Consultation Document

Design of the Test Plan for Northern Ireland

In accordance with the requirements of Articles 43 and 44 to 47 of the Commission Regulation(EU) 2017/2196 Establishing a network code on electricity emergency and restoration

9th April 2021

SONI

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Emergency and Restoration – Response Proforma

SONI Ltd invites responses to this consultation by 7th May 2021. The responses to the specific consultation questions (below) or any other aspect of this consultation can be provided by completing the following form. *The form is also available in .doc format at the Electricity Emergency and Restoration consultation section of our website.*

Please return the completed form to gridcode@SONI.ltd.uk with "**NCER: Test Plans**" in the subject field in the response email.

Respondent:	
Company Name:	
Does this response contain confidential information? If yes, please specify.	
Name of Consultation this response is in relation to:	

No	Question	Response (Y/N)	Rationale
1	Do you agree with the approach taken in the proposal? please provide rationale		
2	Do you agree that the proposal is consistent with the principle of minimum necessary change? please provide rationale		
3	Do you have any other comments in relation to the proposal?		

1. Abbreviations

- TSO – Transmission System Operation
- DNO – Distribution Network Operator
- NCER – Network Code for Emergency Restoration
- SOGL – System Operator Guideline
- RfG – Requirements for Generators
- HVDC – High Voltage Direct Current
- DCC – Demand Connection Code
- SGU - Significant Grid User
- CHCC – Castlereagh House Control Centre
- SDP – System Defence Plan
- SRP – System Restoration Plan
- GC – Grid Code
- PSRP – Power System Restoration Plan
- PGM – Power Generating Module
- PPM – Power Park Module
- DSU – Demand Side Units
- AGU – Aggregated Generating Unit
- OCGT – Open Cycle Gas Turbine
- DRSP – Demand Response Service Provider
- LFDD – Low Frequency Demand Disconnection
- OFGS – Over Frequency Generation Shedding
- UVLS – Under Voltage Load Shedding
- SPS – Special Protection Schemes
- RR – Replacement Reserve
- FRR – Frequency Restoration Reserve (TOR – Tertiary Operating Reserve)

2. Purpose

This Test Plan is prepared in accordance with COMMISSION REGULATION (EU) 2017/2196 of 24 November 2017 “establishing a network code on electricity emergency and restoration” (referred to as NCER), which came into force on the 18th of December 2017. Under NCER the Transmission System Operators (TSO) of a member state are required to develop and consult on a Test Plan prior to submission to the relevant regulatory authority for approval.

This Test Plan has been designed based on the requirements detailed within Articles 43 and 44 to 47 within NCER, the high-level requirements of these articles include:

- Design of the Test Plan
- Assessment and identification of equipment and capabilities to be tested
- Periodicity and conditions of the test

SONI has undertaken this work on the assumption that the Utility Regulator (UR) will allocate the responsibility to deliver the obligations under these articles solely to SONI when it makes its determination in accordance with Article 4 of the code. We have worked closely with NIE Networks, in its role as DNO (Distribution Network Operator), when preparing this plan.

In addition to the Test Plan providing a review of the System Defence Plan and System Restoration Plan actions and measures available to SONI as the TSO and NIE Networks as the DNO; it also outlines the roles and responsibilities of Significant Grid Users (SGUs) including defence and restoration service providers in ensuring the full availability of their equipment and capabilities.

This document also outlines how the Test Plan that is implemented within the SONI TSO controlled area relates to the relevant articles of NCER and the Grid Code as necessary.

This is not an operational document to be used by the TSO in the event a defence or restoration service provider requires to be tested. The step by step actions used by SONI in the Castlereagh House Control Centre (CHCC) or at the facilities site, or by NIE Networks are bespoke operational procedures to the provider/service being tested.

While the NCER requirements and licence requirements for capability testing are jurisdictional the aim is to ensure the all-island system is maintained and operated in a secure manner, hence there is a separate but complementary Ireland Test Plan which EirGrid has developed.

3. Introduction

NCER[1] is one of a suite of European Network Codes and Guidelines that seek to achieve a fully functioning and interconnected energy market, whilst ensuring the security of supply and that all consumers benefit via competitive markets across the EU.

The NCER aims to establish a set of common minimum requirements and principles for the measures and procedures; such as system defence and system restoration, to which TSOs, DNOs and SGUs must adhere to prevent the system from entering Emergency and/or Blackout state or to restore the system to Normal state from the Restoration state.

Also note that NCER links and interacts with a number of other European Network Guidelines and Codes, including but not limited to:

- System Operation Guideline (SOGL), EU Regulation 2017/1485[2]
- Requirements for Generators (RfG), EU Regulation 2016/631[3]
- High Voltage Direct Current (HVDC), EU regulation 2016/1447[4]
- Demand Connection Code (DCC), EU Regulation 2016/1388[5]
- Capacity Allocation and Congestion Management, EU Regulation 2015/1222[6]

EU network guidelines and codes which are necessary for the functioning of the wholesale electricity market continue to apply in Northern Ireland, following the UK departure from the EU, in line with the Withdrawal Agreement. Specifically, the design of this Test Plan is compiled in accordance with NCER Article 43 and is consulted upon in accordance with Article 7.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R2196&from=en

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R1485&from=EN

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0631&from=EN

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R1447&from=EN

[5] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R1388&from=EN

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R1222&from=EN

4. Design of the Test Plan

In accordance with NCER Article 43 and Article 7 (Public consultation), the relevant TSO of a member state is required to define and consult with the Distribution Network Operator (DNO), Significant Grid Users (SGUs), defence and restoration service providers, on a test plan for system defence and system restoration prior to submission to the relevant regulatory authority for approval. SONI has also consulted with NIE Networks in its role of Transmission Asset Owner when developing this plan.

This Test Plan has been designed based on the requirements detailed within Articles 11, 23 and 43 to 47 within NCER, the high-level requirements of these articles include;

- Applicable parties of the Test Plan (Articles 11, 23 and 43)
- Design of the Test Plan (Article 43)
- Compliance testing and periodicity (Articles 43 to 47)

The purpose of this Test Plan is to state how it is implemented in Northern Ireland, in addition to relating the relevant articles of NCER with documentation such as the System Defence Plan (SDP)[7], System Restoration Plan (SRP)[8] and the Grid Code (GC)[9].

Both the SDP and SRP are referenced in this Test Plan and should be considered as complimentary documents. In a similar approach to the other plans this Test Plan is reviewing existing procedures and no significant new processes are being implemented. Where there is a proposed minor amendment to ensure full compliance this is made clear.

In addition, should the detailed plans referenced in this document be altered to take into account the characteristics of the transmission system or underlying DNO systems, due to the behaviour and capabilities of load and generation within the TSO controlled area;

[7] http://www.soni.ltd.uk/media/documents/SONI_System_Defence_Plan_Northern-Ireland.pdf

[8] http://www.soni.ltd.uk/media/documents/SONI_System_Restoration_Plan_NorthernIreland.pdf

[9] http://www.soni.ltd.uk/media/documents/SONI-GridCode-Version-Feb2020.pdf

then this alteration will be in accordance with the NCER Articles and shall be reflected in a revised version of this document. Periodic reviews of both the SDP and SRP shall take place at least every 5 years in accordance with NCER Articles 50 and 51. This review process is not part of the Test Plan.

5. Requirements of the Test Plan

NCER Article 43 article defines the general principles to which the test plan must adhere to, including relevant articles (44 to 47) of NCER. For ease of reference Article 43 has been repeated in full below together with any references to other EU regulations again copied in full.

ARTICLE SUBSECTION	REQUIREMENT
43(1)	Each TSO shall periodically assess the proper functioning of all equipment and capabilities considered in the system defence plan and the restoration plan. To this end, each TSO shall periodically verify the compliance of such equipment and capabilities, in accordance with paragraph 2 and with **Article 41(2) of Regulation (EU) 2016/631(RfG):** "*2. The relevant system operator shall have the right to request that the power-generating facility owner carry out compliance tests and simulations according to a repeat plan or general scheme or after any failure, modification or replacement of any equipment that may have an impact on the power-generating module's compliance with the requirements of this Regulation. The power-generating facility owner shall be informed of the outcome of those compliance tests and simulations."* **, Article 35(2) of Regulation (EU) 2016/1388(DCC):** *"2. The relevant system operator shall have the right to request that the demand facility owner, the DSO or the CDSO carries out compliance tests and simulations according to a repeat plan or general scheme or after any failure, modification or replacement of any equipment that may have an impact on the compliance of the transmission connected demand facility, the transmission-connected distribution facility, the distribution system, or the demand unit with the requirements of this Regulation. The demand facility owner, the DSO or the CDSO shall be informed of the outcome of those compliance tests and simulations."* and **Article 69(1) and (2) of Regulation (EU) 2016/1447(HVDC):** *"1. The HVDC system owner shall ensure that the HVDC system and HVDC converter stations are compliant with the requirements provided for by this Regulation. This compliance*

ARTICLE SUBSECTION	REQUIREMENT
	shall be maintained throughout the lifetime of the facility. *2. The DC-connected power park module owner shall ensure that the DC-connected power park module is compliant with the requirements under this Regulation. This compliance shall be maintained throughout the lifetime of the facility."*
43(2)	By 18 December 2019 each TSO shall define a test plan in consultation with the DSOs, the SGUs identified pursuant to **Articles 11(4):** *"4. In particular, the system defence plan shall include the following elements: (only relevant section(c) shown)* *(c) a list of the SGUs responsible for implementing on their installations the measures that result from the mandatory requirements set out in Regulation (EU) 2016/631(RfG), (EU) 2016/1388 (DCC) and (EU) 2016/1447 (HVDC) or from national legislation and a list of the measures to be implemented by those SGUs; "* and **23(4):** "4*. In particular, the restoration plan shall include the following elements: (only relevant section(c) shown)* *(c) a list of the SGUs responsible for implementing on their installations the measures that result from mandatory requirements set out in Regulations (EU) 2016/631(RfG), (EU) 2016/1388 (DCC) and (EU) 2016/1447 (HVDC) or from national legislation and a list of the measures to be implemented by those SGUs; ."* , the defence service providers and the restoration service providers. The test plan shall identify the equipment and capabilities relevant for the system defence plan and the restoration plan that have to be tested.
43(3)	The test plan shall include the periodicity and conditions of the tests, following the minimum requirements outlined in Articles 44 to 47. The test plan shall follow the methodology laid down in Regulation (EU) 2016/631 (RfG), Regulation (EU) 2016/1388 (DCC) and Regulation (EU) 2016/1447 (HVDC) for the corresponding tested capability. For SGUs that are not subject to Regulation (EU) 2016/631 (RfG),

ARTICLE SUBSECTION	REQUIREMENT
	Regulation (EU) 2016/1388 (DCC) and Regulation (EU) 2016/1447 (HVDC), the test plan shall follow the provisions of national law.
43(4)	Each TSO, DSO, SGU, defence service provider and restoration service provider shall not endanger the operational security of the transmission system and of the interconnected transmission system during the test. The test shall be conducted in a way that minimises the impact on system users.
43(5)	The test is deemed to be successful when it fulfils the conditions established by the relevant system operator pursuant to paragraph 3. As long as a test fails to fulfil these criteria, the TSO, DSO, SGU, defence service provider and restoration service provider shall repeat the test.

Commentary on Article 43

The general principles in Article 43, once enacted, may be described as providing reassurance that the defence and restoration measures listed in the SDP and the SRP, respectively, will be available to be utilised as a when required by the TSO.

To ensure the proper functioning of the service provider's capabilities, the TSO shall periodically carry out an assessment to ensure as far practicable that the service will operate correctly and within the defined time-frame when called upon. This is set out in the Test Plan by confirming which measures in the SDP and SRP are tested.

In developing the Test Plan, any testing and monitoring procedures which may be provided by relevant service providers, SONI has co-ordinated and consulted with the DNO on the production of this document to ensure the following NCER principles are met:

- testing shall not endanger the operational security of the system
- testing shall be conducted to minimise the impact on system users

As noted in Article 43(2), other stakeholders including the SGUs identified and both defence and restoration service providers are to be consulted by the TSO. The

consultation exercise in accordance with Article 7(1) fulfils SONI's obligations in this respect.

It should be noted that some services are mandatory in other EU Regulations including the demonstration of compliance testing and simulations on request of the relevant system operator, whereas the EU Regulations for new HVDC owners mandates certain capabilities of HVDC facilities as the lifetime responsibility of HVDC owners without the need for ongoing compliance testing.

Overall, the testing has due regard to that state of the system during any testing and should be planned to minimise the impact on users and the system. It is important to note that a significant majority of the tests have been established in the national code (Grid Code compliance tests and System Services compliance testing) for many years and have been operating successfully.

The next section will consider each measure of the SRP and SDP in turn and the aspects being tested including how often or when the tests should be carried out. It also includes an assessment of existing practices against compliance with NCER and wherever compliance is demonstrated SONI is not proposing to make any changes.

5.1. Application of the Test Plan – System Restoration Plan

5.1.1. Black Start

Within the SRP there is one main service identified and that is the Black Start Service provided by 3 power stations and as discussed in the SRP the Moyle interconnector is unable to provide Black Start capability.

Black Start capability means the capability to recover a power-generating module (PGM) from a total shutdown through a dedicated auxiliary power source without any electrical energy supply external to the power-generating facility (RfG Article 2(45) refers) and for a PGM to successfully demonstrate this technical capability, it shall start from shut down without any external electrical energy supply with the test deemed successful if the start-up time is kept within the time frame defined by the relevant TSO (RfG Article 45(5) refers).

The Black Start service capability and testing has been present in the SONI Grid Code (CC.S1.1.4 and OC11.6/OC11.11, refers) for many years and is fully aligned with RfG. All units providing Black Start capability will be specified as a Black Start Station (GC definition) in the Connection Agreement. In accordance with the Grid Code SONI will specify which new generating plants are required to be Black Start Stations, as a condition of a connection offer, to ensure the continuing availability of Black Start capability. Please note that Power Park Modules (PPMs) are exempt from providing Black Start capability (CC.S2.1.6 and CC.S2.2.4, refers)

The start-up time is set for individual stations depending on fuel type and ranges between 1 and 4 hours. SONI plans to conduct one Black Start test per year and there is no minimum testing frequency set out in the current Grid Code.

NCER does introduce a testing frequency (or periodicity) in Article 44(1) of conducting a Black Start test per PGM of at least every three years. Currently with 5 generating units providing Black Start capability across the 3 power stations the periodicity of testing will

be increased. While the Grid Code is silent on this issue, consideration is being given to where the testing frequency may best be specified to ensure transparency with the service providers. However, our current thinking is to have the periodicity requirement in the relevant Connection Agreement rather than submitting a Grid Code change that only impacts a small minority of users.

NCER Article 46, Compliance Testing of HVDC capabilities, introduces the same periodicity requirement of testing at least every three years, which will apply if a new interconnector is required by SONI to have Black Start capability.

5.1.2. Quick Resynchronisation

While not mentioned in the SRP, RfG requires generation units with start up times greater than 15 minutes, to be capable of tripping to house load when supply from the transmission system is lost. This is in order to enable these units to carry out quick resynchronisation when supply from the transmission system is restored. A similar requirement exists within the Grid Code for non-RfG units, where their start up time exceeds 30 minutes. Please see Grid Code OC7.5.4 and RfG and non-RfG definitions for more detail.

The methodology for this quick resynchronisation service, (RfG Article 45(6), refers) describes that for a PGM to demonstrate the capability it is required to trip and stably operate on house load followed by a successful re-synch to the network, i.e. the unit remains operational on auxiliaries in order to provide a quicker resynchronisation time than had it been left fully disconnected to go ‘cold’. The time period for quick re-synchronisation will be specified by the relevant system operator for all RfG and non-RfG units.

There are currently no RfG generation units with a start up time greater than 15 minutes in the SONI TSO controlled area, however, in anticipation for when applicable generation

does commission onto the system there are revised compliance tests including 'RfG Trip to House Load' on the SONI compliance testing website.[10]

Therefore SONI is currently compliant and fully aligned with RfG, however NCER Article 44(2) introduces a periodicity element to when these tests will be required to be performed subsequent to commissioning. Rather than a set time-period, re-tests will be required based on certain events occurring, such as changes to equipment impacting house load operation and after two unsuccessful consecutive tripping in real operation (not testing). These requirements will be made clear to the generator owner during the connection application stage as part of the demonstration of full compliance required to successfully commission onto the system.

5.2. Application of the Test Plan – System Defence Plan

Within the SDP there are a number of measures employed to mitigate the operational impact on the system as it moves into an Emergency system state, some of the actions may be deployed to support more than a single operational effect, e.g. dispatching active power for power flow, voltage or frequency issues.

In the following section the individual actions and capabilities delivered by service providers have been considered irrespective of the measures it is listed against in the SDP.

[10] https://www.eirgridgroup.com/customer-and-industry/general-customer-information/grid-code-compliance-test/compliance-testing/conventional-generation/

5.2.1. Automatic Tripping Schemes

Low Frequency Demand Disconnection (LFDD)

One of the main automatic tripping schemes is LFDD where low frequency relays at a mixture of GSP (Grid Supply Point) and BSP (Bulk Supply Point) connections within the distribution system are set at various frequency thresholds to stagger the demand disconnected depending on the severity of the low frequency incident. The stages of the scheme are listed in the SDP.

There is ongoing co-ordination between SONI and NIE Networks to ensure the successful operation and maintenance of this distribution scheme. All the low frequency relays are owned and maintained by NIE Networks, however, SONI is responsible for ensuring sufficient load is allocated to each of the low frequency tripping blocks and for ensuring overall co-ordination with EirGrid for the synchronous area.

The frequency relays in this scheme are tested periodically, either on a three year or five year maintenance plan depending on the type and age of the relay. The relays are trip-tested (offline) as part of their maintenance.

Under Voltage Load Shedding (UVLS) and Special Protection Schemes (SPS)

In a similar way to the LFDD scheme above, the UVLS and SPS rely on relays at various settings of voltage or current to operate the respective protection and trip generation or infrastructure assets as required.

NIE Networks as transmission asset owner is responsible for the maintenance of these relays/ schemes and their protection maintenance policy is on a cycle of three or five years depending on the type of equipment.

Over Frequency Generation Shedding Scheme (OFGS) and Step Wise Linear Disconnection

As noted in the SDP, the OFGS applies only to certain wind farms as the largest loss (export) scenario is most likely when wind farms are near full capability. The threshold frequency from 50.5Hz is selected on the generator's own protection as part of their G59[11] mains protection relay settings. SONI provides the settings for the transmission connected generators to apply; however, it is the generators' responsibility to maintain these relays as part of its own protection.

The SDP makes reference to Step Wise Linear Disconnection if the over-frequency control is insufficient to manage the loss of the largest export, in accordance with NCER. However, as the OFGS is designed to manage this there is not a TSO instructed scheme or any testing requirements.

[11] http://www.dcode.org.uk/assets/files/Qualifying%20Standards/ENA_EREC_G59_Issue_3_Amendment_6_(2019).pdf

5.2.2. Operating Reserve

Frequency Restoration Reserve (FRR)

It was discussed in the SDP that FRR may be categorised as a defence service due to the timing of when the service is provided compared to the declaration of an emergency system state.

SONI publishes the 'DS3 System Services Protocol'[12] to describe the testing and monitoring of Tertiary Operating Reserve (maps to FRR). If there is a 'frequency event' as defined for performance monitoring (+/- 0.3Hz from a nominal 50.0Hz), all operating reserve providers are monitored and assessed as a pass, partial pass or fail. The system services agreement has significant financial incentives to maintain compliance, otherwise performance scalars are applied to the payments received by service providers. Given the above criteria, monitoring occurs multiple times each year, for example there have been at seven frequency events during 2020.

Any units that implement any equipment changes that impact their frequency characteristics will trigger a re-test as per the commissioning tests validated by SONI.

Replacement Reserve (RR)

RR testing in response to a frequency event follows the testing outlined above. However, if tested against response to a dispatch instruction and if fails to synch within 15 minutes, the unit is given a Failure to Follow Notice to Synchronise (GC SDC2.A.4 & DS3 System Services Protocol) which overrides all normal market rules and eliminates any payment against that synchronisation instruction.

[12] http://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Protocol-Regulated-Arrangements-v2.0.pdf

5.2.3. Central Dispatch Instructions

Active Power Set Points

Asking a dispatchable unit to change their active power set point is tested regularly through daily instructions in the market; however, SONI does not carry out monitoring unless there is a specific issue brought to our attention. Dispatch instructions are verified at D+1/ D+4 to ensure accuracy of information for settlement and also for generator performance. Tolerance bands are specified in the Grid Code for relevant dispatchable plant, see OC11.5 or OC11.10 which details the 'Procedure for Monitoring' including for Demand Side Units (DSUs) where performance outside these bands is followed up by SONI directly with the plant owner. Also, it should be noted that if generation units are not following their active power instructions they will be out of balance in the market and will be impacted financially.

SONI procures a number of ramping products and some of these are performance monitored based on their instructions to synchronise (and their monthly payments are adjusted by performance scalars accordingly based on pass / fail criteria).

For those units that do not receive regular dispatch instructions, SONI has an "Availability Testing Policy" where all dispatchable units that have been off load for more than 12 weeks are issued with a synchronisation dispatch instruction at an opportune time and dispatched to their declared availability. This is carried out as soon as practicable taking into account the balance between incurring additional imperfection costs and maintaining system security. For peaking units, i.e. OCGTs and AGU's, the requirement to test is reduced to every 6 weeks.

For thermal, DSU, and AGU units if the declared availability is not achieved and maintained for 60 minutes the test should be logged as 'failed'. For energy limited plant (e.g. hydro, pumped storage, batteries etc.), it is sufficient to achieve full load for the test to be logged as 'passed'.

Reactive Power Set Points

Generating units providing a minimum reactive power capability is mandated in the Grid Code and compliance checked during their initial commissioning tests. Subsequently there is no regular monitoring unless SONI become aware of an issue with a particular unit. Assessment will be carried out against the tolerance bands for re-active power specified in the tables in Grid Code OC11 Appendices.

Units may apply to receive Steady State Reactive Power (SSRP) payments under DS3 System Services, however, these are not actively performance monitored and there are no performance scalars (say similar to Operating Reserves) applied to act as an incentive to maintain compliance. So once a Unit receives this contract, they will receive monthly payments based on their availability unless brought to SONI's attention.

Demand Response Service Provider (DRSP)

As noted in the SDP demand side response has been provided for many years by Demand Side Units (DSUs) as defined in the Grid Code. Moreover, when considering the requirements in DCC for DRSPs, the main demand response service is categorised as Remote Controlled – Active Power Control (RC-APC).

RC-APC is covered by DCC Article 28 which describes the characteristics of the demand response to be agreed with the TSO, which can be made the same as DS3 Ramping Services for demand providers. Currently, only DSUs have the 'proven technology' to provide this service, see 'DS3 System Services Compliance and Testing Capability Management Guidance Document'.[13]

Therefore, while DSUs are a subset of the wider network codes definition of DRSPs, when assessing compliance against NCER Article 45 (1) this is applicable to DSUs only. The NCER requirement is to perform a 'demand modification test' at least every year, which is equivalent to following a dispatch instruction (to provide demand response for a set duration and then return to normal operation, again on instruction).

[13] https://www.eirgridgroup.com/site-files/library/EirGrid/SS-Guidance-document.pdf

DSUs are checked for compliance on connection and for providing DS3 System Services prior to the award of an agreement. Once in service the 'Availability Testing Policy' is followed where DSUs receive a dispatch instruction approximately every 12 weeks unless prohibitively expensive (note: monitoring is for information only as DSUs are paid based on dispatch instruction and not their metered output). Therefore, as costs are taken into account under the current policy, SONI is proposing to update it to include at least one dispatch instruction in a 12 month period to ensure compliance with the periodicity criteria.

5.2.4. Manual Tripping Schemes

Disconnection on Instruction (Generation and Demand)

All centrally dispatched generators or demand units may receive an instruction to be dispatched to zero MWs following normal dynamic parameters. Monitoring performance against dispatch instructions for active power changes is discussed above.

While tripping of units is not usually a planned event and would only be used by the relevant system operator in emergency conditions, conventional (synchronous) generator units are tested during commissioning with a full – load rejection test where the main high voltage circuit breaker is opened to trip the unit, however, this is to check the units for stability and minimum recovery time.

Load Shedding (Demand)

NIE Networks has 18 separate distribution load blocks of demand with some up to 50MW (peak load) set up in their SCADA system. Each block has its own SCADA screen with up to 20 circuit breakers to be opened in turn, which would take under a minute. This provides the control engineers with better discrimination on the amount of load disconnected as there is a summator on each screen so selections may stop when the target amount of load requested by SONI has been reached.

While testing the scheme in full is not practicable, individual circuit breaker maintenance testing is carried out to a standard schedule. Additionally, demand control training is part of a control engineers' authorisation which takes up to a year and all are re-authorised every five years via a formal process. Additionally, whenever there is an (Amber) Alert system state for tight margins this is the signal for the control engineers "to consult their demand control file and review the process" and be on standby if necessary.

5.2.5. Interconnectors

Emergency Assistance

The emergency assistance requirement is part of the standing arrangement in the Interconnector Operating Protocol (IOP) agreed with both SONI and National Grid ESO. The obligation is mutual and cannot be removed unless the sending TSO would enter Emergency or Blackout state by providing Emergency Assistance (NCER Article 14 (1)).

Testing of this service is not required (and not needed for compliance with NCER) as ramping the interconnector are normal actions that are available as long as the interconnector is in service.

5.3. Compliance with NCER Article 44 to 47

While the above sections have considered the testing of all actions and measures in the SDP and SRP, some are set at the commissioning stage and then tested at regular intervals and some only when SONI has cause for concern; the following table reviews the overall Test Plan against the specific requirements of NCER Article 44 to 47. Please note the obligation is on the relevant service provider/ plant owner and not necessarily SONI, however, SONI's proactive testing and monitoring supports the overall compliance with NCER.

Article Subsection	Requirement	Summary of Compliance
44 (1) – Compliance testing of power generating module capabilities	*Each restoration service provider which is a power generating module delivering black start service shall execute a black start capability test, at least every three years, following the methodology laid down in Article 45(5) of Regulation (EU) 2016/631.*	As discussed in section 5.1.1 above and while the obligation is on the restoration service provider, SONI pro-actively monitors the Black Start tests and is proposing to include updating the relevant Connection Agreements to provide transparency with the periodicity requirements of testing each PGM at least every three years.

Article Subsection	Requirement	Summary of Compliance
44(2) – Compliance testing of power generating module capabilities	*Each restoration service provider which is a power generating module delivering a quick re-synchronisation service shall execute tripping to house load test after any changes of equipment having an impact on its house load operation capability, or after two unsuccessful consecutive tripping in real operation, following the methodology laid down in Article 45(6) of Regulation (EU) 2016/631.*	As discussed in section 5.1.2 above, there are not any RfG Generating Units in the SONI controlled area that are mandated to provide a quick resynchronisation service. However, while the obligation is with the restoration service provider, SONI has issued a 'tripping to house load test' on their testing website if required in the future.
45 (1) – Compliance testing of demand facilities providing demand side response	*Each defence service provider delivering demand response shall execute a demand modification test, after two consecutive unsuccessful responses in real operation or at least every year, following the methodology laid down in Article 41(1) of Regulation (EU) 2016/1388.*	As discussed in section 5.2.3 above, the only Demand Response Service Providers in SONI's TSO area are currently Demand Side Units as defined in the Grid Code. As a demand modification test is essentially adjusting their active power in response to a TSO instruction, DSU owners exceed the minimum requirements for periodicity.

Article Subsection	Requirement	Summary of Compliance
45 (2) – Compliance testing of demand facilities providing demand side response	*Each defence service provider delivering demand response low frequency demand disconnection shall execute a low frequency demand disconnection test within a period to be defined at national level and following the methodology laid down in Article 37(4) of Regulation (EU) 2016/1388 for transmission connected demand facilities or according to a similar methodology defined by the relevant system operator for other demand facilities*	As noted in the SDP there is currently not any transmission connected demand providing a low frequency demand disconnection service in SONI's TSO area. Therefore, no requirements for testing have been included. However, if this changes in the future then SONI will bring forward a Test Plan to enable the defence service provider to meet their obligation and comply with NCER including specifying a time limit for disconnection.
46 – Compliance testing of HVDC capabilities	*Each restoration service provider which is an HVDC system delivering a black start service shall execute a black start capability test, at least every three years, following the methodology laid down in Article 71(11) of Regulation (EU) 2016/1447.*	As discussed in section 5.1.1 above and while the obligation is on the restoration service provider, SONI pro-actively monitor the Black Start tests and will support a HVDC owner to comply with the periodicity requirements of testing at least every three years once there is a HVDC provider of Black Start capability.

Article Subsection	Requirement	Summary of Compliance
47 – Compliance testing of low frequency demand disconnection relays	*Each DSO and TSO shall execute testing on the low frequency demand disconnection relays implemented on its installations, within a period to be defined at national level and following the methodology laid down in Article 37(6) and Article 39(5) of Regulation (EU) 2016/1388.*	All low frequency relays in the LFDD scheme are owned by NIE Networks and are their responsibility to test for functionality. SONI's role is to ensure the overall scheme operates correctly at each frequency step by specifying the settings and confirming a fair distribution of demand lost across the whole synchronous area with EirGrid and the scheme complies with NCER. There are less than a couple of dozen of the frequency relays in this scheme, which are tested periodically, either on a three year or five year maintenance plan depending on the type and age of the relay. The relays are trip-tested (offline) as part of their maintenance.

Table 1 – Summary of Compliance against NCER Articles 44 to 47

6. Next Steps

The TSO welcomes feedback on this consultation document. A response proforma has been provided to facilitate this feedback. Following the closure of the consultation period the TSO will consider any comments received and submit the outcome to the Regulator for approval.

It would be helpful if responses are not confidential. If you require your response to remain confidential, you should clearly state this on the coversheet of the response. We intend to publish all non-confidential responses. Please note that, in any event, all responses will be shared with the Utility Regulator.