

nationalgridESO

EU NCER: System Test Plan

Issue 24

February 2022 ~~December 2021~~ 49



Internal Use

Contents

Contents	1
EU NCER: System Test Plan	2
1 VERSION CONTROL.....	3
2 INTRODUCTION.....	4
3 REQUIREMENTS OF THE TEST PLAN	4
4 APPLICATION.....	5
5 IMPLEMENTATION OF THE TEST PLAN IN GB	5
5.1 Assessment and Compliance.....	5
5.0 Compliance Testing and Periodic Review of the System Defence Plan 87	
6.0 Compliance Testing and Periodic Review of the Restoration Plan	10
7.0 Implementation of the Restoration Plan in GB	1214
8.0 Future Work.....	1413
Error! Hyperlink reference not valid. Contents.....	Error! Bookmark not defined. 4
Error! Hyperlink reference not valid. EU NCER: System Test Plan	Error! Bookmark not defined. 2
Error! Hyperlink reference not valid. 1	
INTRODUCTION.....	Error! Bookmark not defined. 3
Error! Hyperlink reference not valid. 2	
REQUIREMENTS OF THE TEST PLAN	Error! Bookmark not defined. 3
Error! Hyperlink reference not valid. 3	
APPLICATION.....	Error! Bookmark not defined. 4
Error! Hyperlink reference not valid. 4	
IMPLEMENTATION OF THE TEST PLAN IN GB.....	Error! Bookmark not defined. 4
Error! Hyperlink reference not valid. 4.1	
Assessment and Compliance	Error! Bookmark not defined. 4
Error! Hyperlink reference not valid. 5.0	
Compliance Testing and Periodic Review of the System Defence Plan	Error! Bookmark not defined. 7
Error! Hyperlink reference not valid. 6.0	
Compliance Testing and Periodic Review of the Restoration Plan	Error! Bookmark not defined. 9
Error! Hyperlink reference not valid. 7.0	
Implementation of the Restoration Plan in GB.....	Error! Bookmark not defined. 10
Error! Hyperlink reference not valid. 8.0	
Future Work.....	Error! Bookmark not defined. 42



EU NCER: System Test Plan

1 VERSION CONTROL

<u>Version</u>	<u>Date</u>	<u>Author</u>	<u>Rationale</u>
<u>Issue 1</u>	<u>Dec 2019</u>	<u>NGESO</u>	<u>Each TSO shall have a Test Plan in Place</u>
<u>Issue 2</u>	<u>Sept 2021</u>	<u>NGESO</u>	<u>Further detail added to reflect changes since the first version of the document was published in December 2019</u>

Formatted Table

42 INTRODUCTION

The *European Network Code on Emergency & Restoration*¹ (**EU NCER**) came into force on 18 December 2017.

Under Article 43 of the EU NCER there is a requirement for each TSO (which in GB is NGESO) in consultation with Distribution System Operators, Significant Grid User's Defence Service Providers and Restoration Service Providers to prepare a Test Plan.

The purpose of this document is to define how the Test Plan is implemented in Great Britain (GB) and the relationship with other GB documents such as the System Defence Plan, the System Restoration Plan and the Grid Code.

[This Test Plan is not intended to replace any provisions currently or proposed in the GB Codes.]

23 REQUIREMENTS OF THE TEST PLAN

Article 43 of the EU NCER is reproduced below, which defines the General Principles of the Test Plan.

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, Article 35(2) of Regulation (EU) 2016/1388 and Article 69(1) and (2) of Regulation (EU) 2016/1447.
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) and 23(4), 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.
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 Regulation (EU) 2016/1388 and Regulation (EU) 2016/1447 for the corresponding tested capability. For SGUs that are not subject to Regulation (EU) 2016/631, Regulation (EU) 2016/1388 and Regulation (EU) 2016/1447, the test plan shall follow the provisions of national law.
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.
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,

¹Network Code on Emergency and Restoration

http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2017.312.01.0054.01.ENG&toc=OJ.L:2017:312:TOC

Commented [AMC1]: In the notification letter being sent to SGUs, will the notification include setting out any testing obligations that they have. AJ Response – It is being sent to all CUSC parties as they fall under the remit of E&R. We cannot forward it to non-CUSC Parties until approval of GC0148. The notification letter has been discussed in the Workgroup and there will be two letter – one for Defence Service Providers and one for Restoration Service Providers

Commented [MK2]: Is it worth explaining what this means, ie just ESO or all TOs? AJ Response – Agreed and updated.

Commented [VG3]: If this is expanded to non-CUSC parties where are the Test requirements documented? For the current non-CUSC provider where is the relationship documented? AJ Response – This would be via contractual arrangements. The System Defence Plan and System Restoration Plan now make this clear – ie EU NCER applies to CUSC Parties and those who have a contract with NGESO to provide a Defence Service or Restoration Service.

Commented [AMC4]: Just to confirm, are all the testing obligations on parties included in GCode obligations? AJ Response – Yes pre GC0148 this was implemented as part of GC0125, GC027 and GC0128.

Commented [J(A5): Alastair Frew Comment] Is everything now not technically national law? AJ Response – Yes this is correct but this is a direct copy from Article 43(3) of the E&R Code and therefore we cannot change it.

Formatted: Indent: Left: 0 cm, Hanging: 1.25 cm

Commented [J(A6): Alastair Frew Comment] - Should this not be extended to the whole system and not just the transmission system. Equally are there different categories of Users? AJ Response – Again this a direct extract of the text from E&R Art 43(4) and therefore we cannot change it.

Commented [AMC7]: format

defence service provider and restoration service provider shall repeat the test.

34 APPLICATION

In GB, the parties within scope of the EU NCER are defined in Appendix A of the System Defence Plan and System Restoration Plan. In summary this extends to CUSC Parties and Non-CUSC Parties who have contract with NGESO to provide a Defence Service or a Restoration Service.

The majority of the requirements in the EU NCER have been retained in GB regulation via the Statutory Instruments (SI 533 2019). Therefore, most of the requirements of the EU NCER will largely apply unchanged which extends to the requirement to have a Test Plan.

45 IMPLEMENTATION OF THE TEST PLAN IN GB

4.45.1 Assessment and Compliance

4.1.1 Article 43(1) states "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, Article 35(2) of Regulation (EU) 2016/1388 and Article 69(1) and (2) of Regulation (EU) 2016/1447"

4.1.2 National Grid Electricity System Operator (NGESO) has prepared a System Defence and System Restoration Plan, which has been submitted to the Regulator for approval. When approved, these documents will be available on the National Grid NGESO Website as final versions. In order to ensure the equipment owned or operated by GB Parties who fall within the scope of the EU NCER (as defined in the Appendix A of the System Defence Plan and System Restoration Plan) compliance testing, simulation and monitoring is undertaken as required in the Grid Code (for example through the Compliance Processes (CP's), European Compliance Processes (ECP's), Operating Code 5 (OC5) and Operating Code 12 (OC12).

4.1.3 In addition, through the European Compliance Processes (ECP's), compliance with Article 41(2) of Regulation (EU) 2016/631 (Requirements for Generators under ECP8.1), Article 35(2) of Regulation (EU) 2016 /1388 (Demand Connection Code under DRSC.11.3.2.2) and Article 69(1) and (2) of Regulation (EU) 2016/1447 (HVDC Code under ECP1.1) is assured.

4.1.4 Article 43 (2) states "By 18 December 2019 each TSO shall define a test plan in consultation with the DSOs, the SGUs identified pursuant to Articles 11(4) and 23(4), 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.

Commented [J(A8)]: In a future iteration of the Test Plan this will be updated to cover how Non-CUSC parties fall under the framework of E&R.

Commented [MK9R8]: I might be wrong – but didn't ESO say that there are a small number of existing non-cusc parties caught by the E&R? If they do exist, then shouldn't we change the plan now to include them? Or will this be a GC0148 task – in which case it is in hand. AJ Response – For the purposes of GC0127 and GC0128 (Implementation of E&R Phase I) this only covered CUSC parties. For GC0148 this is very much an issue and would be cover bot CUSC parties and Non-CUSC Parties for whom we have a contract. There is however a big issue for Non-CUSC parties caught under System Defensive measures which is a much larger problem and if this is the case it is likely that some D Code changes may be necessary.

Commented [AMC10]: The implication is that some of the E&R requirements are not included as Retained Law. Are any of these material / ones that stakeholders would want to know about? AJ Response – This is the same issue as highlighted on the System Defence and System Restoration Plan.

Formatted: Indent: Left: 0 cm

Commented [AMC11]: Might it help to add references to these? AJ Response – We can do this and include it in the consulted version when the Workgroup Consultation is issued

Commented [VG12]: Delete additional full stop. AJ Response – Agreed and corrected.

Commented [G(C13)]: Removed as approval is not required – small change but can discuss

Commented [AMC14]: Just wondered if you wanted to say this as the documents will evolve AJ Response – Agreed and corrected.

Commented [AMC15]: format

4.1.5 Table 1 below shows the applicable requirements of the EU NCER which were implemented into the Grid Code, all of which are important necessary for compliance purposes. This Test Plan will be subject to a full industry consultation and therefore will be subject to all industry parties including Distribution System Operators (including Distribution Network Operators), Significant Grid Users (including System Defence and System Restoration Providers) as identified in Appendix A of the System Defence Plan and System Restoration Plan. The Connection Conditions (CC's), European Connection Conditions, Compliance Processes, European Compliance Processes, Operating Code 5 and Operating Code 12 (OC12) as being amended through Grid Code Modification GC0127 and GC0128 detail the requirements for equipment and capabilities relevant for the System Defence Plan and System Restoration Plan. These requirements and the associated Grid Code clauses are summarised in Table 1 below.

Commented [AMC16]: EU NCER AJ Response – Agreed and Updated.

Commented [AMC17]: Are AJ response - Agreed

Requirement	Grid Code Clause
Connection Requirements	CC/ECC.6.3 and OC5
Compliance Requirements against the Connection Conditions and European Connection Conditions	CC/ECP.A.3, CC/ECP.A.5, CC/ECC.A.6 and CC/ECC.A.7
Power Generating Module Black Start Service repeatability, <u>Anchor Plant and Restoration Service Provider Plant</u> testing every three years as required under NCER Art 44(1)	OC5.7.1(b) – Amendments introduced to the Grid Code through GC0127/GC0128
<u>Type C and Type D</u> Power Generating Module <u>and Anchor Plant</u> quick Resynchronisation tests required after two unsuccessful operations in real time as required under NCER Art 44(2)	<u>OC5.7.1/OC5.7.4</u> – Amendments introduced to the Grid Code through GC0127/GC0128
Demand Modification Tests required after two unsuccessful operations in real time or at least every year as required under NCER Art 45(1)	DRSC11.7.1 – Amendments introduced to the Grid Code through GC0127/GC0128
Low Frequency Demand Disconnection Test within a period defined at National Level as required under NCER Art 45(2)	DRSC11.7.2 – The test period is defined in GB as every three years. This change is introduced through the GC0127/GC0128 amendment process.
HVDC Black Start Service, <u>Anchor HVDC System and Anchor Dc Converter</u> testing to be carried out every three years in accordance with NCER Art 46	<u>OC5.7.1</u> – Amendments introduced to the Grid Code through the GC0125 amendment process.
Low Frequency Demand Disconnection Relay testing to be tested within a period	CC/ECC.A.5.4.2 and CC/ECC.A.5.4.3 – Amendments introduced to the Grid Code

Commented [AMC18]: Is this an exhaustive list of the requirements – eg critical tools AJ Response – Critical tools are covered and now explained In the System Defence and System Restoration Plan. As an addition there is some scope for an additional assurance testing section under OC5.7 which will be part of the GC0148 solution.

Formatted Table

Formatted: Left

Formatted: Left

Commented [J(A19): Alastair Frew Comment Why is this referring to mod numbers surely it is only the requirements that matter? AJ Response – Agreed and deleted

Formatted: Left

Formatted: Highlight

Formatted: Left

Formatted: Left

Formatted: Left

Formatted: Highlight

Formatted: Left

defined at National Level as required under NCER Art 47	through the GC0127/GC0128 amendment process. In GB a period of once every three years has been selected.
---	---

Testing of communication systems and backup power supplies for those communication systems in accordance with NCER Art 48	CC/ECC.6.5.4.4 - Amendments introduced to the Grid Code through the GC0127/GC0128 amendment process. Testing of inter TSO communications is covered in Section 5.0 below.
---	--

Formatted: Left

Table 1

- 4.1.6 Article 43 (3) states “*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 Regulation (EU) 2016/1388 and Regulation (EU) 2016/1447 for the corresponding tested capability. For SGUs that are not subject to Regulation (EU) 2016/631, Regulation (EU) 2016/1388 and Regulation (EU) 2016/1447, the test plan shall follow the provisions of national law*”.
- 4.1.7 The periodicity and conditions of the requirements and tests in relation to Articles 44 to 47 of the NCER are covered in the Grid Code as summarised in Table 1 above. For parties who fall under the requirements of the EU NCER as defined in Appendix A of the System Defence Plan and System Restoration PlanSGUs which are not covered by the requirements of RfG (Regulation (EU) 2016/631, DCC (Regulation (EU) 2016/1388) and HVDC Code (Regulation (EU) 2016/1447) these are covered through the existing requirements of the Grid Code through the Compliance Processes and Operating Code 5.
- 4.1.8 Article 43(4) states “*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*”.
- 4.1.9 As defined in Appendix Appendices A of the System Defence Plan and System Restoration Plan, the approach adopted by the NGESO is that the EU NCER will only apply to CUSC parties and Non-CUSC parties who have a contract with NGESO to provide a Defence Service or a Restoration Service. A “Defence Service” and a “Restoration Service” is defined in the Glossary of the System Defence Plan and System Restoration Plan. OC5.5.3.3 states “The User is responsible for carrying out the test and retains the responsibility for the safety of personnel and plant during the test”. ~~As part of the GC0127 and GC0128 Working Group it was discussed if it was appropriate to expand this requirement to provide clarity that the operational security of the Transmission System should not be put at risk, but it was agreed that that current requirement of OC5.5.3.3 was sufficiently adequate for this purpose. That said, it is expected a~~As part of this Test Plan ~~that~~ any tests undertaken by a User, Defence Service Provider or

Commented [AMC20]: format

Commented [J(A21): This will be updated as part of the GC0148 work to address how Non-CUSC parties will be treated.

Commented [AMC22]: Ok Will need to consider how the obligations will be place on non CUSC parties. AJ Response – This is now clarified in the System Defence and System Restoration Plan and would be achieved via any contract with the ESO.

Commented [J(A23): Alastair Frew Comment Who constitutes the User? This might be fine for small local tests where the User is testing the capability of their plant, but what happens in the larger tests were the User is just providing say an anchor generator and the testing is being driven by the network operators and they are deciding on what is being connected and revised protection settings due to distances involved. AJ Response – We need to change the Grid Code legal text here as part of the GC0148 solution

Commented [AMC24]: Delete AJ Response - Agree

Restoration Service Provider should not put the operational security of the Transmission System or the Interconnected Transmission System at risk and any tests conducted should also minimise the impact on System User's as provided for under OC.5.5.3.3.

4.1.120 Article 43(5) states “*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.*”

4.1.121 As noted in section 3.19 and as defined in Appendix Appendices A of the System Defence Plan and System Restoration Plan, the approach adopted by the ESO is that the EU NCER will only apply to CUSC parties. OC5.5.4 refers the individual performance requirements for each type of plant and tests against which the Grid Code requirements are assessed which include the requirements of RfG, DCC and HVDC Connection Network Codes. OC5.5.4 of the Grid Code states the pass and fail criteria against the tests to be conducted.

5.0 Compliance Testing and Periodic Review of the System Defence Plan

5.1.1 Article 50(1) of EU NCER states “*Each DSO concerned by the implementation of the low frequency demand disconnection on its installations shall update once a year the communication to the notifying system operator provided for in point (b) of Article 12(6). This communication shall include the frequency settings at which netted demand disconnection is initiated and the percentage of netted demand disconnected at every such setting.*”

5.1.2. Article 50(2) of the EU NCER states “*Each TSO shall monitor the proper implementation of the low frequency demand disconnection on the basis of the yearly written communication referred to in paragraph 1 and on the basis of implementation details of TSOs' installations where applicable.*”

5.1.2 Both the requirements of Articles 50(1) and 50(2) of the EU NCER are fulfilled through the Grid Code Week 24 process as required under PC.A.1.2 and PC.A.4.6 of the Planning Code. The technical requirements for low frequency demand disconnection are detailed in CC.6.4.3, ECC.6.4.3, CC.A.5, ECC.A.5 and OC6.6.6.

5.1.3. Article 50(3) of the EU NCER states “*Each TSO shall review, at least every five years, its complete system defence plan to assess its effectiveness. The TSO shall in this review take into account at least:*”

- the development and evolution of its network since the last review or first design;*
- the capabilities of new equipment installed on the transmission and distribution systems since the last review or first design;*
- the SGUs commissioned since the last review or first design, their capabilities and relevant services offered;*
- the tests carried out and the analysis of system incidents pursuant to Article 56(5) of Regulation (EU) 2017/1485; and*

Commented [MK25]: What is the difference between these two terms? AJ Response – Agreed – text updated

Commented [AMC26]: ..should also minimise,,, AJ response - Agreed

Formatted: Indent: Left: 0 cm, Hanging: 1.25 cm

Commented [AMC27]: format

Commented [AMC28]: format

Commented [AMC29]: check numbering AJ Response – Agreed – We will update the document numbering once it is further formalised.

Commented [MK30]: To be changed? AJ Response – Yes agreed

Commented [AMC31]: what about the testing of DNO critical tools and facilities.

Isn't there an obligation under E&R Art 49 to test these every 3 years.

E&R Art 49 also has a requirement to test the backup power supplies every 5 years in DNO substations. Is this codified in the GCode?

Commented [VG32R31]: Art 49 only applies if the TSO tools involve DSOs and SGUs not necessarily the DSO tools on their own. RE: power supply tests we'd need to know what s/s these were – currently its redacted! AJ Response – Some of these aspects were covered in GC0127 and GC0128. We need to re-address this as part of GC0148 solution and I propose to add a nw section to the legal text on assurance testing in OC5.7.

Commented [MK33]: Wh

Commented [MK34]: You should be consistent in the capitalization of defined G Code terms. Personally I prefer this, but elsewhere defined terms are capitalized without explanation of their relevance to this document. AJ Response – We can update and check this and ensure future versions are more consistent. – This is for the future but aim to get the detail correct first.

Commented [AMC35]: Not sure the GCode really covers off “Each TSO shall monitor the proper implementation of the low frequency demand disconnection...” AJ Response – This is already a Grid Code requirement under Week 24.

(e) the operational data collected during normal operation and after disturbance”.

5.1.4 With the introduction of the EU NCER, it is proposed that ~~the~~ the NGESO in coordination with GB Stakeholders will review and update the System Defence Plan ~~as published on its website~~. The mechanism by which items (a) to (e) of Article 50(3) are undertaken are summarised in Table 2 below.

Formatted: Indent: Left: 0 cm, Hanging: 1 cm

EU Criteria Requirement	GB Implementation
<i>The development and evolution of its network since the last review or first design;</i>	Covered through the Grid Code Week 24 process under PC.A.1.2 and STC STCP 22-1, STCP 04-4 STCP 12-1,
<i>The capabilities of new equipment installed on the transmission and distribution systems since the last review or first design;</i>	For Transmission this is covered through the STC via STCP Procedures STCP 22-1, STCP 19-5, STCP 18-1, STCP 19-4, STCP 04-1, STCP 19-3, STCP 27-1 and STCP 19-3. In the case of Distribution Systems caught by the requirements of the Grid Code, these issues are captured under the Connection Conditions, European Connection Conditions, Compliance Processes, European Compliance Processes, Planning Code and Data Registration Code
the <u>the</u> <u>SGUs commissioned since the last review or first design, their capabilities and relevant services offered;</u>	Captured through the Grid Code compliance process under the Compliance Processes and European Compliance Processes defined in the Grid Code.
<u>The</u> <u>tests carried out and the analysis of system incidents pursuant to Article 56(5) of Regulation (EU) 2017/1485; and</u>	Captured through Grid Code OC5, OC7 and OC12. Through the System Operator Transmission Owner Code these requirements are captured through STCP-03-1, STCP 06-3, STCP 06-4, STCP 08-3, STCP 08-4, STCP 27-01 and STCP 19-3. In addition, <u>the outcome of measures introduced following previous System events learned from System and</u> Incidents to prevent re-occurrence are managed through external investigations (eg via EC3, internal investigations and internal procedures including training and authorisation.
the <u>The</u> <u>operational data collected during normal operation and after disturbance”.</u>	Captured through Grid Code CC.6.5.6, ECC.6.5.6, CC6.6, ECC.6.6 with any re-testing being carried out in OC5. For Transmission Licensees, the requirements are carried through the System Operator Transmission Owner

Commented [AMC36]: Does the testing of DNO critical tools and facilities need to be included? AJ Response – Art 50 of E&R only refers to TSO's

Formatted Table

Commented [MK37]: Will need an update for non-cusc parties, particularly generators. AJ Response – Agree – For Distribution connections this is more challenging and we need to discuss this.

Commented [AMC38]: The AJ Response - Agree

Commented [MK39]: First design of what? The Defence/Restoration plans? AJ Response - This is a direct lift from Art 50(3)(c) so we will need to try and translate this as best as we can in a GB world. We could say from 18th December 2019, does that work.

Commented [AMC40]: The AJ Response - Agree

Commented [MK41]: Is this phrase correct? Events are not learned. AJ Response – Agreed and Updated.

Commented [AMC42]: The AJ Response - Agree

- 5.1.5 Article 50(4) of the EU NCER states “Each TSO shall review the relevant measures of its system defence plan in accordance with paragraph 3 before any substantial change in the configuration of the grid”. ~~It is understood that this~~ This requirement relates to the need to review the System Defence Plan prior to making any changes to the Transmission System (for example major reinforcement made to the Transmission System as a result of load or generation growth which would need to be factored into the System Defence Plan). Within GB this requirement is implicit in so far that there is a requirement to update and maintain the Grid Code (Grid Code GR2 and GR3.2 refers) to ensure the Grid Code facilitates achievement of the Grid Code Objectives). In addition, the STC is governed by a similar approach ~~and Panel~~ as defined in Section 6 of the STC. In addition and through internal and external investigations, learning points arising from the outcomes of System Events and recommendations by EC3, in addition to the development of internal procedures, training and authorisation on top of those already in existence in the light of industry experience, measures will be introduced to the System Defence Plan, System Restoration Plan and Industry Codes to improve the reliability and robustness of the System and ensure its timely re-establishment in the event of a disturbance prevent recurrence.
- 5.1.6 Article 50(5) of the EU NCER states “When the TSO identifies the need to adapt the system defence plan, it shall amend its system defence plan and implement these amendments in accordance with points (c) and (d) of Article 4(2) and Articles 11 and 12”. In summary there will be a need to update the System Defence Plan as the System (including reinforcement) and the type of plant connected to it ~~continues to evolve~~ evolve. ~~Where-When~~ the System Defence Plan is updated, this shall follow the same process as defined in EU NCER Article 4(2) and Articles 11 and 12 in the same way that the current System Defence Plan has been prepared.

6.0 Compliance Testing and Periodic Review of the Restoration Plan

- 6.1.1 Article 51(1) of EU NCER states “Each TSO shall review the measures of its restoration plan using computer simulation tests, using data from the DSOs identified pursuant to Article 23(4) and the restoration service providers, at least every five years. The TSO shall define these simulation tests in a dedicated testing procedure covering at least:
- (a) the energising restoration path from restoration service providers with black start or island operation capabilities. This would include Restoration Service Providers taking part in both Local Joint Restoration Plans and Distribution Restoration Zone Plans;
 - (b) the supply of power generating modules main auxiliaries;
 - (c) the demand reconnection process; and
 - (d) the process for resynchronisation of networks in island operation.

Commented [MK43]: We shouldn't be equivocating in this definitive plan. AJ Response – Agreed.

Commented [MK44]: Do these two words live here? AJ Response – Agree and text updated.

Commented [MK45]: This is a garbled mix of ideas and concepts. Suggest rewrite. Industry codes is neither a defined term nor proper noun. AJ Response – Text updated

Commented [MK46]: Why, if this is Heading 2 style, is it not 5.2? AJ Response – it's a new section but happy to change if we feel it is appropriate to do so but not really a material issue.

6.1.2 In the event of a Black Start situation when the System has shutdown, ~~the~~ NGESO has a well established process to restore the System ~~which requires a relying on its~~ pre-prepared plan and strategy. In order to enact this plan, the first requirement is to have in place Black Start ~~Contracts~~ Contracts with a number of strategically placed Black Start Service Providers and Distribution Restoration Contracts with Restoration Service Providers for the provision of establishing several Distribution Restoration Zones. Black Start Service Providers ~~whose Plant who can Generate or Supply~~ Power and energise part of the ~~System~~ without any external Power Supply within two hours of an instruction from ~~the~~ NGESO. The requirements for ~~a~~ Black Start Service ~~Providers~~ Provider and their capabilities ~~yes~~ are defined in CC/ECC.6.3.5, OC9.4.5 and ~~their~~ the Black Start ~~Contracts~~ Contract. There is also a requirement to ensure these facilities are fit for purpose and capable of operation when required which is why procedures (under OC5.7 of the Grid Code) are in place for testing. As part of this requirement under EU NCER, there will be a requirement for computer simulations and these will be included and developed as part of the Assurance Framework (see section 7.1.3 below). In the case of Distribution Restoration Zones, there is a requirement for Anchor Plant Owners whose plant can supply power without any external Power Supply within eight hours of an instruction from the Distribution Network Operator. There is also a requirement for Restoration Service Providers (including Anchor Plant Owners) to undertake regular testing in accordance with the requirements of OC5.7.

Commented [MK47]: What's the difference between these two words in this context? AJ Response – Agreed and updated.

Commented [AMC48]: format

Formatted: Highlight

Commented [J(A49): For GC0148 – If Distributed Re-Start is included within the scope of GC0148 and hence falls under E&R, this needs to be factored into the test Plan.

6.1.3 Once the Black Start Providers have been instructed as per OC9.4.7, or Distribution Network Operators have been instructed to establish a Distribution Restoration Zone as per OC9.4.7, their purpose is to energise parts of the System to form Power Islands with local demand being fed within these power islands. Once the Power Islands ~~have been formed and are~~ established, the individual Power Islands are then connected to each other which then enables the System to be re-established. This process continues until the ~~whole~~ System is reconnected and all Demand re-established.

6.1.4 In respect of Users of the Transmission System (for example Generators, HVDC System Owners, Distribution Network Operators) and Restoration Service Providers who are Non-CUSC Parties and have a contract with NGESO to provide a Restoration Service, the requirements for System Restoration during a Black Start situation are detailed in OC9 of the Grid Code. ~~In addition, the~~ The requirements on Transmission Licensees are detailed in STCP 06-4 and 1 and obligations on User's connected to the these of Distribution Network Licensees are within DOC9.4 of the Distribution ~~Network~~ Code.

Commented [AMC50]: Space before and AJ Response - Agree

Commented [MK51]: This is wrong. Obligations on DNOs are in the Grid Code. DOC 9 places obligations on DNO system users. AJ Response – Agreed and corrected.

6.1.5 Articles 51(2)(3)(4) and (5) of the EU NCER state: -

Article 51(2) - *In addition, where deemed necessary by the TSO for the effectiveness of the restoration plan, each TSO shall execute operational testing of parts of the restoration plan, in coordination with the DSOs identified pursuant to Article 23(4) and the restoration service providers. The TSO shall set out, in consultation with the DSOs and restoration service providers, those operational tests in a dedicated testing procedure.*

Commented [AMC52]: format

Article 51(3) - *Each TSO shall review its restoration plan to assess its effectiveness, at least every five years.*

Article 51(4). *Each TSO shall review the relevant measures of its restoration plan in accordance with paragraph 1 and review their effectiveness before any substantial change in the configuration of the grid.*

Article 51(5). *When the TSO identifies the need to adapt the restoration plan, it shall amend its restoration plan and implement these amendments in accordance with points (c) and (d) of Article 4(2) and Articles 23 and 24.*

- 6.1.6 Each of the items raised in section 6.1.5 above are covered through the assurance framework and Implementation of the Restoration Plan as discussed in section 7 below.

7.0 Implementation of the Restoration Plan in GB

- 7.1.1 ~~In addition, the~~ NGESO works with all stakeholders as Emergency response plans and procedures cannot be considered reliable until they have been exercised and proven to be workable. This is especially true for Black Start restoration, where it is not possible to exercise the process end-to-end in its entirety.

- 7.1.2 Exercising provides the following benefits:

- a. Builds capability and competence across the sector and ensures all stakeholders are aware of their roles and responsibilities;
- b. Identifies staff training needs and opportunities;
- c. Validates existing response plans and procedures and ensures these are supported through continuous development, review and improvement
- d. Provides assurance that the sector can effectively respond to a Black Start.

- 7.1.3 It is recognised that organisations carry out a range of exercising / testing activities for their own internal assurance. ~~The~~ NGESO however needs to engage and work with External Stakeholders through an assurance framework to ensure that System restoration is achieved in the most efficient manner. A diagram showing this assurance framework is shown below.

Commented [MK53]: 5.3?? AJ Response – We will review the numbering in the next iteration when the more material issues have been resolved.

Commented [AMC54]: review format text in the section

Commented [MK55]: To what? AJ Response - Updated

Commented [MK56]: This section is full of spurious tab characters... yet only one has been deleted.....? It's very distracting. AJ Response – We will address this in the next version when the mor material issues have been addressed.

Formatted: Justified



Figure 1.0

7.1.4 In order to achieve this objective, ~~the Electricity System Operator~~ ~~Operator~~ (SO), NGESO has undertaken the following activities:

Commented [AMC57]: not really needed – used ESO many times already AJ response – Agreed and updated

- a. Identified and mapped the high-level interactions that are likely to take place between organisations during a Black Start.
- b. Reviewed current exercising practices across the sector through an industry-wide survey
- c. Analysed survey response and assessed the gaps in current exercising practices;
- d. Proposed a framework to align and standardise Black Start exercising and testing across the sector.

7.1.5 Individual organisations will be responsible for undertaking the Black Start exercising and tests at the frequencies necessary. Where the NGESO is not legally obliged to assess the outcome of the tests, organisations will be expected to assess themselves.

Formatted: Justified

Commented [AMC58]: ESO AJ Response – Agreed and updated

7.1.6 ~~The NGESO~~ working with the ~~Energy Emergency Executive Committee (E3C)~~ proposes developing a risk matrix for each ~~stakeholder~~ stakeholder, tailored according to the tests they are expected to undertake and weighted according to their importance to the Black Start restoration process.

Commented [MK59]: What does this mean? AJ Response - Updated

Commented [AMC60]: Has this been completed? AJ Response – This needs checking.

7.1.7 ~~The NGESO is~~ will be responsible for collating and analysing returns from across the sector and providing an assurance assessment based on the overarching GB risk. This will provide an indication of the level of confidence around the ability of stakeholders to respond to a Black Start event and restore electricity supply within tolerated timeframes.

Formatted: Justified

Commented [AMC61]: Is AJ Response – Agreed and updated.

7.1.8 This risk matrix is currently based on the frequency of exercising/testing undertaken across the industry over a year. But further work is required to incorporate other performance criteria e.g. successful execution of testing.

7.1.9 The SO will present its assurance assessment to a Monitoring Body (consisting of BEIS, Ofgem and the SO). If the risk is assessed as High or Medium, the Monitoring Body will have the authority through the Black Start Standard to set mitigating actions to be implemented by organisations within an agreed timeframe.

Commented [MK62]: Is this a formally established body? What's its title? How often will the reports be made? What is the Black Start Standard? AJ Response - Deleted - if it is required it will be picked up as part of the ESRs work.

8.0 Future Work

8.1 It is recognised that as the System continues to evolve with new forms of connection technologies, there is a need to constantly review —and update the System Defence Plan, System Restoration Plan and Test Plan and Assurance Framework. It is believed that this work —is fully within the spirit and requirements of the EU NCER.

Commented [MK63]: Is this something formal? Or not? It is section 7 (or 5.3)? If it is formal, why not state wo in section 7 and capitalize it throughout the document? AJ Response – Deleted to simplify. I also expect in the fullness of time this will be picked up as part of the Electricity Restoration Standard.

Commented [VG64]: Is this the document which the ESO have a licence condition to prepare? AJ Response – Removed.

Faraday House, Warwick Technology Park,
Gallows Hill, Warwick, CV346DA
nationalgridNGESO.com

nationalgridESO