STCP 06-1 Issue 006 System RestorationBlack Start

CM089 – Electricity System Restoration Standard
9 June 2023

STC Procedure Document Authorisation

Party	Name of Party Representative	Signature	Date
National Grid Electricity System Operator Ltd			
National Grid Electricity Transmission plc			
SP Transmission plc			
Scottish Hydro Electric Transmission plc			
Offshore Transmission Owners			

STC Procedure Change Control History

Issue 001	23/12/2004	BETTA Go-Live Version
Issue 002	28/07/2005	Issue 002 incorporating PA028
Issue 003	05/10/2005	Issue 003 incorporating PA035 and PA037
Issue 004	30/09/2010	Issue 004 incorporating Offshore
Issue 005	19/05/2016	Issue 005 incorporating PM088
Issue 006	01/04/2019	Issue 006 incorporating National Grid Legal Separation changes
Issue 007	19/05/2023	Issue 007 Incorporating changes to facilitate the Electricity System Restoration Standard

1 Introduction

1.1 Scope

1.1.1 This document describes the planning and procedures required by NGESO and the TOs to manage the Black Start recoverySystem Restoration of the Total System in an efficient manner.

1.1.2 Only the onshore part of the National Electricity Transmission System is included in the Black Start strategy Local Joint Restoration Plans (LJRPs) and any Power Islands created under them only include sites from within a single Transmission Area. No offshore networks currently include a nominated Black Start station.

An onshore TO will not control an offshore network under a LJRP. To avoid a situation arising of an onshore TO controlling assets owned by an offshore TO then where an offshore network connects within an onshore network covered by a LJRP the offshore network will be disconnected prior to or at the start of the implementation of the LJRP. The offshore TO will not participate in the LJRP except to disconnect from the onshore TO's system.

1.1.3 Where an offshore network connects within an onshore network covered by a Local Joint Restoration Plan (LJRP) the offshore transmission network would only be connected when the LJRP has been terminated and operational control has transferred back to NGESO.

1.1.41.1.2 This document covers the restoration of the Total System following a Partial Shutdown or Total Shutdown in accordance with the Local Joint Restoration Plans be they Local Joint Restoration Plans or Distributed Restoration Zone Plans. The restoration process may include an onshore TO carrying out the processes set out in Local Joint Restoration Plans or a Network Operator carrying out the processes set out in a Distribution Restoration Zone Plan. These processes are also described in OC9 of the Grid Code.

1.1.51.1.3 TO network start up plans may be invoked in response to power island operation. Their use is outside the scope of this document. They are considered in STCP 06-2 Power Island Management.

1.1.61.1.4 This procedure applies to NGESO and each TO. For the purposes of this document, the TOs are:

- NGET as an onshore Transmission Licence holder
- SPT as an onshore Transmission License holder
- SHETL as an onshore Transmission License holder
- Offshore Transmission License holders as appointed by OFGEM.

1.2 Objectives

1.2.1 The objective of this document is to enable, as far as possible, restoration of the TOs' Transmission Systems and interfacing Users' Systems in the shortest possible time using the most effective means following a Total Shutdown or Partial Shutdown.

2 Key Definitions

2.1 None

3 Procedure

3.1 Responsibilities

3.1.1 NGESO shall establish the overall Black Start for the TOs' Transmission SystemsSystem Restoration strategy. This shall require Black Start Stations and other Power Stations Restoration Contractors to be party to Local Joint Restoration Plans. Where an offshore network connects within an onshore network covered by a Local Joint Restoration Plan (LJRP) the offshore TO shall not be a party to the Local Joint Restoration Plan and the offshore TO network will not be connected to the onshore TO network until the LJRP has been terminated as outlined in sections 3.4.11, 3.4.12 or 3.4.14 and NGESO have taken control of co-ordination of the interconnection of both systems.

3.1.2 NGESO shall establish Local Joint Restoration Plans which also includes Offshore Local Joint Restoration Plans (as described in this document) and associated Ancillary Service Agreements. In addition, NGESO shall also instruct relevant Network Operators to establish Distribution Restoration Zone Plans.

3.1.3 Local Joint Restoration Plans shall be agreed by NGESO, the relevant onshore TOs, relevant Network Operators and Restoration Contractors.any relevant Users

3.1.4 NGESO shall provide the onshore TO with a signed copy of each Local Joint Restoration Plan relevant to that TO's Transmission System as provided for in Grid Code OC9.4.7.6.1. Where an offshore network connects within an onshore network covered by a Local Joint Restoration Plan (LJRP) the offshore TO shall receive a copy of the agreed LJRP for information.

3.1.5 Where requested by NGESO, the relevant onshore TO shall assist in the development and production of Local Joint Restoration Plans.

3.1.6 The relevant onshore TO and NGESO shall each inform the other party if they become aware of any material change that may invalidate a Local Joint Restoration Plan. In the case of Distribution Restoration Zone Plans, the Network Operator (in coordination with NGESO) shall inform the TO of any material change that may invalidate a Restoration Plan as specified in Grid Code OC9 and the Restoration Plan.

3.1.7 NGESO in coordination with relevant Network Operators shall regularly review, update and re-issue the Local Joint Restoration Plans as necessary in accordance with the requirements of Grid Code OC9.

3.1.8 When a Total or Partial Shutdown exists, NGESO shall notify the relevant TOs and Users of the situation. The Parties shall agree the implementation of those Local Joint Restoration Plans (taking account of advised Generating Unit Restoration Contractors availabilities, and the availability of each TO Transmission System and the availability of Plant to establish Distribution Restoration Zones).

3.1.9 In Scotland, the relevant onshore TO shall implement the Local Joint Restoration Plans and issue instructions to Network Operators in Scotland to implement Distribution Restoration Zone Plans.

3.1.10 If there is a failure of the voice communications the procedure described in section 3.5 shall be applied.

3.1.11 NGESO shall direct and manage System Restorationthe Black Start through:

- agreeing the implementation of the Local Joint Restoration Plans or other actions with the relevant onshore TO;
- overseeing the coupling of Power Islands; and
- co-ordinating the operation of established parts of the National Electricity Transmission System.

3.1.12 NGESO shall ensure that Users and offshore TOs shall abide with the Local Joint Restoration Plans.

3.1.13 NGESO shall periodically carry out System RestorationBlack Start and remote synchronisation tests and NGESO will advise the onshore TO of these. The relevant TO shall co-operate with NGESO and relevant Network Operators in the case of Distribution Restoration Zones in facilitating these tests including the provision of additional staff and resources when identified as needed by NGESO. NGESO shall procure that relevant Users and offshore TOs co-operate in facilitating such tests as provided for in Grid Code OC5.7.2.1(g) or OC5.7.2.3(d) as applicable.~~.~~

3.2 Local Joint Restoration Plans

3.2.1 Description of Local Joint Restoration Plans including Offshore Local Joint Restoration Plans

3.2.1.1 Local Joint Restoration Plans (LJRP) shall include the agreed method and procedures for Power Island creation. This may require the relevant onshore TO to issue instructions to Anchor Plant and Top Up Restoration Plant Power Stations (other than Black Start Stations) that are party to the relevant Local Joint Restoration Plan and to liaise with any offshore TO connecting within the network covered by the LJRP to the extent required to disconnect the offshore network from the onshore network prior to LJRP implementation. For the avoidance of doubt, the requirements applicable to Distributed Restoration Zones are covered in section 3.3 of this document and are completely separate from Local Joint Restoration Plans.

It may be deemed appropriate for a specific restoration option to be developed which prioritises restoration of a site deemed of strategic importance to the Transmission System restoration. Where possible this should be achieved as part of a standard Local Joint Restoration Plan. However there may be occasions when this restoration option is only achievable using assets on either side of an onshore TO boundary.

Should this be the case; an Annex to each relevant LJRP should be developed, discussed and agreed with the relevant onshore TO and Users which will allow one TO to operate a Power Island that encompasses another TO's area. The Annex will specifically detail the restoration route, equipment to be energised, and load to be supplied. It will also detail the command and communication chain for this Annex to be enacted and the format of instructions that should be issued.

NGESO will instruct the enacting of this Annex (if no communications exist then this can be enacted upon communication and agreement between both TOs). Once the Annex is enacted the LJRP will end if the network is extended any further than detailed in the Annex. At this point the LJRP will end and control of the interconnected Power Island will revert to NGESO as per standard LJRP operation. On the day, all parties to the Annex have the right to refuse this operation if deemed

it places plant/personnel/restoration at risk.

3.2.1.2 Local Joint Restoration Plans and any Power Islands created under them shall only include sites from within a single ~~onshore~~ Transmission Area (unless an Annex to the LJRP exists for a defined restoration route and is signed, and agreed, by all impacted TOs). ~~Where an offshore network connects within an onshore network covered by a Local Joint Restoration Plan (LJRP) the offshore TO will not participate in the LJRP apart from facilitating disconnection from the onshore TO's system.~~

3.2.1.3 Local Joint Restoration Plans shall detail the agreed method and procedures which the ~~onshore~~ TO shall use to restore parts of the Transmission network, and coordinate the actions of ~~Black Start Station Generating Unit(s)~~ Anchor Plant that shall energise parts of the Transmission System and the subsequent synchronisation of Top Up Restoration Plant, and meet complementary demand, so as to form a Power Island.

3.2.1.4 The Local Joint Restoration Plan shall include a record of which TO and which ~~onshore~~ TO sites are covered by the Local Joint Restoration Plan, and shall set out what actions are required by NGESO and the ~~onshore~~ TO should a Total Shutdown or a Partial Shutdown (and the need to implement a Local Joint Restoration Plan) arise.

3.2.1.5 The Local Joint Restoration Plan shall go on to cover the creation of Power Islands within ~~onshore~~ TO Transmission areas and may require the despatch of ~~Generating Units~~ Top Up Restoration Plant other than Anchor Plant~~those at Black Start Stations~~.

3.2.1.6 A Local Joint Restoration Plan shall include the agreed methods and procedures that a~~n onshore~~ TO shall use to restore that TO's Transmission System and interfacing Users' Systems. These procedures shall be based on the following:

- Each User shall make available relevant demand blocks;
- ~~Generating Units at Black Start Stations~~ Anchor Plant shall be available to energise the National Electricity Transmission System and meet demand blocks;
- ~~Generating Units, other than those at Black Start Stations~~Top Up Restoration Plant, shall be able to receive supplies, synchronise to the National Electricity Transmission System and meet demand blocks, and
- interaction between ~~Generating Units at Black Start Stations and~~ Restoration Contractors Plant~~any other Generating Units~~ included in the Local Joint Restoration Plan shall be managed by the onshore TO in respect of frequency control and reactive power requirements in a Power Island.

3.2.1.7 The list of Local Joint Restoration Plans is contained in Appendix B. NGESO shall be responsible for proposing amendments to Appendix B of this STCP through the STC Committee so that the list remains current and correct.

3.2.2 Creation of a new Local Joint Restoration Plan

3.2.2.1 When NGESO identifies a requirement for a new Local Joint Restoration Plan (including an Offshore Local Joint Restoration Plan), NGESO shall discuss and agree such a plan with the relevant ~~onshore~~ TO and Users.

3.2.2.2 Each Local Joint Restoration Plan shall be prepared by NGESO to reflect the above discussions and agreement. The ~~onshore~~ TO shall support NGESO in developing the Local Joint Restoration Plans, including the provision of relevant information, data and resources, where necessary as detailed in Grid Code OC9.4.7.6.1.

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~~3.2.2.2~~3.2.2.3 When a Local Joint Restoration Plan has been prepared, it shall be sent by NGESO to the ~~onshore~~ TO for confirmation of the agreement. NGESO shall also send the prepared LJRP to Users involved for confirmation of the agreement

~~3.2.2.3~~3.2.2.4 The Local Joint Restoration Plan shall then be signed by NGESO and the relevant ~~onshore~~ TO to confirm agreement to the Plan. NGESO shall procure that involved Users also sign to confirm agreement.

Once signed by the relevant parties, the Local Joint Restoration shall apply between NGESO and the relevant TO as if it were part of this STCP.

3.2.2.5 NGESO shall distribute a signed copy of the new Local Joint Restoration Plan to each relevant ~~onshore~~ TO and User indicating the date of implementation. ~~Where an offshore network connects within an onshore network covered by a Local Joint Restoration Plan (LJRP) the offshore TO will also be provided with a copy of the LJRP by NGESO for information.~~

3.2.2.6 The establishment, testing and provisions of the Local Joint Restoration Plan shall be in accordance with OC9.4.7.6 of the Grid Code.

3.2.3 Changes to an Existing Local Joint Restoration Plan

3.2.3.1 If NGESO becomes aware that a change is required to a Local Joint Restoration Plan, NGESO shall initiate discussions with the relevant ~~onshore~~ TO and Users to seek agreement for that change. NGESO shall procure that Users (the Network Operator, relevant ~~Generators, including those for Power Stations other than the Black Start Stations,~~ Restoration Contractors which NGESO reasonably require and~~,~~ Non Embedded Customers) shall join those discussions. ~~Where an offshore network connects within an onshore network covered by a LJRP the offshore TO may be invited to participate in the discussions by NGESO.~~

3.2.3.2 If the ~~onshore~~ TO party to a Local Joint Restoration Plan becomes aware that a change is required to that Local Joint Restoration Plan, it shall contact NGESO who shall then initiate such discussions with the relevant TO, Users and other affected parties to seek agreement for that change. NGESO shall procure that Users (the Network Operator, relevant Restoration Contractors ~~Generators, including those for Power Stations other than the Black Start Stations~~, which NGESO reasonably require and~~,~~ Non Embedded Customers) shall join those discussions. ~~Where an offshore network connects within an onshore network covered by a LJRP the offshore TO may be invited to participate in the discussions by NGESO.~~

3.2.3.3 The principles applied in section 3.2.2 shall apply to discussions held under 3.2.3.1 and 3.2.3.2 and to any consequent changes.

When changes to a Local Joint Restoration Plan are agreed, NGESO shall update and reissue that Local Joint Restoration Plan to the relevant ~~onshore~~ TO, Users and other affected parties indicating the issue number and the date that any change takes effect

3.2.3.4 The establishment, testing and provisions of the Local Joint Restoration Plan shall be in accordance with OC9.4.7.6 of the Grid Code. .

3.2.4 Failure to Agree

3.2.4.1 If NGESO or the relevant onshore TO do not agree on a Local Joint Restoration Plan, NGESO shall develop and agree its own restoration plan.

3.3 Distribution Restoration Zone Plans

3.3.1 Description of Distribution Restoration Zone Plans

3.3.1.1 Distribution Restoration Zone Plans (DRZP) shall include the agreed method and procedures for Power Island creation where the Power Island has been initiated through instructions issued by Network Operators to Anchor Restoration Contractors and Top Up Restoration Contractors.

3.3.1.2 The Distribution Restoration Zone Plan shall include a record of which onshore TO, which Network Operator, which onshore TO sites and which Network Operator sites are covered by the Distribution Restoration Zone Plan, and shall set out what actions are required by Network Operators, NGESO and the onshore TO should a Total Shutdown or a Partial Shutdown (and the need to implement a Distribution Restoration Zone Plan) arise. For the avoidance of doubt, any Restoration Plan involving an Offshore Transmission Licensee and Offshore Generator shall be treated under the auspices of an Offshore Local Joint Restoration Plan rather than a Distribution Restoration Zone Plan even where Embedded Offshore Transmission Systems are involved.

3.3.1.3 The Distribution Restoration Zone Plan shall include the provision for the creation of Power Islands within Network Operator's Systems which may also extend to Onshore TO's assets and may require the despatch of Top Up Restoration Plant in addition to the despatch of Anchor Plant.

3.3.1.4 A Distribution Restoration Zone Plan shall include the agreed methods and procedures that a Network Operator shall use to restore part of the Network Operator's System. These procedures shall be based on the following :

- Each Party covered under the Distribution Restoration Zone Plan shall make available relevant demand blocks;
- Anchor Plant shall be available to energise the Network Operator's System and meet demand blocks;
- Top Up Restoration Plant other than those in respect of Anchor Plant, shall be able to receive supplies, synchronise to the Network Operator's System and meet demand blocks, and
- interaction between Anchor Plant and Top Up Restoration Pant included in the Distribution Restoration Zone Plan shall be managed by the Network Operator in respect of frequency control and reactive power requirements in a Power Island.

3.3.1.5 The list of Distribution Restoration Zone Plans is contained in Appendix B. NGESO shall be responsible for proposing amendments to Appendix B of this STCP through the STC Committee so that the list remains current and correct.

3.3.2 Creation of a new Distribution Restoration Zone Plan

3.3.2.1 When NGESO or the relevant Network Operator identifies a requirement for a new Distribution Restoration Zone Plan, the relevant Network Operator shall discuss and agree such a plan with NGESO, the relevant onshore TO and relevant Restoration Contractors.

3.3.2.2 Each Distribution Restoration Zone Plan shall be prepared by the relevant Network Operator to reflect the above discussions and agreement. NGESO and onshore TO shall support the relevant Network Operator in developing the Distribution Restoration

Zone Plans, including the provision of relevant information, data and resources, where necessary as detailed in Grid Code OC9.4.7.6.1.

3.3.2.3 When a Distribution Restoration Zone Plan has been prepared, it shall be sent by the relevant Network Operator to NGESO and the onshore TO for confirmation of the agreement. The relevant Network Operator shall also send the prepared Distribution Restoration Zone Plan to Restoration Contractors (including those who own and operate Anchor Plant) involved for confirmation of the agreement.

3.3.2.4 The Distribution Restoration Zone Plan shall then be signed by the relevant Network Operator, NGESO and the relevant onshore TO to confirm agreement to the Plan. The relevant Network Operator in coordination with NGESO, shall procure that those parties involved (including Restoration Contractors) also sign to confirm agreement.

Once signed by the relevant parties, the Distribution Restoration Zone Plan shall apply between the relevant Network Operator, NGESO and the relevant TO as if it were part of this STCP.

3.3.2.5 The relevant Network Operator shall distribute a signed copy of the new Distribution Restoration Zone Plan to each relevant party indicating the date of implementation.

3.3.2.6 The establishment, testing and provisions of the Distribution Restoration Zone Plan shall be in accordance with OC9.4.7.6 of the Grid Code.

3.3.3 Changes to an Existing Distribution Restoration Zone Plan

3.3.3.1 If any party to the Distribution Restoration Zone Plan (including NGESO) becomes aware that a change is required to that Distribution Restoration Zone Plan, it shall contact the Network Operator and the Network Operator shall then initiate such discussions with the ESO and TO, and other affected parties to seek agreement for that change. Relevant Network Operators in coordination with the ESO, shall procure in coordination with the ESO that other parties who are signatories to the Distribution Restoration Zone Plan or new parties who need to be party to the Distribution Restoration Zone Plan shall join those discussions.

3.3.3.2 The principles applied in section 3.2.2~~3.3.2~~ shall apply to discussions held under 3.2.3.1~~3.3.3.1~~ and to any consequent changes.

3.3.3.3 When changes to a Distribution Restoration Zone Plan are agreed, the relevant Network Operator shall update and reissue that Distribution Restoration Zone Plan to the relevant onshore TO, NGESO, and those parties who are signatories to the Plan and other affected parties indicating the issue number and the date that any change takes effect as provided for in OC9.4.7.6.1 of the Grid Code.

~~3.3~~3.4 System Restoration~~Black Start~~ Incident Management

~~3.3.1~~3.4.1 When notified that a Total Shutdown or Partial Shutdown has occurred, all Parties shall establish communications routes and arrangements between Duty Managers or other representatives between NGESO, onshore TO, Generators relevant Users and affected offshore TOs to provide urgent managerial communication channels. Under such conditions, it may also be necessary to invoke the System Incident Management procedures under STCP 06-3.

~~3.4~~3.5 System Restoration~~Black Start~~ Procedure

~~3.4.1~~3.5.1 In the event of a Total Shutdown or Partial Shutdown, NGESO shall, as soon as reasonably practicable, notify the relevant ~~onshore~~ TO, Users, Restoration Contractors, relevant Network Operators and other affected parties that a Total Shutdown or a Partial Shutdown exists and that a ~~Local Joint~~ Restoration Plan shall be implemented.

~~3.4.2~~3.5.2 Where voice communication between NGESO and the relevant ~~onshore~~ TO and/or Users is not available and prevents NGESO from invoking System Restoration~~Black Start~~, the provisions of section 3.5 shall apply.

~~3.4.3~~3.5.3 In Scotland

~~3.4.3.1~~3.5.3.1 The onshore TO shall request ~~Black Start Stations, other Generators~~ Restoration Contractors party to the Local Joint Restoration Plan (including Offshore Local Joint Restoration Plans) and affected Users to assess the condition of their assets, and report on their capability to carry out their obligations under the Local Joint Restoration Plan. Where a Distribution Restoration Zone Plan is in place, the onshore TO shall request the relevant Network Operator to assess the feasibility of establishing a Distribution Restoration Zone in accordance with the Distribution Restoration Zone Plan. This shall include the Network Operator undertaking an assessment of its System to ensure the network is in a position to establish a Distribution Restoration Zone and that Restoration Contractors Plant are in a sufficient state of readiness to permit the establishment of a Distribution Restoration Zone in accordance with the Distribution Restoration Zone Plan.

~~3.4.3.2~~3.5.3.2 Where an offshore network connects within an onshore network covered by a Local Joint Restoration Plan (LJRP) the onshore TO shall, as necessary, liaise with the offshore TO to confirm the status of the connection between the onshore and offshore networks. The relevant TO shall gather these reports and feed them back to NGESO as soon as reasonably practicable.

~~3.4.3.3~~3.5.3.3 Where the availability and capability of the ~~onshore~~ TO's Transmission System and Users' Systems, and the availability of ~~Black Start Stations and other Power Stations~~ Restoration Contractors Plant in the Local Joint Restoration Plan are not significantly different with the Local Joint Restorations Plan's requirements, NGESO shall give the onshore TO the authority to implement the appropriate Local Joint Restoration Plan or Offshore Local Joint Restoration Plan as appropriate. Where the availability and capability of the onshore TO's Transmission System and Network Operators' Systems, and the availability of Anchor Contractor's Plant in the Distribution Restoration Zone Plan are not significantly different with the Distribution Restoration Zone Plan's requirements, NGESO shall give the onshore TO the authority to implement the appropriate Distribution Restoration Plan though the issue of instructions to the relevant Network Operator.

~~3.4.3.4~~3.5.3.4 Where to the extent that the availability and capability of the ~~onshore~~ TO's Transmission System or Users' Systems, or the availability of ~~Black Start Stations or other Power Stations~~ Restoration Contractors Plant in the Local Joint Restoration Plan is significantly different to that set out in the Local Joint Restoration Plan, NGESO may choose to manage the restoration of part of the ~~onshore~~ TO's Transmission System outside the provisions of the Local Joint Restoration Plan, using STCP 01-1 Operational

Switching and normal energy balancing processes as appropriate.

~~3.4.3.5~~3.5.3.5 When the relevant onshore TO has been given the authority to implement the appropriate Local Joint Restoration Plan, it shall execute and progress the appropriate Local Joint Restoration Plan in accordance with its obligations under that LJRP.

~~3.4.3.6 Where an offshore network connects within an onshore network covered by a Local Joint Restoration Plan (LJRP) the onshore TO shall liaise with the offshore TO to confirm the intention to implement the LJRP and the disconnection of the offshore network until the LJRP is terminated and operational control is transferred back to NGESO.~~

~~3.4.3.7~~3.5.3.6 When implementing a Local Joint Restoration Plan, the onshore TO shall carry out operational liaison, complete appropriate Operational Switching actions and issue instructions to Users, including ~~Black Start Stations and Generators~~ Restoration Contractors party to the Local Joint Restoration Plan to establish and control a Power Island in accordance with the provisions of the Local Joint Restoration Plan. When implementing a Distribution Restoration Zone Plan, the onshore TO shall issue instructions to relevant Network Operators to establish a Distribution Restoration Zone. The relevant Network Operator shall then carry out the requirements of the Distribution Restoration Zone Plan together with the relevant requirements of OC9 of the Grid Code and DOC9 of the Distribution Code which will enable the control and establishment of a Power Island.

~~3.4.4~~3.5.4 In England and Wales

~~3.4.4.1~~3.5.4.1 NGESO has the sole authority to implement the Local Joint Restoration Plans. In the case of Distribution Restoration Zone Plans, NGESO will issue instructions to relevant Network Operators who will then implement the relevant Distribution Restoration Zone Plan.

~~3.4.4.2~~3.5.4.2 NGESO shall request ~~Black Start Stations, other Generators~~ Restoration Contractors party to the Local Joint Restoration Plan to assess the condition of their assets, and report on their capability to carry out their obligations under the Local Joint Restoration Plan. NGESO shall request Network Operators party to the Local Joint Restoration Plan to assess the condition of their assets and report on their capability to carry out their obligation under the Local Joint Restoration Plan. In addition, and where a Distribution Restoration Zone Plan is in place, NGESO shall request the relevant Network Operator to undertake an assessment of the Distribution Network to ensure the network is in a position to establish a Distribution Restoration Zone and that Restoration Contractor's Plant is in a sufficient state of readiness to permit the establishment of a Distribution Restoration Zone in accordance with the Distribution Restoration Zone Plan.

~~3.4.4.3~~3.5.4.3 Where an offshore network connects within an onshore network covered by a Local Joint Restoration Plan (LJRP) NGESO shall as necessary, liaise with the offshore TO to confirm the status of the connection between the onshore and offshore networks.

~~3.4.4.4 Where an offshore network connects within an onshore network covered by a Local Joint Restoration Plan (LJRP), NGESO shall liaise with the offshore TO to confirm the intention to implement the LJRP and the disconnection of the offshore network until the LJRP is terminated.~~

~~3.4.4.5~~3.5.4.4 W~~w~~hen implementing a Local Joint Restoration Plan, NGESO shall carry out operational liaison, with ~~Black Start Stations and Generators~~ Restoration Contractors party to the Local Joint Restoration Plan in accordance with the provisions of the Local Joint Restoration Plan. The relevant TO ~~NGET~~ shall carry out operational liaison, direct appropriate Operational Switching actions and issue instructions to relevant Users party to the Local Joint Restoration Plan to establish and control a Power Island in accordance with the provisions of the Local Joint Restoration Plan. When implementing a Distribution Restoration Zone Plan, NGESO shall issue instructions to relevant Network Operators to establish a Distribution Restoration Zone. The relevant Network Operator shall then carry out the requirements of the Distribution Restoration Zone Plan together with the relevant requirements of OC9 of the Grid Code and DOC9

of the Distribution Code which will enable the control and establishment of a Power Island.

~~3.4.5~~3.5.5 Power Islands:

Where possible, a Power Island (be it established either through a Local Joint Restoration Plan (LJRP) or Distribution Restoration Zone Plan (DRZP)) should be operated in accordance with following frequency and voltage criteria:

- the frequency on the Transmission System shall be nominally 50Hz and shall be controlled within the limits 49.5 – 50.5Hz;
- the voltage on the Transmission System shall normally remain within -/+ 5% of nominal. The minimum voltage is –10% and the maximum is +10% of nominal. Voltages of +10% and –5% should not prevail for more than 15 minutes.
- The voltage on the Distribution System when operated at 110kV or above shall normally remain within the limits of -/+10%. For nominal voltages of below 110kV on the Distribution System the voltage shall normally remain within -/+ 6%.

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~~3.4.6~~3.5.6 During the initial stages of implementing a Local Joint Restoration Plan or Distribution Restoration Zone Plan, normal operational standards may not be appropriate or possible and the ~~onshore~~ TO's Transmission System may be operated outside normal voltage and frequency standards provided that it does not result in damage to Plant and/or Apparatus, or a safety hazard.

~~3.4.7~~3.5.7 At any time during the implementation of the Local Joint Restoration Plan or Distribution Restoration Zone Plan, the ~~onshore~~ TO shall advise NGESO (and relevant Network Operator) of any circumstances that may require significant modification to the implementation of the Local Joint Restoration Plan or Distribution Restoration Zone Plan. Where such modifications are required, both parties may agree a new course of action consistent with the aims of the Local Joint Restoration Plan or Distribution Restoration Zone Plan.

~~3.4.8~~3.5.8 At any time during the implementation of the Local Joint Restoration Plan and where there is good reason, NGESO may choose to terminate operation in accordance with the Local Joint Restoration Plan and manage restoration of that part of the Transmission System without the bounds of the Local Joint Restoration Plan. NGESO shall notify the relevant onshore TO and any other affected parties of the termination of the Local Joint Restoration Plan. In the case of a Distribution Restoration Zone Plan and where there is good reason, the Network Operator may choose to terminate operation in accordance with the Distribution Restoration Zone Plan and manage restoration of that part of the Distribution System without the bounds of the Distribution Restoration Zone Plan. The relevant Network Operator shall notify NGESO, relevant onshore TO and any other affected parties of the termination of the Distribution Restoration Zone Plan.

~~3.4.9~~3.5.9 At any time during the implementation of the Local Joint Restoration Plan or Distribution Restoration Zone Plan and where there is good reason, the onshore TO may choose to terminate operation in accordance with the Local Joint Restoration Plan or (where relevant) Distribution Restoration Zone Plan having liaised with the relevant Network Operator. The ~~onshore~~ TO will advise NGESO of the termination of the Local Joint Restoration Plan or termination of the Distribution Restoration Zone Plan having held discussions with both the relevant Network Operator and NGESO. Operation and restoration of that part of the National Electricity~~-~~ Transmission System will return to NGESO. NGESO shall notify the relevant affected parties of the termination of the Plan.

~~3.4.10~~3.5.10 The onshore TO shall keep NGESO informed of progress in establishing the Power Island(s). At any time during establishing Power Islands the onshore TO shall inform NGESO if further resources become~~s~~ available, such that additional Power Islands can be established in accordance with the relevant Local Joint Restoration Plan or Distribution Restoration Zone Plan. NGESO and the onshore TO shall decide if and when additional Local Joint Restoration Plans should be invoked. In the case of Distribution Restoration Zones, NGESO, relevant Network Operators and TO's shall decide if and when additional Distribution Restoration Zones shall be invoked.

~~3.4.11~~3.5.11 Interconnection of Power Islands

~~3.4.11.1~~3.5.11.1 NGESO shall agree with the ~~onshore~~ TO to the interconnection of any Power Islands which are not expressly allowed for in a Local Joint Restoration Plan or Distribution Restoration Zone Plan. Local Joint Restoration Plan operation and Distribution Restoration Zone Plan operation shall terminate at this point and NGESO shall take back control of that part of the TO's Transmission System formed from the interconnected Power Islands irrespective of whether they were formed by a Local Joint Restoration Plan or Distribution Restoration Zone Plan. ~~Onshore~~ TOs shall not operate a Power Island that contains part of more than one TO's Transmission System unless through a prescribed Local Joint Restoration Plan Annex.

~~3.4.11.2~~3.5.11.2 NGESO shall coordinate the interconnection of sub-systems ~~including offshore transmission networks,~~ created from the interconnection of Power Islands ~~(or multiple Power Islands as allowed for in the Local Joint Restoration Plan),~~ irrespective of whether they were formed from a Local Joint Restoration Plan or Distribution Restoration Zone Plan to form an integrated System. The completion of the integration of sub-systems shall eventually re-establish the TO's Transmission System or the re-connection of the relevant part of the TO's Transmission System, completing System RestorationBlack Start.

~~3.4.11.3~~3.5.11.3 At any point during the connection of Power Islands or management of sub-systems, NGESO may request the ~~onshore~~ TO to resume Local Joint Restoration Plan operation of part of that onshore TO's Transmission System, providing its operation would still remain within the bounds of an applicable Local Joint Restoration Plan and would not include more than one TO's Transmission System unless through a prescribed Local Joint Restoration Plan Annex. Equally at any point during the connection of Power Islands or management of sub-systems, NGESO may request a Network Operator to resume Distribution Restoration Zone Plan operation of part of restoration of the onshore TO's Transmission System, providing its operation would still remain within the bounds of an applicable Distribution Restoration Zone Plan and would not include more than one Distribution System unless specifically prescribed by a Distribution Restoration Zone Plan.

~~3.4.12~~3.5.12 Completion of System RestorationBlack Start

~~3.4.12.1~~3.5.12.1 When the System RestorationBlack Start is complete, NGESO shall formally notify the TOs and Users that System Restorationthe Black Start is complete and normal operation has been resumed.

~~3.5~~3.6 *Voice Communication Failure*

~~3.5.1~~3.6.1 In the event of a total communication failure between the ~~onshore~~ TO and NGESO during System Restoration ~~Black Start~~ conditions, the ~~onshore~~ TO where possible, may choose to invoke the LJRP(s) for its Transmission System and operate within those provisions

~~3.5.2~~3.6.2 Where voice communication failure is protracted, the ~~onshore~~ TO, where possible may consider the interconnection of established Power Islands as allowed for in the Local Joint Restoration Plan(s) or Network Operators in the case of Distribution Restoration Zone Pans.

~~3.5.3~~3.6.3 The ~~onshore~~ TO must seek to inform NGESO as soon as reasonably practicable of all actions they have taken and the status of the restoration after communication is re-established.

~~3.6~~3.7 *System RestorationBlack Start Training*

~~3.6.1~~3.7.1 NGESO shall carry out and make available appropriate and regular training for TO staff, to allow them to carry out their roles and responsibilities under a System RestorationBlack Start condition. The TO shall make available appropriately skilled personnel to complete the prescribed System RestorationBlack Start training. Training and Assurance shall also be undertaken as provided for in Grid Code OC5.7 in particular OC5.7.4. In addition, training and regular exercises shall be undertaken in accordance with the requirements of OC9.4.7.6.2 of the Grid Code.

~~3.7~~3.8 *System RestorationBlack Start Testing*

~~3.7.1~~3.8.1 NGESO shall carry out System RestorationBlack Start and other related Tests on a routine basis. All System RestorationBlack Start or related Tests shall be carried out in accordance with the provision of STCP 08-3 Operational Tests and System Tests in addition to the requirements of OC5.7 of the Grid Code and OC9.4.7.6.2 of the Grid Code.

~~3.8~~3.9 System RestorationBlack Start Test Bookings

~~3.8.1~~3.9.1 System RestorationBlack Start Tests shall be booked in the Outage database by NGESO for information. Booking requests shall be agreed in accordance with STCP 11-1 Outage Planning.

Appendix A – Process Diagrams

Note that the Process Diagrams shown in this Appendix A are for information only. In the event of any contradiction between the process represented in this Appendix and the process described elsewhere in this STCP, then the text elsewhere in this STCP shall prevail.

STCP 6-1 System Restoration
Changes to an Existing LJRP
External
SO
TO
SO identifies a change required to a LJRP
TO identifies a change required to a LJRP
SO initiates discussions with relevant TO and other relevant parties
All parties discuss and agree the changes of the LJRP
No
No
SO produces a revised LJRP for agreement
Relevant Users receive revised LJRP for agreement
TO receives revised LJRP for agreemnet
Do relevant Users agree?
Yes
Yes
Does TO agree?
SO updates and reissues LJRP indicating issue number and the effective date of change
Relevant Users receive revised LJRP
Affected TO(s) receive revised LJRP

STCP 6-1 System Restoration
Creation of New DRZP
External
SO/Network Operator
TO
DRZP identified
SO/Network Operator initiates discussion with Restoration Contractor
TO notified
All parties discuss and agree the detail of the DRZP
Network Operator prepare DRZP to reflect discussions with RC
TO supports Network Operator in developing DRZP
Network Operator receive relevant information, data and resources and distributes final version of DRZP
Relevant Users receive DRZP for agreement
TO receives DRZP
Does TO agree?
Yes
No
Relevant Users receive and sign DRZP
Network Operator agrees DRZP with RC
TO receives and signs DRZP
Return signed DRZP
Network Operator distribute Copy of Signed DRZP with Implementation Date
Relevant Users receive signed DRZP
All parties receive signed DRZP
TO to feedback concern to Network Operator/SO and DRZP to be reassessed

STCP 6-1 System Restoration
Changes to an Existing DRZP
External
Network Operator/SO
TO
TO identifies a change required to a DRZP
Network Operator/SO identifies a change required to a DRZP
Network Operator initiates discussions with the Restoration Contractor and other relevant parties
All parties discuss and agree the changes of the DRZP
No
No
Network Operator produces a revised DRZP for agreement
Relevant Users receive revised DRZP for agreement
TO receives revised DRZP for agreement
Do relevant Users agree?
Yes
Yes
Does TO agree?
Relevant Users receive revised DRZP
Network Operator updates and reissues DRZP indicating issue number and the effective date of change
Affected TO(s) receive revised DRZP

STCP 6-1 System Restoration
System Restoration Procedure, Page 1
External
SO
TO/Network Operator
Total or Partial shutdown
Is voice communication available?
No
TO/Network Operator may invoke LJRP/ DRZP for its network and inform SO asap of actions taken
Yes
Restoration Contractors (that are party to LJRP/DRZP) are informed
SO notifies of its intention to implement LJRP/ DRZP
Affected TO/Network Operator informed
TO requests Restoration Contractors, Non-Embedded Customers & Network Operator to assess the condition of their assets and to report on capability to carry out an LJRP
DNO contact RCs and TOs where relevant to assess the condition of assets to carry out DRZPs
Restoration Contractors, Non-Embedded Customers, Network Operators and TOs as applicable receives request to assess assets and report on capability to carry out LJRP/DRZP
TO/Network Operator assess own network and connection points for capability to carry out LJRP/DRZP
Restoration Contractors, Non-Embedded Customers & Network Operator and TOs send report to TO/ Network Operator as applicable
TO/DNO receives reports and informs SO
SO receives reports
SO/TO/Network Operator agree implementation of LJRP/DRZP based on reports
Is availability & capbility consistent with LJRP/DRZP requirements?
Yes
TO executes LJRP Network Operator executes DRZP
No
Does SO choose to use LJRP/DRZP?
Yes
Go to A
No
SO may manage the restoration by using STCP1-1 Operational Switching and normal energy balancing processes

STCP6-1 System Restoration Issue 002 England and Wales
System Restoration Procedure, Page 2
External
SO
TO/DNO
A
TO carries out operational liaison, operational switching actions & instructions to Network Operators for LJRPs.
Network Operator carries out operational liaison, operational switching actions & instructions to TOs as relevant for DRZPs
All parties notified
SO carries out operational liaison, operational & instructions to Generators in the case of LJRPs
Network Operator carries out operational liaison, operational & instructions to Generators in the case of DRZPs
Power Island Established
TO/Network Operator advises SO of any circumstances that may require significant modification to the LJRP/DRZP
SO advised
SO/TO/Network Operator agree new course of action
Does SO wish to terminate operation of the LJRP/ DRZP?
NO
Does TO/Network Operator wish to terminate operation of the LJRP/DRZP?
Yes
Yes
SO may manage the restoration by switching STCP1-1 Operational Switching and normal energy balancing processes
TO/ Network Operator advise SO
NO
SO complete interconnection of Power Islands and notify all parties System Restoration is completed
LJRP/DRZP implemented to restore Power Island(s) to point of interconnection and hands back to SO
All parties notified
All parties notified

Appendix B – LJRPs and DRZPs

This Appendix has been removed from this version of the STCP on the grounds of Confidentiality. In respect of LJRPs, this decision was taken, in accordance with the decision taken by the STC Committee in July 2005 and in respect of DRZPs, this decision was taken in accordance with the decision taken by the STC Committee in XX 2023.

For further information please e-mail STC.Team@nationalgrid.com

Appendix C:– Abbreviations & Definitions

Abbreviations

STCP	System Operator –Transmission Owner Code Procedure
TO	Transmission Owner
TSC	Transmission Status Certificate
GC	Grid Code

Definitions

STC definitions used:

~~Black Start~~
Committee
Distribution Restoration Zone Plan
Generator
Generating Unit
Local Joint Restoration Plan
Network Operator
NGESO
NGET
Non Embedded Customer
Offshore
Offshore Local Joint Restoration Plan
Offshore Transmission System
Partial Shutdown
Party
Power Station
Restoration Contractor
Restoration Plan
System
System Restoration
Total Shutdown
Total System
User

Grid Code definitions used:

Anchor
Anchor Restoration Contractor
Ancillary Services Agreement
Distribution Restoration Zone
Embedded
~~Local Joint Restoration Plan~~
Plant
Power Island
Top Up Restoration Contractor
Top Up Restoration Plant
~~Black Start Station~~

Definitions used from other STCPs:

Duty Manager	As defined in STCP 06-3 System Incident Management