements for a given secured event. Raising the lower frequency limit for infeed loss risks in the range of greater than 1000MW to 1320MW to 49.5Hz would have the effect of increasing Primary Response requirements significantly in periods of low demand. The cost of the additional frequency response is estimated at in excess of £100m per year.
- 2.10 Infeed losses of above 1000MW have been relatively infrequent. In the period between 1<sup>st</sup> May 1998 and 31<sup>st</sup> July 2012 there were 54 incidents where 1000MW or more was lost<sup>2</sup> (an average of less than 4 per year). Given this low historic rate of occurrence, the additional expenditure would yield very little benefit. If the rate of occurrence rises in the future, there may then be a case to increase frequency response requirements to maintain acceptable frequency control performance.
- 2.11 The SQSS Review Panel believes that this additional expenditure was not an intended effect of the GSR007 proposals and that the criteria set under the definition of Unacceptable Frequency Conditions applies.

## Way Forward

- 2.12 It is therefore proposed that NETS SQSS drafting should be modified to clarify that infeed loss risks should be managed in accordance with the definition of Unacceptable Frequency Conditions as intended.
- 2.13 It should also be noted that the frequency control requirements in the SQSS are likely to need to be reviewed when the Load Frequency Control and Reserves European Code (LFCR)<sup>3</sup> comes into effect. The LFCR is in its final form prior to the European Commission giving it consideration. It is expected to come into force in 2014 with an implementation period of 18 months. At that time, it may be necessary to change the SQSS to ensure it is not inconsistent with the LFCR. Interested parties will have an opportunity to contribute to any changes that are required. The "Frequency Quality Defining Parameters" specified in the current version of the LFCR are illustrated in Figure 1.

---

<sup>2</sup> <http://www.nationalgrid.com/NR/rdonlyres/B256B837-1C17-4CE6-9955-EADC0B3ADA3/57610/November2012GCRPpapers3.zip> :

"Annual Summary Report for Significant System Events (1 August 2011 to 31 July 2012)"

<sup>3</sup> <https://www.entsoe.eu/major-projects/network-code-development/load-frequency-control-reserves/>

	CE	GB	IRE	NE
Standard Frequency Range	±50 mHz	±200 mHz	±200 mHz	±100 mHz
Maximum Instantaneous Frequency Deviation	800 mHz	800 mHz	1000 mHz	1000 mHz
Maximum Steady-state Frequency Deviation	200 mHz	500 mHz	500 mHz	500 mHz
Time to Recover Frequency	not used	1 minute	1 minute	not used
Frequency Recovery Range	not used	±500 mHz	±500 mHz	not used
Time to Restore Frequency	15 minutes	10 minutes	20 minutes	15 minutes
Frequency Restoration Range	not used	±200 mHz	±200 mHz	±100 mHz
Alert State Trigger Time	5 minutes	10 minutes	10 minutes	5 minutes

Table 1 : Frequency Quality Defining Parameters of the Synchronous Areas

**Figure 1:** Extract from LFCR Drafting (Table 1)

### 3 Solution

- 3.1 It is proposed that the definitions of the Normal Infeed Loss Risk and Infrequent Loss Risk in the NETSS SQSS are modified to eliminate any potential confusion or inconsistency with the criteria set in the definition of Unacceptable Frequency Conditions.
- 3.2 As described above, the Normal Infeed Loss Risk is currently defined as:
- "That level of loss of power infeed risk which is covered over long periods operationally by frequency response to avoid a deviation of system frequency by more than 0.5Hz. Until 31st March 2014, this is 1000MW. From April 1st 2014, this is 1320MW"*
- 3.3 There are a number of ways in which the definition of Normal Infeed Loss Risk could be modified to achieve the desired effect. However, care must be taken to ensure that undesired effects do not occur. One such undesired effect would be restricting the design on an Offshore Transmission System which is not the intention of this proposal.
- 3.4 A straightforward way of avoiding confusion or inconsistency between the definition of Normal Infeed Loss Risk and the definition of Unacceptable Frequency Conditions is to remove the reference to frequency response in the Normal Infeed Loss definition. The new definition would therefore be *"Until 31st March 2014, this is a loss of power infeed risk of 1000MW. From April 1st 2014, this is a loss of power infeed risk 1320MW"*. Any future necessary changes to frequency control requirements in the NETS SQSS (as a consequence of the LFCR code for example) would be implemented by modifying the definition of Unacceptable Frequency Conditions.
- 3.5 Extension of this principle to the definition of Infrequent Infeed Loss Risk would mean its definition would change to *"Until 31st March 2014, this is a loss of power infeed risk of 1320MW. From April 1st 2014, this is a loss of power infeed risk of 1800MW"*.
- 3.6 One further simplification which could be made is to remove all references to dates in the definitions. The definitions would then become *"This is a loss of power infeed risk of...MW"*. If the change were effective from April 1<sup>st</sup> 2014, this change would have no material effect as is intended. However, the date of any change cannot be guaranteed at this stage so this change is not proposed at this time.
- 3.7 The legal text required to implement the proposed solution for both the Normal Infeed Loss Risk and Infrequent Infeed Loss Risk definitions is provided in Annex 1.



## 4 Impact & Assessment

### NETS SQSS Review Panel Assessment

- 4.1 The Review Panel agreed with the NGET view that the proposed changes are implemented as they improve NETS SQSS drafting clarity and consistency.
- 4.2 The inconsistency between the definition of Normal Infeed Loss and Unacceptable Frequency Conditions could be interpreted to mean that Primary Response requirements need to increase from 1<sup>st</sup> April 2014. The additional frequency response would be procured to secure infeed loss risks in the size range of greater than 1000MW to 1320MW to a higher containment frequency than at present, despite there being no material change in the frequency of losses in this size range. The proposed change removes any potential ambiguity, ensures that frequency control performance is maintained within the current criteria and that Balancing Services costs are managed appropriately.
- 4.3 No alternative views were have been put forward by Panel members.

### Impact on the NETS SQSS

- 4.4 GSR015 requires amendments to the following parts of the NETS SQSS:
  - Terms and Definitions
- 4.5 The text required to give effect to the proposal is contained in Annex 1 of this consultation.

### Impact on National Electricity Transmission System (NETS)

- 4.6 The proposed changes will ensure that no additional Balancing Services costs are incurred due to the change in the value the Normal Infeed Loss whilst ensuring that frequency control standards will be maintained at their current level.

### Impact on NETS SQSS Users

- 4.7 The proposed modification means an increase in the volume of Balancing Services procured and costs incurred will be avoided.

### Impact on Greenhouse Gas emissions

- 4.8 The proposed modification will have no material impact on Greenhouse Gas emissions.

### Assessment against NETS SQSS Objectives

- 4.9 The SQSS Review Panel considers that the proposed changes would better facilitate the SQSS objective:
  - (i) facilitate the planning, development and maintenance of an efficient, coordinated and economical system of electricity transmission, and the operation of that system in an efficient, economic and coordinated manner;

*The change removes an inconsistency in SQSS drafting which could be interpreted to mean that additional frequency response needs to be procured to secure infeed loss risks in the size range of greater*



*than 1000MW to 1320MW despite there being no material change in the frequency of losses in this size range occurring;*

- (ii) ensure an appropriate level of security and quality of supply and safe operation of the National Electricity Transmission System;

*The changes will maintain current frequency control criteria.*

- (iii) facilitate effective competition in the generation and supply of electricity, and (so far as consistent therewith) facilitating such competition in the distribution of electricity; and

*The proposal has a neutral impact on this objective*

- (iv) facilitate electricity Transmission Licensees to comply with their obligations under EU law.

*The proposal has a neutral impact on this objective*

### **Impact on core industry documents**

4.10 The proposed modification does not impact on any core industry documents

### **Impact on other industry documents**

4.11 The proposed modification does not impact on any other industry documents

### **Implementation**

4.12 The NETS SQSS Review Panel proposes GSR015 should be implemented 10 business days after an Authority decision. Views are invited on this proposed implementation date.

## 5 Consultation Responses

5.1 Views are invited upon the proposals outlined in this consultation, which should be received by **06 December 2013**.

Your formal responses may be emailed to:

[sqss@nationalgrid.com](mailto:sqss@nationalgrid.com)

5.2 Responses are invited to the following questions:

- (i) Do you agree that there is an inconsistency in the current definitions of Infeed Loss Risks and Unacceptable Frequency Conditions in the NETS SQSS?
- (ii) Do you agree that the proposed change to the definitions of Normal Infeed Loss and Infrequent Infeed Loss Risk removes any inconsistency?
- (iii) Have you identified any material negative consequences of the proposed change? Please explain what these are.
- (iv) Do you believe that GSR015 better facilitates the appropriate NETS SQSS objectives?
- (v) Do you support the proposed implementation approach of 10 business days following an Authority decision?

5.3 If you wish to submit a confidential response please note the following:

- (i) Information provided in response to this consultation will be published on National Grid's website unless the response is clearly marked "Private & Confidential", we will contact you to establish the extent of the confidentiality. A response marked "Private and Confidential" will be disclosed to the Authority in full but, unless agreed otherwise, will not be shared with the SQSS Panel or the industry and may therefore not influence the debate to the same extent as a non confidential response.
- (ii) Please note an automatic confidentiality disclaimer generated by your IT System will not in itself, mean that your response is treated as if it had been marked "Private and Confidential".

## Annex 1 - Proposed Legal Text

This section contains the proposed legal text to give effect to the proposals. The proposed new text is in red and is based on NETS SQSS v2.2.

Normal Infeed Loss Risk      ~~That level of loss of power infeed risk which is covered over long periods operationally by frequency response to avoid a deviation of system frequency by more than 0.5Hz.~~ Until 31st March 2014, this is *a loss of power infeed risk of 1000MW.* From April 1st 2014, this is *a loss of power infeed risk of 1320MW.*

Infrequent Infeed Loss Risk      ~~That level of loss of power infeed risk which is covered over long periods operationally by frequency response to avoid a deviation of system frequency outside the range 49.5Hz to 50.5Hz for more than 60 seconds.~~ Until 31st March 2014, this is *a loss of power infeed risk of 1320MW.* From April 1st 2014, this is *a loss of power infeed risk of 1800MW.*