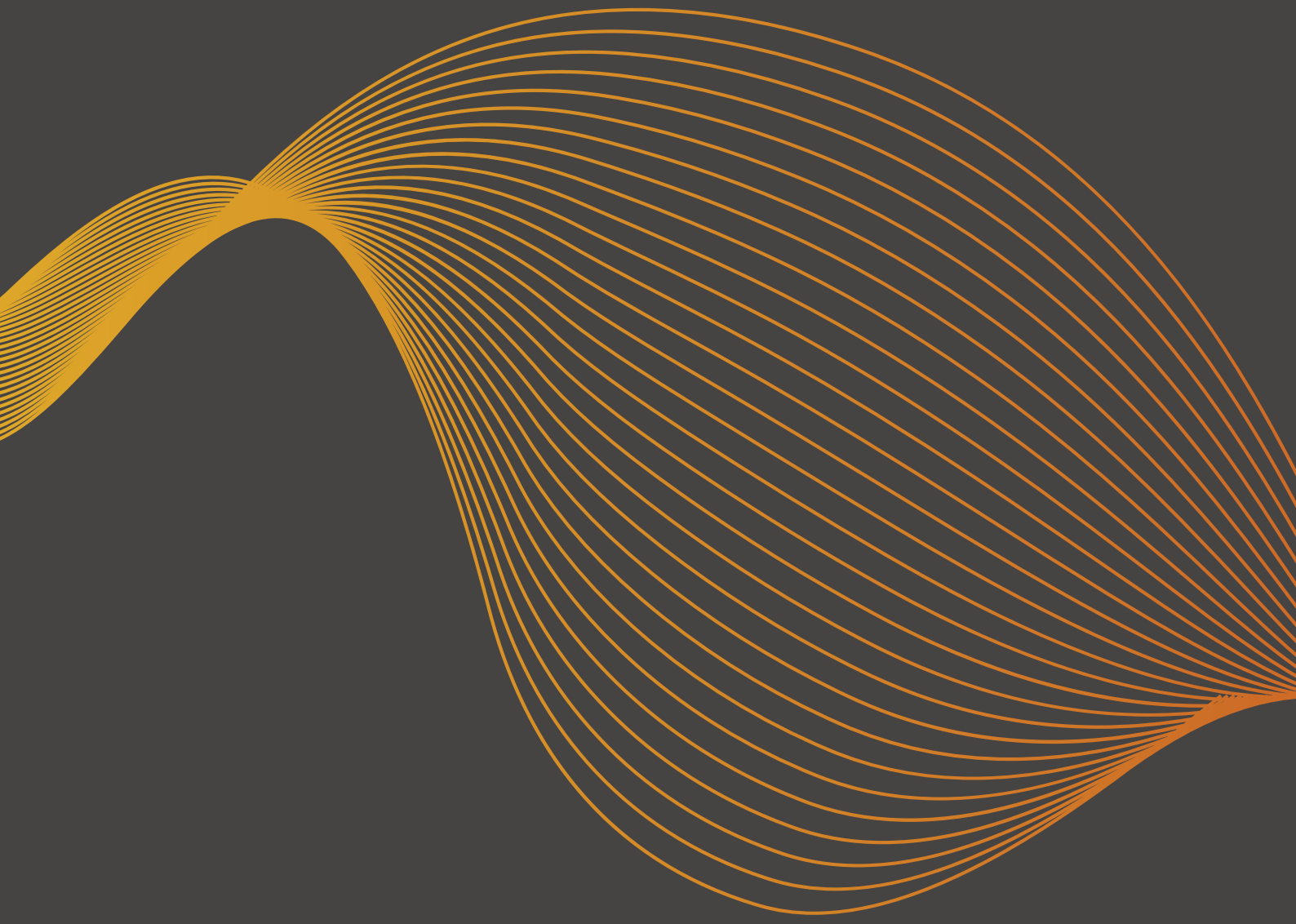
Distributed ReStart

Distribution Restoration future commercial structure and industry codes recommendations

Appendix 3 – Codes Legal Text Drafts

Procurement and Compliance workstream
20 December 2021



Contents

Grid Code

Extracts from Glossary and Definitions

Anchor Generator	A **Generator** who owns and operates any **Anchor Generating Unit**, **Anchor Power Park Module** or **Anchor Power Generating Module**.
Anchor DC Converter	An **Embedded DC Converter** with an **Anchor Plant Capability** which can be used to establish the first stage of a **Distribution Restoration Zone** by energising a dead part of the **Network Operator's System**.
Anchor DC Converter Owner	A **DC Converter** owner who owns and is responsible for an **Anchor DC Converter**.
Anchor DC Converter Test	A test carried out by an **Anchor DC Converter Owner** at an **Anchor DC Converter** while the **Anchor DC Converter** is disconnected from all external electrical power supplies from the **Total System**.
Anchor Power Station	An **Embedded Power Station** comprising **Anchor Plant.**
Anchor Power Station Test	A test carried out by an **Anchor Generator** at an **Anchor Power Station** while that **Anchor Power Station** is disconnected from all external electrical power supplies from the **Total System**.
Anchor Generating Unit	An **Embedded Generating Unit** with **Anchor Plant Capability.**
Anchor Generating Unit Test	A test carried out on an **Anchor Generating Unit** or a **CCGT Unit** or a **Power Generating Module**, as the case may be, at an **Anchor Power Station** while that **Power Station** remains connected to an external alternating current electrical supply.
Anchor HVDC System	An **Embedded HVDC System** with **Anchor Plant Capability** which can be used to establish the first stage of a **Distribution Restoration Zone** by energising a dead part of the **Network Operator's System**.
Anchor HVDC System Owner	An **HVDC System Owner** who owns and is responsible for an **Anchor HVDC System**.

Anchor HVDC System Test	A **Test** carried out by an **Anchor HVDC System Owner** with an **Anchor HVDC System** while the **Anchor HVDC System** is disconnected from all external electrical power supplies from the **Total System**.
Anchor Plant	**Anchor Plant** collectively means one or more of the following and includes an **Embedded Generating Unit**, an **Embedded Power Park Module**, **Embedded Power Generating Module**, and **Embedded HVDC System**, or an **Embedded DC Converter** which has an **Anchor Plant Capability**.
Anchor Plant Capability	Is the ability of a **Plant** to **Start-Up** from **Shutdown** and to energise part of the **Network Operator's System** forming part of a **Distribution Restoration Zone** within 8 hours, without an external electrical power supply.
Distribution Restoration Contract	An agreement between an **Anchor Plant Owner** or **Restoration Service Provider** and **The Company** and **Network Operator** under which the **Anchor Plant Owner** or **Restoration Service Provider** (upon instruction) can establish and/or maintain a **Distribution Restoration Zone**.
Anchor Plant Owner	The owner and/ or operator of an **Anchor Plant**.
Anchor Plant Test	A test conducted on an **Anchor Plant** to confirm it is capable of meeting the requirements of the **Distribution Restoration Contract**.
Auxiliary Energy Supplies	An energy supply (which could include an **Auxiliary Diesel Engine** or **Auxiliary Gas Turbine** or other source of electrical energy) that is capable of supplying a **Unit Board** or **Station Board** or equivalent, which can start without an electrical power supply from outside the **Power Station** or **HVDC System** or **HVDC Converter** or **DC Converter Station** within which it is situated.
Black Start	The procedure necessary for a recovery from a **Total Shutdown** or **Partial Shutdown**
Black Start Capability	In the case of a **Black Start Station**, is the ability for at least one of its **Gensets** to **Start-Up** from **Shutdown** and to energise a part of the **System** and be **Synchronised** to the **System** upon instruction from **The Company**, within two hours, without an external electrical power supply. In the case of a **Black Start HVDC System** is the ability of an **HVDC System** to **Start-Up** from **Shutdown** and to energise a part of the **System** and be **Synchronised** to the **System** upon instruction from **The Company**, within two hours, without an external electrical power supply from the **GB Synchronous Area**.
Black Start Contract	An agreement between a **Black Start Service Provider** and **The Company** under which the **Black Start Service Provider** provides **Black Start Capability** and other associated services.
Black Start HVDC System	An **HVDC System** or **DC Converter Station** which are registered, pursuant to the **Bilateral Agreement** with a **User**, as having a **Black Start Capability**.
Black Start HVDC Test	A **Black Start Test** carried out by an **HVDC System Owner** or **DC Converter Station Owner** with a **Black Start HVDC System** while the **Black Start HVDC System** is disconnected from all external electrical power supplies from the **Total System**~~**GB Synchronous Area**~~.
Black Start Service Provider	A **Generator** with a **Black Start Station** or an **HVDC System Owner** or **DC Converter Station Owner** with a **Black Start HVDC System**.

Black Start Station Test	**A Black Start Test** carried out by a **Generator** with a **Black Start Station** while the **Black Start Station** is disconnected from all external electrical power supplies from the **GB Synchronous Area**.
Black Start Stations	**Power Stations** which are registered, pursuant to the **Bilateral Agreement** with a **User**, as having a **Black Start Capability**.
Black Start Test	A **Black Start Test** carried out by a **Black Start Service Provider** on the instructions of **The Company**, in order to demonstrate that a **Black Start Station** or a **Black Start HVDC System** has a **Black Start Capability**. For the avoidance of doubt, a **Black Start Test** could compromise a **Black Start Station Test,** a **Black Start Unit Test** or **Black Start HVDC Test.**
Black Start Unit Test	A **Black Start Test** carried out on a **Generating Unit** or a **CCGT Unit** or a **Power Generating Module**, as the case may be, at a **Black Start Station** while the **Black Start Station** remains connected to an external alternating current electrical supply.
Block Loading Capability	The incremental **Active Power** steps, from no load to **Rated MW**, which a **Generating Unit** or **Power Generating Module** or **Power Park Module** or **HVDC System** (including **Anchor Plant** and **Plant** belonging to **Restoration Service Providers**) can instantaneously supply without causing it to trip or go outside the **Frequency** range of 47.5 – 52Hz (or an otherwise agreed **Frequency** range). The time between each incremental step shall also be provided.
De-synchronised Island Procedure	Has the meaning set out in OC9.5.4.
De-synchronised Island(s)	Has the meaning set out in OC9.5.1(a).
Distribution Restoration Zone	Part of a **Network Operator's System**, which is not part of the **National Electricity Transmission System** which has been energised by **Anchor Plant** following a **Total System Shutdown** or **Partial System Shutdown**. **The Distribution Restoration Zone** shall comprise of **Anchor Plant** and may also include **Plant** owned and operated by one or more **Restoration Service Providers**.
Distribution Restoration Zone Control System	A mains independent combined automatic control and supervisory system which assesses the status and operational conditions of a **Network Operator's System** for the purposes of operating **Anchor Plant** and **Restoration Service Providers Plant** and **Apparatus** in addition to operating items of **Distribution Network Operators** equipment for the purposes of establishing and operating a **Distribution Restoration Zone**.
Distribution Restoration Zone Plan	A plan produced under OC9.4.7.6.2 detailing the agreed method and procedure by which a **Network Operator** or **Distribution Restoration Zone Control System** will instruct an **Anchor Plant Owner** to energise part of a **Network Operator's System** together with other **Restoration Service Providers** to meet blocks of local **Demand** so as to form a **Power Island**. A **Distribution Restoration Zone** falls outside the provisions of a **Local Joint Restoration Plan**.

Local Joint Restoration Plan	A plan produced under OC9.4.7.6.1~~OC9.4.7.12~~ detailing the agreed method and procedure by which a **Black Start Service Provider** will energise part of the **Total System** and meet complementary blocks of local **Demand** so as to form a **Power Island**. In Scotland, the plan may also: cover more than one **Black Start Service Provider**; including **Gensets** other than those at a **Black Start Station** and cover the creation of one or more **Power Islands**. A **Distribution Restoration Zone** falls outside the provisions of a **Local Joint Restoration Plan** and is covered by the provisions of a **Distribution Restoration Zone Plan** as provided for under OC9.4.7.6.2.
Part 1 System Ancillary Services	**Ancillary Services** which are required for **System** reasons and which must be provided by **Users** in accordance with the **Connection Conditions** or **European Connection Conditions**. An exhaustive list of **Part 1 System Ancillary Services** is included in that part of CC.8.1 or ECC.8.1 headed Part 1.
Quick Resynchronisation Unit Test	A test undertaken on a **Generating Unit** forming part of a **Type C** or **Type D Power Generating Module** as detailed in OC5.7.1, OC5.7.3 and OC5.7.4 necessary to determine its ability to demonstrate a **Quick Resynchronisation Capability**.
Restoration Service Provider	A party with a legal or contractual obligation to provide a service contributing to one or several measures of the **System Restoration Plan**. For the avoidance of doubt this may include a party contributing to a either a Local Joint Restoration Plan or a **Distribution Restoration Zone**.
Target Frequency	That **Frequency** determined by **The Company**, in its reasonable opinion, as the desired operating **Frequency** of the **Total System** or of a relevant **Power Island**. This will normally be 50.00Hz plus or minus 0.05Hz, except in exceptional circumstances as determined by **The Company**, in its reasonable opinion when this may be 49.90 or 50.10Hz. An example of exceptional circumstances may be difficulties caused in operating the **System** during disputes affecting fuel supplies or following a **Total Shutdown** or **Partial Shutdown** where **Power Islands** are established, and each **Power Island** has its own unique **Frequency**.

Extracts from Planning Code

PC.A.5.7 Black Start Related Information (excluding Distribution Restoration Zone information formulated as part of a Distribution Restoration Zone Plan)

For the avoidance of doubt, data relating to **Anchor Plant** and **Plant** and **Apparatus** owned and/or operated by **Restoration Service Providers** forming part of a **Distribution Restoration Zone**, should be supplied in accordance with the requirements of PC.A.5.8

Data identified under this section PC.A.5.7 must be submitted as required under PC.A.1.2. This information may also be requested by **The Company** during a **Black Start** and should be provided by **Generators**. **HVDC System Owners** and **DC Converter Station Owners -** where reasonably possible. For the avoidance of doubt, **Generators** in this section PC.A.5.7 means **Generators** only in respect of their **Large Power Stations**.

The following data items/text must be supplied, from each **Generator** and ~~.~~ **HVDC System Converter Station Owner -** to **The Company**. In the case of **Generators**, the data supplied should be with respect to each **BM Unit** at a **Large Power Station** For the avoidance of doubt, the data required under PC.A.5.7 (a) and (b) below, does i) not need to be supplied in respect of **Generators** that are contracted to provide a **Black Start Capability** and ii), the data only needs to be supplied in respect of the **BM Unit** at a **Large Power Station** and does not need to include **Generating Unit** data;

(a) Expected time for each **BM Unit** to be **Synchronised** following a **Total Shutdown** or **Partial Shutdown**. The assessment should include the **Power Station's** or **HVDC System's** or **DC Converter Station's** ability to re-synchronise all **BM Units**, if all were running immediately prior to the **Total Shutdown** or **Partial Shutdown**. Additionally, this should highlight any specific issues (i.e. those that would impact on the **BM Unit's** time to be **Synchronised**) that may arise, as time progresses without external supplies being restored.

(b) **Block Loading Capability**. This should be provided in either graphical or tabular format showing the estimated block loading capability from 0MW to **Registered Capacity**. Any particular MW loading points at which the **BM Unit** should be operated until further changes in output can be accommodated ~~'hold' points~~ should also be identified. The data of each **BM Unit** should be provided for the condition of a **Generating Unit** (which is considered as both a 'hot' unit (run prior to **Shutdown**) and cold unit (not run for 48 hours or more prior to the **Shutdown**)) that was **Synchronised** just prior to the **Total Shutdown** or **Partial Shutdown**. In the case of an **HVDC System** or **DC Converter Station**, data should be provided when the **HVDC System** or **DC Converter Station** has been considered to have run immediately before the **Total Shutdown** or **Partial Shutdown** and equally when the **HVDC System** or **DC Converter Station** has been considered to have been **Shutdown** for a period of 48 hours or more. The block loading assessment should be done against a frequency variation of 49.5Hz – 50.5Hz.

PC.A.5.8 Distributed Restoration Zone Related Information (excluding Black Start information formulated as part of a Local Joint Restoration Plan))

Data identified under this section PC.A.5.8 must be submitted as required under PC.A.1.2. This information may also be requested by **The Company** during a **Black Start** and should be provided by **Network Operators -** where reasonably possible. For the avoidance of doubt **Anchor Plant Owners** forming part of a **Distribution Restoration Zone Plan** should submit the relevant information to the **Network Operator** who will then supply the relevant information to **The Company**.

The following data items/text must be supplied, from each **Network Operator** in respect of each **Distribution Restoration Zone**.

(a) Expected time for each **Anchor Plant Owner** and **Restoration Service Provider's Plant** to be **Synchronised** following a **Total Shutdown** or **Partial Shutdown**. The assessment should include the **Anchor Plant Owners** and **Restoration Service Provider's** ability to re-synchronise all their **Plant**, if all were running immediately prior to the **Total Shutdown** or **Partial Shutdown**. Additionally, this should highlight any specific issues (i.e. those that would impact the time at which the **Anchor Plant** and **Restoration Service Provider's Plant** to be **Synchronised**) that may arise, as time progresses without external supplies being restored.

(b) **Block Loading Capability**. This should be provided in either graphical or tabular format showing the estimated **Block Loading Capability** from 0MW to **Registered Capacity** or **Maximum Capacity** as the case may be. Any particular MW loading points at which the **Anchor Plant Owner's** or **Restoration Service Provider's Plant** should be operated until further changes in output can be accommodated should also be identified. The data of each **Anchor Plant** and **Restoration Service Provider's Plant** forming part of a **Distribution Restoration Zone** should be provided for the condition of an **Anchor Plant** or **Restoration Service Provider's Plant** (which is considered as both a 'hot' unit (run prior to **Shutdown**) and cold unit (not run for 48 hours or more prior to the shutdown) that was **Synchronised** just prior to the **Total Shutdown** or **Partial Shutdown**. In the case of an **HVDC System** or **DC Converter**, data should be provided when the **HVDC System** or **DC Converter** has been considered to have run immediately before the **Total Shutdown** or **Partial Shutdown** and equally when the **Embedded HVDC System** or **Embedded DC Converter** has been considered to have been **Shutdown** for a period of 48 hours or more. The block loading assessment should be done against a frequency variation of 49.5Hz – 50.5Hz.

Extracts from Connection Conditions

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CC.6.3.5 It is an essential requirement that the **National Electricity Transmission System** must incorporate a **Black Start Capability**. This will be achieved by agreeing a **Black Start Capability** with a number of strategically located **Black Start Service Providers**. For each **Black Start Service Provider**, **The Company** will state in the **Bilateral Agreement** whether or not a **Black Start Capability** is required. In the case of **Anchor Plant Owners** forming part of a **Distribution Restoration Zone**, **The Company** shall agree with the relevant **Network Operator** which would be pursuant to the terms of the **Distribution Restoration Contract**.

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CC.8 ANCILLARY SERVICES

CC.8.1 System Ancillary Services

The **CC** contain requirements for the capability for certain **Ancillary Services**, which are needed for **System** reasons ("**System Ancillary Services**"). There follows a list of these **System Ancillary Services**, together with the paragraph number of the **CC** (or other part of the **Grid Code**) in which the minimum capability is required or referred to. The list is divided into two categories: Part 1 lists the **System Ancillary Services** which

(a) **GB Generators** in respect of **Large Power Stations** are obliged to provide (except **GB Generators** in respect of **Large Power Stations** which have a **Registered Capacity** of less than 50MW and comprise **Power Park Modules**); and,

(b) GB **Generators** in respect of **Large Power Stations** with a **Registered Capacity** of less than 50MW and comprise **Power Park Modules** are obliged to provide in respect of **Reactive Power** only; and,

(c) **DC Converter Station** owners are obliged to have the capability to supply; and

(d) **GB Generators** in respect of **Medium Power Stations** (except **Embedded Medium Power Stations**) are obliged to provide in respect of **Reactive Power** only:

and Part 2 lists the **System Ancillary Services** which **GB Generators** will provide only if agreement to provide them is reached with **The Company**:

Part 1

(a) **Reactive Power** supplied (in accordance with CC.6.3.2) otherwise than by means of synchronous or static compensators (except in the case of a **Power Park Module** where synchronous or static compensators within the **Power Park Module** may be used to provide **Reactive Power**)

(b) **Frequency** Control by means of **Frequency** sensitive generation - CC.6.3.7 and BC3.5.1

Part 2

(c) **Frequency** Control by means of **Fast Start** - CC.6.3.14

(d) **Black Start Capability** or **Anchor Plant Capability**- CC.6.3.5

(e) **System to Generator Operational Intertripping**

(f) Services provided by **Restoration Service Providers.**

CC.8.2 Commercial Ancillary Services

Other **Ancillary Services** are also utilised by **The Company** in operating the **Total System** if these have been agreed to be provided by a **GB Code User** (or other person) under an **Ancillary Services Agreement** or under a **Bilateral Agreement**, with payment being dealt with under an **Ancillary Services Agreement** or in the case of **Externally Interconnected System Operators** or **Interconnector Users**, under any other agreement (and in the case of **Externally Interconnected System Operators** and **Interconnector Users** includes ancillary services equivalent to or similar to **System Ancillary Services**) ("**Commercial Ancillary Services**"). The capability for these **Commercial Ancillary Services** is set out in the relevant **Ancillary Services Agreement** or **Bilateral Agreement** (as the case may be).

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Extracts from European Connection Conditions

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ECC.6.3.5 BLACK START

ECC.6.3.5.1 **Black Start** is not a mandatory requirement, however **EU Code Users** may wish to notify **The Company** of their ability to provide a **Black Start** facility and the cost of the service. **The Company** will then consider whether it wishes to contract with the **EU Code User** for the provision of a **Black Start** service which would be specified via a **Black Start Contract** or **Distribution Restoration Contract**. Where an **EU Code User** does not offer to provide a cost for the provision of a **Black Start Capability**, **The Company** may make such a request if it considers **System** security to be at risk due to a lack of **Black Start** capability.

ECC.6.3.5.2 It is an essential requirement that the **National Electricity Transmission System** must incorporate a **Black Start Capability**. This will be achieved by agreeing a **Black Start Capability** at a number of strategically located **Power Stations** and **HVDC Systems**. For each **Power Station** or **HVDC System**, **The Company** will state in the **Bilateral Agreement** whether or not a **Black Start Capability** is required. In addition, this will also be achieved by agreeing **Distribution Restoration Contracts** with a number of **Restoration Service Providers**.

ECC.6.3.5.3 Where an **EU Code User** has entered into a **Black Start Contract** to provide a **Black Start Capability** or **Distribution Restoration Contract** to provide an **Anchor Plant Capability** in respect of a **Type C Power Generating Module** or **Type D Power Generating Module** (including **DC Connected Power Park Modules)** the following requirements shall apply.

(i) The **Power-Generating Module** or **DC Connected Power Park Module** shall be capable of starting from shutdown without any external electrical energy supply within a time frame specified by **The Company** in the **Black Start Contract** or **Distribution Restoration Contract**.

(ii) Each **Power Generating Module** or **DC Connected Power Park Module** shall be able to synchronise within the frequency limits defined in ECC.6.1. and, where applicable, voltage limits specified in ECC.6.1.4;

(iii) The **Power Generating Module** or **DC Connected Power Park Module** shall be capable of connecting on to an unenergised **System**.

(iv) The **Power-Generating Module** or **DC Connected Power Park Module** shall be capable of automatically regulating dips in voltage caused by connection of demand;

(v) The **Power Generating Module** or **DC Connected Power Park Module** shall:

be capable of **Block Loading Capability**,

be capable of operating in **LFSM-O** and **LFSM-U**, as specified in ECC.6.3.7.1 and ECC.6.3.7.2

control **Frequency** in case of overfrequency and underfrequency within the whole **Active Power** output range between the **Minimum Regulating Level** and **Maximum Capacity** as well as at houseload operation levels

be capable of parallel operation of a few **Power Generating Modules** including **DC Connected Power Park Modules** within an isolated part of the **Total System** that is still supplying **Customers**, and control voltage automatically during the system restoration phase;

ECC.6.3.5.4 Each **HVDC System** or **Remote End HVDC Converter Station** which has a **Black Start Capability** shall be capable of energising the busbar of an AC substation to which the another **HVDC Converter Station** is connected. The timeframe after shutdown of the **HVDC System** prior to energisation of the AC substation shall be pursuant to the terms of the **Black Start Contract**. The **HVDC System** shall be able to synchronise within the **Frequency** limits defined in ECC.6.1.2.1.2 and voltage limits defined in ECC.6.1.4.1 unless otherwise specified in the **Black Start Contract**. Wider **Frequency** and voltage ranges can be specified in the **Black Start Contract** in order to restore **System** security.

ECC.6.3.5.5 With regard to the capability to take part in operation of an isolated part of the **Total System** that is still supplying **Customers**:

Power Generating Modules including **DC Connected Power Park Modules** shall be capable of taking part in island operation if specified in the **Black Start Contract** or **Distribution Restoration Contract** required by **The Company** and:

the **Frequency** limits for island operation shall be those specified in ECC.6.1.2,

the voltage limits for island operation shall be those defined in ECC.6.1.4;

(i) **Power Generating Modules** including **DC Connected Power Park Modules** shall be able to operate in **Frequency Sensitive Mode** during island operation, as specified in ECC.6.3.7.3. In the event of a power surplus, **Power Generating Modules** including **DC Connected Power Park Modules** shall be capable of reducing the **Active Power** output from a previous operating point to any new operating point within the **Power Generating Module Performance Chart**. **Power Generating Modules** including **DC Connected Power Park Modules** shall be capable of reducing **Active Power** output as much as inherently technically feasible, but to at least 55 % of **Maximum Capacity**;

(iii) The method for detecting a change from interconnected system operation to island operation shall be agreed between the **EU Generator**, **The Company**, the **Relevant Transmission Licensee** and in the case of a **Distribution Restoration Zone** the relevant **Network Operator**. The agreed method of detection must not rely solely on **The Company**, **Relevant Transmission Licensee's** or **Network Operators** switchgear position signals;

(iv) **Power Generating Modules** including **DC Connected Power Park Modules** shall be able to operate in **LFSM-O** and **LFSM-U** during island operation, as specified in ECC.6.3.7.1 and ECC.6.3.7.2;

ECC.6.3.5.6 With regard to quick re-synchronisation capability:

(i~~b~~) In case of disconnection of the **Power Generating Module** including **DC Connected Power Park Modules** from the **System**, the **Power Generating Module** shall be capable of quick re-synchronisation in line with the **Protection** strategy agreed between **The Company** and/or **Network Operator** in co-ordination with the **Relevant Transmission Licensee** and the **Generator**;

(ii) A **Power Generating Module** including a **DC Connected Power Park Module** with a minimum re-synchronisation time greater than 15 minutes after its disconnection from any external power supply must be capable of **Houseload Operation** from any operating point on its **Power Generating Module Performance Chart**. In this case, the identification of **Houseload Operation** must not be based solely on the **Total System's** switchgear position signals;

(iii) **Power Generating Modules** including **DC Connected Power Park Modules** shall be capable of **Houseload Operation**, irrespective of any auxiliary connection to the **Total System**. The minimum operation time shall be specified by **The Company**, taking into consideration the specific characteristics of prime mover technology.

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ECC.8 ANCILLARY SERVICES

ECC.8.1 System Ancillary Services

The **ECC** contain requirements for the capability for certain **Ancillary Services**, which are needed for **System** reasons ("**System Ancillary Services**"). There follows a list of these **System Ancillary Services**, together with the paragraph number of the **ECC** (or other part of the **Grid Code**) in which the minimum capability is required or referred to. The list is divided into two categories: Part 1 lists the **System Ancillary Services** which

(a) **Generators** in respect of **Type C** and **Type D Power Generating Modules** (including **DC Connected Power Park Modules** and **Electricity Storage Modules**) are obliged to provide; and,

(b) **HVDC System Owners** are obliged to have the capability to supply;

(c) **Generators** in respect of **Medium Power Stations** (except **Embedded Medium Power Stations**) are obliged to provide in respect of **Reactive Power** only:

and Part 2 lists the **System Ancillary Services** which **Generators** will provide only if agreement to provide them is reached with **The Company**:

Part 1

(a) **Reactive Power** supplied (in accordance with ECC.6.3.2)

(b) **Frequency** Control by means of **Frequency** sensitive generation - ECC.6.3.7 and BC3.5.1

Part 2

(c) **Frequency** Control by means of **Fast Start** - ECC.6.3.14

(d) **Black Start Capability** or **Anchor Plant Capability** - ECC.6.3.5

(e) **System to Generator Operational Intertripping**

ECC.8.2 Commercial Ancillary Services

Other **Ancillary Services** are also utilised by **The Company** in operating the **Total System** if these have been agreed to be provided by a **User** (or other person) under an **Ancillary Services Agreement** or under a **Bilateral Agreement**, with payment being dealt with under an **Ancillary Services Agreement** or in the case of **Externally Interconnected System Operators** or **Interconnector Users**, under any other agreement (and in the case of **Externally Interconnected System Operators** and **Interconnector Users** includes ancillary services equivalent to or similar to **System Ancillary Services**) ("**Commercial Ancillary Services**"). The capability for these **Commercial Ancillary Services** is set out in the relevant **Ancillary Services Agreement** or **Bilateral Agreement** (as the case may be).

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Extracts from Operating Code 5

OPERATING CODE NO. 5

(OC5)

TESTING AND MONITORING

CONTENTS

OC5.1 INTRODUCTION

Operating Code No. 5 ("**OC5**") specifies the procedures to be followed by **The Company** in carrying out:

(a) monitoring

(i) of **BM Units** against their expected input or output;

(ii) of compliance by **Users** with the **CC** or **ECC** as applicable and in the case of response to **Frequency**, **BC3**; and

(iii) of the provision by **Users** of **Ancillary Services** which they are required or have agreed to provide; and

(b) the following tests (which are subject to **System** conditions prevailing on the day):

(i) tests on **Gensets**, **CCGT Modules**, **Power Generating Modules, Power Park Modules**, **DC Converters, HVDC Equipment**, **OTSUA** (prior to the **OTSUA Transfer Time**) and **Generating Units** (excluding **Power Park Units**) to test that they have the capability to comply with the **CC** and **ECC**, and in the case of response to **Frequency**, **BC3** and to provide the **Ancillary Services** that they are either required or have agreed to provide;

(ii) tests on **BM Units**, to ensure that the **BM Units** are available in accordance with their submitted **Export and Import Limits** and **Dynamic Parameters**.

The **OC5** tests include the procedures relating to **Black Start Tests** and procedures relating to testing **Anchor Plant** in respect of a **Distribution Restoration Zones**.

OC5 also specifies in OC5.8 the procedures which apply to the monitoring and testing of **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** and **Embedded DC Converter Stations (or Embedded HVDC Equipment)** not subject to a **Bilateral Agreement**.

In respect of a **Cascade Hydro Scheme** the provisions of **OC5** shall be applied as follows:

(a) in respect of the **BM Unit** for the **Cascade Hydro Scheme** the parameters referred to at OC5.4.1 (a) and (c) in respect of **Commercial Ancillary Services** will be monitored and tested;

(b) in respect of each **Genset** forming part of the **Cascade Hydro Scheme** the parameters referred to at OC5.4.1 (a), (b) and (c) will be tested and monitored. In respect of OC5.4.1 (a) the performance of the **Gensets** will be tested and monitored against their expected input or output derived from the data submitted under BC1.4.2(a)(2). Where necessary to give effect to the requirements for **Cascade Hydro Schemes** in the following provisions of **OC5** the term **Genset** will be read and construed in the place of **BM Unit**.

In respect of **Embedded Exemptable Large Power Stations** the provisions of **OC5** shall be applied as follows:

(a) where there is a **BM Unit** registered in the **BSC** in respect of **Generating Units** the provisions of **OC5** shall apply as written;

(b) in all other cases, in respect of each **Power Generating Module,** and/or **Generating Unit** and **HVDC Equipment** the parameters referred to at OC5.4.1(a), (b) and (c) will be tested and monitored. In respect of OC5.4.1(a) the performance of the **Power Generating Module** and/or **Generating Unit** and **HVDC Equipment** will be tested and monitored against their expected input or output derived from the data submitted under BC1.4.2(a)(2). Where necessary to give effect to the requirements for such **Embedded Exemptable Large Power Stations** in the provisions of **OC5** the term **Generating Unit** will be read and construed in place of **BM Unit**.

OC5.2 OBJECTIVE

The objectives of **OC5** are to establish:

(a) that **Users** comply with the **CC** or **ECC** as applicable (including in the case of **OTSUA** prior to the **OTSUA Transfer Time**);

(b) whether **BM Units** operate in accordance with their expected input or output derived from their **Final Physical Notification Data** and agreed **Bid-Offer Acceptances** issued under **BC2**;

(c) whether each **BM Unit** is available as declared in accordance with its submitted **Export and Import Limits** and **Dynamic Parameters**; and

(d) whether **Generators**, **DC Converter Station** owners, **HVDC Equipment Owners** and **Suppliers** can provide those **Ancillary Services** which they are either required or have agreed to provide.

In certain limited circumstances as specified in this **OC5** the output of **CCGT Units** may be verified, namely the monitoring of the provision of **Ancillary Services** and the testing of **Reactive Power** and automatic **Frequency Sensitive Operation**.

OC5.3 SCOPE

OC5 applies to **The Company** and to **Users**, which in **OC5** means:

(a) **Generators** (including those undertaking **OTSDUW**);

(b) **Network Operators**;

(c) **Non-Embedded Customers**;

(d) **Suppliers**; and

(e) **DC Converter Station** owners or **HVDC Equipment Owners**.

OC5.4 MONITORING

OC5.4.1 Parameters to be monitored

The Company will monitor the performance of:

(a) **BM Units** against their expected input or output derived from their **Final Physical Notification Data** and agreed **Bid-Offer Acceptances** issued under **BC2**;

(b) compliance by **Users** with the **CC** or **ECC** as applicable; and

(c) the provision by **Users** of **Ancillary Services** which they are required or have agreed to provide.

OC5.4.2 Procedure For Monitoring

OC5.4.2.1 In the event that a **BM Unit** fails persistently, in **The Company's** reasonable view, to follow, in any material respect, its expected input or output or a **User** fails persistently to comply with the **CC** or **ECC** as applicable and in the case of response to **Frequency**, **BC3** or to provide the **Ancillary Services** it is required, or has agreed, to provide, **The Company** shall notify the relevant **User** giving details of the failure and of the monitoring that **The Company** has carried out.

OC5.4.2.2 The relevant **User** will, as soon as possible, provide **The Company** with an explanation of the reasons for the failure and details of the action that it proposes to take to:

(a) enable the **BM Unit** to meet its expected input or output or to provide the **Ancillary Services** it is required or has agreed to provide, within a reasonable period, or

(b) in the case of a **Power Generating Module**, **Generating Unit** (excluding a **Power Park Unit**), **CCGT Module**, **Power Park Module**, **OTSUA** (prior to the **OTSUA Transfer Time**), **HVDC Equipment** or **DC Converter** to comply with the **CC** or **ECC** as applicable and in the case of response to **Frequency**, **BC3** or to provide the **Ancillary Services** it is required or has agreed to provide, within a reasonable period.

OC5.4.2.3 **The Company** and the **User** will then discuss the action the **User** proposes to take and will endeavour to reach agreement as to:

(a) any short term operational measures necessary to protect other **Users**; and

(b) the parameters which are to be submitted for the **BM Unit** and the effective date(s) for the application of the agreed parameters.

OC5.4.2.4 In the event that agreement cannot be reached within 10 days of notification of the failure by **The Company** to the **User**, **The Company** or the **User** shall be entitled to require a test, as set out in OC5.5 and OC5.6, to be carried out.

OC5.5 PROCEDURE FOR TESTING

OC5.5.1 The Company's Instruction fFor Testing

OC5.5.1.1 **The Company** may at any time (although not normally more than twice in any calendar year in respect of any particular **BM Unit**) issue an instruction requiring a **User** to carry out a test, provided **The Company** has reasonable grounds of justification based upon:

(a) a failure to agree arising from the process in CP.8.1 or ECP.8.1; or

(b) monitoring carried out in accordance with OC5.4.2.

OC5.5.1.2 The test, referred to in OC5.5.1.1 and carried out at a time no sooner than 48 hours from the time that the instruction was issued, on any one or more of the **User's BM Units** should only be to demonstrate that the relevant **BM Unit**:

(a) if active in the **Balancing Mechanism**, meets the ability to operate in accordance with its submitted **Export and Import Limits** and **Dynamic Parameters** and achieve its expected input or output which has been monitored under OC5.4; and

(b) meets the requirements of the paragraphs in the **CC** which are applicable to such **BM Units**; and

in the case of a **BM Unit** comprising a **Generating Unit**, a **CCGT Module**, a **Power Park Module**, a **Power Generating Module**, **HVDC System** or a **DC Converter** meets,

(c) the requirements for operation in **Frequency Sensitive Mode** and compliance with the requirements for operation in **Limited Frequency Sensitive Mode** in accordance with CC.6.3.3, ECC.6.3.3, CC.6.3.7, ECC.6.3.7, BC3.5.2 and BC3.7.2; or

(d) the terms of the applicable **Bilateral Agreement** agreed with the **Generator** to have a **Fast Start Capability**; or

(e) the **Reactive Power** capability registered with **The Company** under **OC2** which shall meet the requirements set out in CC.6.3.2 or ECC.6.3.2 as applicable. In the case of a test on a **Generating Unit** within a **CCGT Module** the instruction need not identify the particular **CCGT Unit** within the **CCGT Module** which is to be tested, but instead may specify that a test is to be carried out on one of the **CCGT Units** within the **CCGT Module**.

OC5.5.1.3 (a) The instruction referred to in OC5.5.1.1 may only be issued if the relevant **User** has submitted **Export and Import Limits** which notify that the relevant **BM Unit** is available in respect of the **Operational Day** current at the time at which the instruction is issued. The relevant **User** shall then be obliged to submit **Export and Import Limits** with a magnitude greater than zero for that **BM Unit** in respect of the time and the duration that the test is instructed to be carried out, unless that **BM Unit** would not then be available by reason of forced outage or **Planned Outage** expected prior to this instruction.

(b) In the case of a **CCGT Module** the **Export and Import Limits** data must relate to the same **CCGT Units** which were included in respect of the **Operational Day** current at the time at which the instruction referred to in OC5.5.1.1 is issued and must include, in relation to each of the **CCGT Units** within the **CCGT Module**, details of the various data set out in BC1.A.1.3 and BC1.A.1.5, which parameters **The Company** will utilise in instructing in accordance with this **OC5** in issuing **Bid-Offer Acceptances**. The parameters shall reasonably reflect the true operating characteristics of each **CCGT Unit**.

(c) The test referred to in OC5.5.1.1 will be initiated by the issue of instructions, which may be accompanied by a **Bid-Offer Acceptance**, under **BC2** (in accordance with the **Export and Import Limits** and **Dynamic Parameters** which have been submitted for the day on which the test was called, or in the case of a **CCGT Unit**, in accordance with the parameters submitted under OC5.5.1.3(b)). The instructions in respect of a **CCGT Unit** within a **CCGT Module** will be in respect of the **CCGT Unit**, as provided in BC2.

OC5.5.2 User Request For Testing

OC5.5.2.1 Where a **GB Code User** undertakes a test to demonstrate compliance with the **Grid Code** and **Bilateral Agreement** in accordance with CP.6 or CP.7 or CP.8 (other than a failure between **The Company** and a **GB Code User** to agree in CP.8.1 where OC5.5.1.1 applies) the **GB Code User** shall request permission to test using the process laid out in OC7.5.

OC5.5.2.2 Where an **EU Code User** undertakes a test to demonstrate compliance with the **Grid Code** and **Bilateral Agreement** in accordance with ECP.6.1, ECP.6.2, ECP.6.3 or ECP.7 or ECP.8 (other than a failure between **The Company** and a **EU Code User** to agree in ECP.8.1 where OC5.5.1.1 applies) the **EU Code User** shall request permission to test using the process laid out in OC7.5.

OC5.5.3 Conduct oOf Test

OC5.5.3.1 The performance of the **BM Unit** will be recorded at **Transmission Control Centres** notified by **The Company** with monitoring at site when necessary, from voltage and current signals provided by the **User** for each **BM Unit** under CC.6.6.1 or ECC.6.6.1 as applicable.

OC5.5.3.2 If monitoring at site is undertaken, the performance of the **BM Unit** will be recorded on a suitable recorder (with measurements, in the case of a **Synchronous Generating Unit** (which could be part of a **Synchronous Power Generating Module**), taken on the **Generating Unit** Stator Terminals / on the **LV** side of the generator transformer) or in the case of a **Non-Synchronous Generating Unit** (excluding **Power Park Units**), **Power Generating Module**, **Power Park Module** or **HVDC Equipment** or **DC Converter** at the point of connection (including where the **OTSUA** is operational prior to the **OTSUA Transfer Time**, the **Transmission Interface Point**) in the relevant **User's Control Room**, in the presence of a reasonable number of representatives appointed and authorised by **The Company**. If **The Company** or the **User** requests, monitoring at site will include measurement of the parameters set out in OC5.A.1.2 or OC5.A.1.3 or ECP.A4.2 or ECP.A.4.3 as appropriate.

OC5.5.3.3 The **User** is responsible for carrying out the test and retains the responsibility for the safety of personnel and plant during the test.

OC5.5.4 Test aAnd Monitoring Assessment

The criteria must be read in conjunction with the full text under the Grid Code reference. The **BM Unit**, **Power Generating Module**, **CCGT Module**, **Power Park Module** or **Generating Unit** (excluding **Power Park Units**), **HVDC Equipment** and **DC Converters** and **OTSUA** will pass the test- the criteria below are met:

Parameter to be Tested		Criteria against which the test results will be assessed by The Company.
Voltage Quality	Harmonic Content	CC.6.1.5(a) or ECC.6.1.5(a)— Measured harmonic emissions do not exceed the limits specified in the **Bilateral Agreement** or where no such limits are specified, the relevant planning level specified in **Engineering Recommendation G5**.
	Phase Unbalance	CC.6.1.5(b) or ECC.6.1.5(b), The measured maximum **Phase (Voltage) Unbalance** on the **National Electricity Transmission System** should remain, in England and Wales, below 1% and, in Scotland, below 2% and **Offshore** will be defined in relevant **Bilateral Agreement**. CC.6.1.6 or ECC.6.1.6 In England and Wales, measured infrequent short duration peaks in **Phase (Voltage) Unbalance** should not exceed the maximum value stated in the **Bilateral Agreement**.
	Rapid Voltage Change	CC.6.1.7(a) or ECC.6.1.7(a) The measured Rapid Voltage Change– at the **Point of Common Coupling** shall not exceed the Planning Levels specified in CC.6.1.7(a) or ECC 6.1.7.(i)
	Flicker Severity	CC.6.1.7(j) or ECC.6.1.7(j) The measured Flicker Severity at the **Point of Common Coupling** shall not exceed the limits specified in the table of CC.6.1.7(j) or ECC 6.1.7(j).

Parameter to be Tested		Criteria against which the test results will be assessed by The Company.
	Voltage Fluctuation	CC.6.1.8 or ECC.6.1.8 **Offshore**, measured voltage fluctuations at the **Point of Common Coupling** shall not exceed the limits set out in the **Bilateral Agreement**.
Fault Clearance	Fault Clearance Times	CC.6.2.2.2.2(a), CC.6.2.3.1.1(a), ECC.6.2.2.2.2(a), ECC.6.2.3.1.1(a), **Bilateral Agreement**
	Back Up Protection	CC.6.2.2.2.2(b), CC.6.2.3.1.1(b), ECC.6.2.2.2.2(a), ECC.6.2.3.1.1(a), **Bilateral Agreement**
	Circuit Breaker Fail **Protection**	CC.6.2.2.2.2(c), CC.6.2.3.1.1(c), ECC.6.2.2.2.2(c), ECC.6.2.3.1.1(c)
	Reactive Capability	CC.6.3.2 or ECC.6.3.2 (and in the case of CC.6.3.2(e)(iii) and ECC.6.3.2.5 and ECC.6.3.2.6, the **Bilateral Agreement**), CC.6.3.4 or ECC.6.3.4, **Ancillary Services Agreement**. For a test initiated under OC.5.5.1.1 the **Power Generating Module**, **Generating Unit**, **HVDC Equipment**, **DC Converter** or **Power Park Module** or (prior to the **OTSUA Transfer Time**) **OTSUA** will pass the test if it is within ±5% of the reactive capability registered with **The Company** under **OC2**. The duration of the test will be for a period of up to 60 minutes during which period the system voltage at the **Grid Entry Point** for the relevant **Power Generating Module**, **Generating Unit**, **HVDC Equipment**, **DC Converter** or **Power Park Module** or **Interface Point** in the case of **OTSUA** will be maintained by the **Generator** or **HVDC System Owner**, **DC Converter Station** owner at the voltage specified pursuant to BC2.8 by adjustment of **Reactive Power** on the remaining **Power Generating Module**, **Generating Unit**, **HVDC Equipment**, **DC Converter** or **Power Park Modules** or **OTSUA**, if necessary. Any test performed in respect of an **Embedded Medium Power Station** not subject to a **Bilateral Agreement** or, an **Embedded DC Converter Station** or **Embedded HVDC System** not subject to a **Bilateral Agreement** shall be as confirmed pursuant to OC5.8.3. Measurements of the **Reactive Power** output under steady state conditions should be consistent with Grid Code requirements i.e. fully available within the voltage range ±5% at all voltages.
Governor /	Primary Secondary and High **Frequency** Response	**Ancillary Services Agreement**, CC.6.3.7 and where applicable CC.A.3 or ECC.6.3.7 and where applicable ECC.A.3.

Parameter to be Tested		Criteria against which the test results will be assessed by The Company.
		For a test initiated under OC.5.5.1.1 the measured response in MW/Hz is within ±5% of the level of response specified in the **Ancillary Services Agreement** for that **Genset**.
	Stability with Voltage	CC.6.3.4 or ECC.6.3.4
	Governor / Load / **Frequency** Controller **System** Compliance	CC.6.3.6(a), CC.6.3.7, CC.6.3.9, CC.8.1, where applicable CC.A.3, BC3.5, BC3.6, BC3.7 or ECC.6.3.6, ECC.6.3.7, ECC.6.3.9, ECC8.1, where applicable ECC.A.3, BC3.5, BC3.6, BC3.7
	Output at Reduced **System Frequency**	CC.6.3.3 or ECC.6.3.3 - For variations in **System Frequency** exceeding 0.1Hz within a period of less than 10 seconds, the **Active Power** output is within ±0.2% of the requirements of CC.6.3.3 or ECC.6.3.3 when monitored at prevailing external air temperatures of up to 25ºC., BC3.5.1
	Fast Start	**Ancillary Services Agreement** requirements
	Black Start	OC5.7
	Excitation/Voltage **Control System**	CC.6.3.6(b), CC.6.3.8, CC.A.6 or CC.A.7 as applicable, BC2.11.2, and the **Bilateral Agreement** or ECC.6.3.6, ECC.6.3.8, ECC.A.6 or ECC.A.7 or ECC.A.8 as applicable
	Fault Ride Through and Fast Fault Current Injection	CC.6.3.15, CC.A.4.A or CC.A.4.B as applicable or ECC.6.3.15, ECC.6.3.16, ECC.A.4. or ECC.A.4EC as applicable
Dynamic Parameters	**Export and Import Limits**, and **Dynamic Parameters**	BC2 The **Export and Import Limits Dynamic Parameters** under test are within 2½% of the declared value being tested.
	Synchronisation time	BC2.5.2.3 **Synchronisation** takes place within ±5 minutes of the time it should have achieved **Synchronisation**.

Parameter to be Tested		Criteria against which the test results will be assessed by The Company.
	Run-up rates	BC2 Achieves the instructed output and, where applicable, the first and/or second intermediate breakpoints, each within ±3 minutes of the time it should have reached such output and breakpoints from **Synchronisation** (or break point, as the case may be), calculated from the run-up rates in its **Dynamic Parameters**.
	Run-down rates	BC2 Achieves the instructed output and, where applicable, the first and/or second intermediate breakpoints, each within ±5 minutes of the time it should have reached such output and breakpoints from **Synchronisation** (or break point, as the case may be), calculated from the run-up rates in its **Dynamic Parameters**.
	Demand Response	DRSC.11.7 **Non-Embedded Customers** and **BM Participants** who are also **Demand Response Providers** shall execute a demand modification test when requested as per DRSC.11.7 to ensure the requirements of the **Ancillary Services** agreement and **Demand Response Services Code** are satisfied.

OC5.5.4.1 The duration of the **Dynamic Parameter** tests in the above table will be consistent with and sufficient to measure the relevant expected input or output derived from the **Final Physical Notification Data** and **Bid-Offer Acceptances** issued under **BC2** which are still in dispute following the procedure in OC5.4.2.

OC5.5.4.2 Due account will be taken of any conditions on the **System** which may affect the results of the test. The relevant **User** must, if requested, demonstrate, to **The Company's** reasonable satisfaction, the reliability of the suitable recorders, disclosing calibration records to the extent appropriate.

OC5.5.5 Test Failure / Re-test

OC5.5.5.1 If the **BM Unit**, **Power Generating Module**, **CCGT Modules**, **Power Park Module**, **OTSUA**, or **Generating Unit** (excluding **Power Park Units**), **HVDC Equipment** or **DC Converter Station** concerned fails to pass the test instructed by **The Company** under OC5.5.1.1 the **User** must provide **The Company** with a written report specifying in reasonable detail the reasons for any failure of the test so far as they are then known to the **User** after due and careful enquiry. This must be provided within five **Business Days** of the test.

OC5.5.5.2 If in **The Company's** reasonable opinion the failure to pass the test relates to compliance with the **CC** or **ECC** as applicable then **The Company** may invoke the process detailed in CP.8.2 to CP.9, or ECP.8.2 to ECP.9

OC5.5.5.3 If a dispute arises relating to the failure, **The Company** and the relevant **User** shall seek to resolve the dispute by discussion, and, if they fail to reach agreement, the **User** may by notice require **The Company** to carry out a re-test on 48 hours' notice which shall be carried out following the procedure set out in OC5.5.3 and OC5.5.4 and subject as provided in OC5.5.1.3, as if **The Company** had issued an instruction at the time of notice from the **User**.

OC5.5.6 Dispute Following Re-Test

If the **BM Unit**, **Power Generating Module**, **CCGT Module**, **Power Park Module**, **OTSUA**, or **Generating Unit** (excluding **Power Park Units**), **HVDC Equipment** or **DC Converter** in **The Company's** view fails to pass the re-test and a dispute arises on that re-test, either party may use the **Disputes Resolution Procedure** for a ruling in relation to the dispute, which ruling shall be binding.

OC5.6 DISPUTE RESOLUTION

OC5.6.1 If following the procedure set out in OC5.5 it is accepted that the **BM Unit**, **Power Generating Module, CCGT Module**, **Power Park Module**, **OTSUA** (prior to the **OTSUA Transfer Time**) or **Generating Unit** (excluding **Power Park Units**)), **HVDC Equipment** or **DC Converter** has failed the test or re-test (as applicable), the **User** shall within 14 days, or such longer period as **The Company** may reasonably agree, following such failure, submit in writing to **The Company** for approval the date and time by which the **User** shall have brought the **BM Unit** concerned to a condition where it complies with the relevant requirement. **The Company** will not unreasonably withhold or delay its approval of the **User's** proposed date and time submitted. Should **The Company** not approve the **User's** proposed date or time (or any revised proposal), the **User** should amend such proposal having regard to any comments **The Company** may have made and re-submit it for approval.

OC5.6.2 If a **BM Unit** fails the test, the **User** shall submit revised **Export and Import Limits** and/or **Dynamic Parameters**, or in the case of a **BM Unit** comprising a **Generating Unit**, **Power Generating Module, CCGT Module**, **HVDC Equipment**, **DC Converter**, **OTSUA** (prior to the **OTSUA Transfer Time**) or **Power Park Module**, the **User** may amend, with **The Company's** approval, the relevant registered parameters of that **Generating Unit**, **Power Generating Module**, **CCGT Module**, **HVDC Equipment**, **DC Converter**, **OTSUA** (prior to the **OTSUA Transfer Time**) or **Power Park Module**, as the case may be, relating to the criteria, for the period of time until the **BM Unit** can achieve the parameters previously registered, as demonstrated in a re-test.

OC5.6.3 Once the **User** has indicated to **The Company** the date and time that the **BM Unit**, **Power Generating Module**, **CCGT Module**, **Power Park Module**, **Generating Unit** (excluding **Power Park Units**) or **OTSUA** (prior to the **OTSUA Transfer Time**), **HVDC Equipment** or **DC Converter Station** can achieve the parameters previously registered or submitted, **The Company** shall either accept this information or require the **User** to demonstrate the restoration of the capability by means of a repetition of the test referred to in OC5.5.3 by an instruction requiring the **User** on 48 hours notice to carry out such a test. The provisions of this OC5.6 will apply to such further test.

OC5.7 BLACK START TESTING

OC5.7.1 General

As provided for in OC9.1.1 there are two ways in which the **Total System** (or de-energised **System** in the case of a **Partial Shutdown**) can be re-established. These being a top down approach using **Local Joint Restoration Plans** or a bottom up approach using one or more **Distribution Restoration Zone Plans**. In practice, and in order to re-establish the **Total System** and **User's Demand** to normal operational conditions in the shortest possible time and in the most reliable way, it is expected that **The Company** would initiate a top down and bottom up approach in parallel.

To achieve this objective, it is essential that **Black Start Providers** or **Anchor Plant Owners**, test their **Plant** and **Apparatus** at regular intervals to demonstrate that there is a high level of confidence that they will be able to satisfy the requirements of the Grid Code and **Black Start Contract** or **Distribution Restoration Contract** should the need arise.

OC5.7.1.1 General Requirements applicable to Black Start Providers forming part of a Local Joint Restoration Plan

(a) **The Company** shall require a **Black Start Service Provider** to carry out a **Black Start Test** in order to demonstrate that a **Black Start Station** or **Black Start HVDC System** has a **Black Start Capability**.

(i) In the case of a **Generator**, **The Company** shall require a **Generator** with a **Black Start Station** to carry out a test (either a "**Black Start Unit Test"** or a **Black Start Station Test**") in order to demonstrate that a **Black Start Station** has a **Black Start Capability**.

(ii) In the case of an **HVDC System Owner** or **DC Converter Station Owner**, **The Company** shall require an **HVDC System Owner** or **DC Converter Station Owner** with a **Black Start HVDC System** to carry out a test (a "**Black Start HVDC Test**") on a **HVDC System** or **DC Converter**, in order to demonstrate that a **Black Start HVDC System** has a **Black Start Capability**.

(iii) In the case of an **EU Generator**, **The Company** may also require a **Generator** with a **Black Start Station** to carry out a test (a **Quick Resynchronisation Unit Test**) in order to demonstrate that a **Black Start Station** has a **Quick Re-Synchronisation Capability**.

(b) Where **The Company** requires a **Black Start Service Provider** to undertake testing, the following requirements shall apply:-

(i) Where **The Company** requires a **Generator** with a **Black Start Station** to carry out a **Black Start Unit Test**, on each **Genset,** which has **Black Start Capability**, within such a **Black Start Station**, the **Generator** shall execute such a test- at least once every three years. **The Company** shall not require the **Black Start Test Unit** to be carried out on more than one **Genset** at that **Black Start Station** at the same time, and would not, in the absence of exceptional circumstances, expect any of the other **Gensets** at the **Black Start Station** to be directly affected by the **Black Start Unit Test**.

(ii) **The Company** may occasionally require the **Generator** to carry out a **Black Start Station Test** at any time (but will not require a **Black Start Station Test** to be carried out more than once in every three calendar years in respect of any particular **Genset** unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test). If successful, this **Black Start Station Test** shall count as a successful **Black Start Unit Test** for the **Genset** used in the test.

(iii) **The Company** may require the **HVDC System Owner** or **DC Converter Station Owner** to carry out a **Black Start HVDC Test** at any time (but will not require such a test to be carried out more than once in every three calendar years unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test).

(iv) The **Company** may occasionally require the **EU Generator** to carry out a **Quick Re-Synchronisation Test** at any time, but will generally only be required where the **EU Generator** has made a change to its **Plant** and **Apparatus** which has an impact on its **Houseload Operation** or after two unsuccessful tripping **Events** in the operational environment.

The above tests will be deemed a success where starting from **Shutdown** is achieved within a time frame specified by **The Company** and which may be agreed in the **Black Start Contract**.

(c) **The Company** may require a **Generator** to carry out a **Black Start Unit Test** at any time (but will not require a **Black Start Unit Test** to be carried out more than once in each calendar year in respect of any particular **Genset** unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test).

(d) When **The Company** wishes a **Black Start Service Provider** to carry out a **Black Start Test**, it shall notify the relevant **Black Start Service Provider** at least 7 days prior to the time of the **Black Start Test** with details of the proposed **Black Start Test**.

OC5.7.1.2 General Requirements applicable to Anchor Plant Owners forming part of a Distribution Restoration Zone Plan

(a) **The Company** shall require a **Network Operator** in coordination with an **Anchor Plant Owner** to carry out tests in order to demonstrate that an **Anchor Plant** has an **Anchor Plant Capability**. Prior to any test taking place, the **Network Operator** shall ensure its **System** is appropriately configured to undertake the test.

(i) In the case of an **Anchor Generator**, **The Company** shall require a **Network Operator** to instruct an **Anchor Generator** to carry out a test (either a "**Anchor Generating Unit Test"** or an **Anchor Power Station Test**") in order to demonstrate that an **Anchor Power Station** has an **Anchor Plant Capability**.

(ii) In the case of an **Anchor HVDC System Owner** or **Anchor DC Converter Owner**, **The Company** shall require a **Network Operator** to instruct an **Anchor HVDC System Owner** or **Anchor DC Converter Owner** with an **Anchor HVDC System** or **Anchor DC Converter** to carry out a test (an "**Anchor HVDC Test**" or **Anchor DC Converter Test**) on a **HVDC System** or **DC Converter**, in order to demonstrate that it has an **Anchor Plant Capability**.

(iii) Where applicable, **The Company** may also require a **Network Operator** to instruct an **Anchor Generator** to carry out a test a **Quick Resynchronisation Unit Test** on its **Anchor Generating Unit** in order to demonstrate that it has a **Quick Re-Synchronisation Capability**.

(b) Where **The Company** requires an **Anchor Plant** to undertake testing, the following requirements shall apply:-

(i) **The Company** shall instruct the relevant **Network Operator** to instruct an **Anchor Generator** with an **Anchor Power Station** to carry out a**n Anchor Generating Unit Test**, on each **Anchor Generating Unit**, within such an **Anchor Power Station**. The test is required to be conducted at least once every three years. **The Company** shall not require the **Network Operator** to instruct the **Anchor Generating Unit Test** to be carried out on more than one **Anchor Generating Unit** at that **Anchor Power Station** at the same time, and would not, in the absence of exceptional circumstances, expect any of the other **Anchor Generating Units** at the **Anchor Power Station** to be directly affected by the **Anchor Generating Unit Test**.

(ii) **The Company** may occasionally require the **Network Operator** to instruct an **Anchor Generator** to carry out an **Anchor Power Station Test** at any time (but will not require an **Anchor Power Station Test** to be carried out more than once in every three calendar years in respect of any particular **Anchor Generating Unit** unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test). If successful, this **Anchor Power Station Test** shall count as a successful **Anchor Generating Unit Test** for the **Anchor Generating Unit** used in the test.

(iii) **The Company** may require the **Network Operator** to instruct an **Anchor HVDC System Owner** or **Anchor DC Converter Owner** to carry out an **Anchor HVDC Test** at any time (but will not require such a test to be carried out more than once in every three calendar years unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test).

(iv) The **Company** may occasionally require a **Network Operator** to instruct an **EU Generator** which is also an **Anchor Generator** to carry out a **Quick Re-Synchronisation Test** at any time, but will generally only be required where such an **Anchor Generator** has made a change to its **Plant** and **Apparatus** which has an impact on its **Houseload Operation** or after two unsuccessful tripping **Events** in the operational environment.

The above tests defined in OC5.7.1.2 (b)(i) – (iv) will be deemed a success where stable operation is achieved within a time frame which may be specified in the **Distribution Restoration Contract**.

(c) **The Company** may require a **Network Operator** to instruct an **Anchor Generator** to carry out an **Anchor Generating Unit Test** at any time (but will not require an **Anchor Generating Unit Test** to be carried out more than once in each calendar year in respect of any particular **Anchor Generating Unit** unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test).

(d) When **The Company** wishes a **Network Operator** to instruct an **Anchor Plant Owner** to carry out an **Anchor Plant Test**, the **Network Operator** shall notify the relevant **Anchor Plant Owner** at least 7 days prior to the time of the **Anchor Plant Test** with details of the proposed **Anchor Plant Test**.

OC5.7.2 Procedure for a Black Start Tests in respect of Local Joint Restoration Plans and Anchor Plant in respect of Distribution Restoration Zone Plans

For **Black Start Service Providers** ,who own and operate **Plant** with a **Black Start Capability** the procedure for **Black Start –Tests** will, so far as practicable, be carried out in accordance with the applicable requirements and sequence defined in OC5.7.2.1 to OC5.7.2.9 and OC5.7.3

For **Anchor Plant Owners** who own and operate **Anchor Plant** forming part of a **Distribution Restoration Zone**, the procedure for **Anchor Plant Tests** are detailed in OC5.7.4, For the avoidance of doubt, **Anchor Plant Owners** are therefore not required to satisfy the requirements of OC5.7.2.1 to OC5.7.2.9 and OC5.7.3.

OC5.7.2.1 Black Start Unit Tests

(a) The relevant **Generating Unit** shall be **Synchronised** and **Loaded**;

(b) All the **Auxiliary Gas Turbines** and/or **Auxiliary Diesel Engines** in the **Black Start Station** in which that **Generating Unit** is situated, shall be **Shutdown**.

(c) The **Generating Unit** shall be **De-Loaded** and **De-Synchronised** and all alternating current electrical supplies to its **Auxiliaries** shall be disconnected.

(d) The **Auxiliary Gas Turbine(s)** or **Auxiliary Diesel Engine(s)** to the relevant **Generating Unit** shall be started, and shall re-energise the **Unit Board** of the relevant **Generating Unit**.

(e) The **Auxiliaries** of the relevant **Generating Unit** shall be fed by the **Auxiliary Gas Turbine(s)** or **Auxiliary Diesel Engine(s)**, via the **Unit Board**, to enable the relevant **Generating Unit** to return to **Synchronous Speed**.

(f) The relevant **Generating Unit** shall be **Synchronised** to the **System** but not **Loaded**, unless the appropriate instruction has been given by **The Company** under **BC2** which would also be in accordance with the requirements of the **Black Start Contract**.

(g) In respect of **EU Generators**, the above tests defined in OC5.7.2.1(a) – (e) shall be in accordance with the requirements of ECC.6.3.5.3.

OC5.7.2.2 Black Start Station Test

(a) All **Generating Units** at the **Black Start Station**, other than the **Generating Unit** on which the **Black Start Test** is to be carried out, and all the **Auxiliary Gas Turbines** and/or **Auxiliary Diesel Engines** at the **Black Start Station**, shall be **Shutdown**.

(b) The relevant **Generating Unit** shall be **Synchronised** and **Loaded**.

(c) The relevant **Generating Unit** shall be **De-Loaded** and **De-Synchronised**.

(d) All external alternating current electrical supplies to the **Unit Board** of the relevant **Generating Unit**, and to the **Station Board** of the relevant **Black Start Station**, shall be disconnected.

(e) An **Auxiliary Gas Turbine** or **Auxiliary Diesel Engine** at the **Black Start Station** shall be started, and shall re-energise either directly, or via the **Station Board**, the **Unit Board** of the relevant **Generating Unit**.

(f) The provisions of OC5.7.2.1 (e) and (f) shall thereafter be followed.

(g) In respect of **EU Generators**, the above tests defined in OC5.7.2.2(a) – (e) shall be in accordance with the requirements of ECC.6.3.5.3.

OC5.7.2.3 Procedure for a **Black Start HVDC Test**

a) The **HVDC System** or **DC Converter Station** shall demonstrate its technical capability to energise the busbar of the de-energised AC substation to which it is connected, within the **GB Synchronous Area** within a timeframe specified by **The Company**. In the case of **HVDC Systems** this shall be in accordance with the requirements of ECC.6.3.5.4. As part of this test, all **Auxiliaries** are required to be derived from within the **HVDC System** or **DC Converter Station**.

b) The test shall be carried out while the **HVDC System** or **DC Converter Station** starts from **Shutdown**;

c) The test shall be deemed passed, provided that the following conditions are cumulatively fulfilled:

i) The **HVDC System Owner** has demonstrated its **HVDC System** or **DC Converter Station** is able to energise the busbar of the isolated AC-substation to which it is connected within the **GB Synchronous Area**

ii) The **HVDC System** or **DC Converter Station** can achieve a stable operating point at an agreed capacity as agreed with **The Company**. The relevant **HVDC System** or **DC Converter Station** can be connected to the **System** but not **Loaded**, unless appropriate instructions are given by **The Company** under **BC2** which would also be in accordance with the requirements of the **Black Start Contract**.

iii) In respect of **HVDC Systems** and **Remote End HVDC Converter Stations**, the above tests defined in OC5.7.2.3(a) – (c) shall be in accordance with the requirements of, ECC.6.1.2, ECC.6.1.4, ECC.6.2.2.9.4 and ECC.6.3.5.4.

iv) In respect of **DC Converter Stations**, the above tests defined in OC5.7.2.3(a) – (c) shall be in accordance with the requirements of, CC.6.1.2, CC.6.1.3 and CC.6.1.4.

OC5.7.2.4 All **Black Start Tests** shall be carried out at the time specified by **The Company** in the notice given under OC5.7.1 and shall be undertaken in the presence of a reasonable number of representatives appointed and authorised by **The Company**, who shall be given access to all information relevant to the **Black Start Test**.

OC5.7.2.5 Failure of a Black Start Test

A **Black Start Station** or **Black Start HVDC System** shall fail a **Black Start Test** if the **Black Start Test** shows that it does not have a **Black Start Capability** (ie. if the relevant **Generating Unit** or **HVDC System** or **DC Converter** fails to be **Synchronised** to the **System** within two hours of the **Auxiliary Gas Turbine(s)** or **Auxiliary Diesel Engine(s)** being required to start unless this is part of a **Local Joint Restoration Plan** where the times will be adjusted accordingly).

OC5.7.2.6 If a **Black Start Station** or **Black Start HVDC System** fails to pass a **Black Start Test** the **Black Start Service Provider** must provide **The Company** with a written report specifying in reasonable detail the reasons for any failure of the test so far as they are then known to the **Black Start Service Provider** after due and careful enquiry. This must be provided within five **Business Days** of the test. If a dispute arises relating to the failure, **The Company** and the relevant **Black Start Service Provider** shall seek to resolve the dispute by discussion, and if they fail to reach agreement, the **Black Start Service Provider** may require **The Company** to carry out a further **Black Start Test** on 48 hours notice which shall be carried out following the procedure set out in OC5.7.2.1 or OC5.7.2.2 or OC5.7.2.3 as the case may be, as if **The Company** had issued an instruction at the time of notice from the **Black Start Service Provider.**

OC5.7.2.7 If the **Black Start Station** or **Black Start HVDC System** concerned fails to pass the re-test and a dispute arises on that re-test, either party may use the **Disputes Resolution Procedure** for a ruling in relation to the dispute, which ruling shall be binding.

OC5.7.2.8 If following the procedure in OC5.7.2.6 and OC5.7.2.7 it is accepted that the **Black Start Station** or **Black Start HVDC System** has failed the **Black Start Test** (or a re-test carried out under OC5.7.2.5), within 14 days, or such longer period as **The Company** may reasonably agree, following such failure, the relevant **Black Start Service Provider** shall submit to **The Company** in writing for approval, the date and time by which that **Black Start Service Provider** shall have brought that **Black Start Station** or **Black Start HVDC System** to a condition where it has a **Black Start Capability** and would pass the **Black Start Test**, and **The Company** will not unreasonably withhold or delay its approval of the **Black Start Service Provider's** proposed date and time submitted. Should **The Company** not approve the **Black Start Service Provider's** proposed date and time (or any revised proposal) the **Black Start Service Provider** shall revise such proposal having regard to any comments **The Company** may have made and resubmit it for approval.

OC5.7.2.9 Once the **Black Start Service Provider** has indicated to **The Company** that the **PowerStation** or **HVDC System** or **DC Converter Station** has a **Black Start Capability**, **The Company** shall either accept this information or require the **Black Start Service Provider** to demonstrate that the relevant **Black Start Station** or **Black Start HVDC System** has its **Black Start Capability** restored, by means of a repetition of the **Black Start Test** referred to in OC5.7.1.1~~(d)~~ following the same procedure as for the initial **Black Start Test**. The provisions of this OC5.7.2, will apply to such test.

OC5.7.3~~4~~ Quick Re-synchronisation Unit Test

(a) The relevant **Generating Unit** shall be **Synchronised** and **Loaded**;

(b) All the **Auxiliary Gas Turbines** and/or **Auxiliary Diesel Engines** in the **Black Start Station** in which that **Generating Unit** is situated, shall be **Shutdown**.

(c) The **Generating Unit** shall be tripped to house load**.**

(d) The relevant **Generating Unit** shall be **Synchronised** to the **System** but not **Loaded**, unless the appropriate instruction has been given by **The Company** under **BC2** which would also be in accordance with the requirements of the **Black Start Contract**.

In respect of **EU Generators**, the above tests defined in OC5.7~~.2~~.3(a) – (d~~e~~) shall be in accordance with the requirements of ECC.6.3.5.6.

OC5.7.4 Procedure for Anchor Plant Testing forming part of a Distribution Restoration Zone

The following procedure will, so far as practicable, be carried out in the following sequence for **Anchor Plant Tests**.

Anchor Plant Owners who form part of a **Distribution Restoration Zone** are required to satisfy the requirements of OC5.7.4 and not the requirements of OC5.7.2 and OC5.7.3.

All tests shall be instructed and coordinated by the **Network Operator**. The **Network Operator** shall inform **The Company** of the progress and completion of the tests following the relevant requirements of OC7.5.

All **Anchor Plant Tests** shall be carried out at the time specified by **The Company** in agreement with the **Network Operator** in the notice periods given under OC5.7.1.2(c) and (d) and shall be undertaken in the presence of a reasonable number of representatives appointed and authorised by **The Company** and/or **Network Operator**, who shall be given access to all information relevant to the **Anchor Plant Test**.

OC5.7.4.1 Anchor Generating Unit Tests

(a) Prior to the test, the **Network Operator** shall have reconfigured its **System** to enable the **Anchor Generating Unit Test** to be completed whilst having due regard for the safety of plant and personnel on its **System**.

(b) The relevant **Anchor Generating Unit** shall be **Synchronised** and **Loaded**;

(c) All the **Auxiliary Energy Supplies** in the **Anchor Power Station** in which that **Anchor Generating Unit** is situated, shall be **Shutdown**.

(d) The **Anchor Generating Unit** shall be **De-Loaded** and **De-Synchronised** and all alternating current electrical supplies to its **Auxiliaries** shall be disconnected.

(e) The **Auxiliary Energy Supplies**, to the relevant **Anchor Generating Unit** shall be started, and shall re-energise the **Unit Board** of the relevant **Anchor Generating Unit**.

(f) The **Auxiliaries** of the relevant **Anchor Generating Unit** shall be fed by the **Auxiliary Energy Supplies**, via the **Unit Board** or equivalent, to enable the relevant **Anchor Generating Unit** to return to a condition when it is ready to synchronise to the **Network Operator's System**.

(g) The relevant **Anchor Generating Unit** shall be **Synchronised** to the **System** but not **Loaded**, unless the appropriate instruction has been given by **The Company** to the **Network Operator** under **BC2** which would also be in accordance with the requirements of the **Distribution Restoration Contract**.

(h) **The Company** and **Network Operator** shall agree with the **Anchor Generator** when the test has been completed.

(i) In respect of **Anchor Generators** which are **EU Generators**, the above tests defined in OC5.7.4.1(b) – (h) shall be in accordance with the requirements of ECC.6.3.5.

OC5.7.4.2 **Anchor Power Station** Tests

(a) Prior to the test, the **Network Operator** shall have reconfigured its **System** to enable the **Anchor Generating Unit Test** to be completed whilst having due regard for the safety of plant and personnel on its **System**.

(b) All **Anchor Generating Units** at the **Anchor Power Station**, other than the **Anchor Generating Unit** on which the **Anchor Generating Unit Test** is to be carried out, and all the **Auxiliary Energy Supplies** at the **Anchor Power Station**, shall be **Shutdown**.

(c) The relevant **Anchor Generating Unit** shall be **Synchronised** and **Loaded**.

(d) The relevant **Anchor Generating Unit** shall be **De-Loaded** and **De-Synchronised**.

(e) All external alternating current electrical supplies to the **Unit Board** of the relevant **Anchor Generating Unit**, and to the **Station Board** of the relevant **Anchor Power Station**, shall be disconnected.

(f) An **Auxiliary Energy Supply** at the **Anchor Power Station** shall be started, and shall re-energise either directly, or via the **Station Board**, the **Unit Board** of the relevant **Anchor Generating Unit**.

(g) The provisions of OC5.7.4.1 (e) to (h) shall thereafter be followed.

(h) **The Company** and **Network Operator** shall agree with the **Anchor Generator** when the test has been completed.

(i) In respect of **EU Generators**, the above tests defined in OC5.7.4.2(a) – (h) shall be in accordance with the requirements of ECC.6.3.5.

OC5.7.4.3 Procedure for an **Anchor HVDC System Test** or **Anchor DC Converter Test**

a) The **Anchor HVDC System** or **Anchor DC Converter** shall demonstrate its technical capability to energise the busbar of the de-energised AC substation to which it is connected, within the **Network Operator's System** within a timeframe specified by the **Network Operator**. In the case of **Anchor HVDC Systems** this shall be in accordance with the requirements of ECC.6.3.5.4. As part of this test, all **Auxiliaries** are required to be derived from within the **Anchor HVDC System** or **Anchor DC Converter**.

b) The test shall be carried out while the **Anchor HVDC System** or **Anchor DC Converter** starts from **Shutdown**;

c) The test shall be deemed passed, provided that the following conditions are cumulatively fulfilled:

i) The **Anchor HVDC System Owner** or **Anchor DC Converter Owner** has demonstrated its **Anchor HVDC System** or **Anchor DC Converter** is able to energise the busbar of the isolated AC-substation to which it is connected within the **Network Operator's System**.

ii) The **Anchor HVDC System** or **Anchor DC Converter** can achieve a stable operating point at an agreed capacity as agreed with the **Network Operator**. The relevant **Anchor HVDC System** or **Anchor DC Converter** can be connected to the **Network Operator's System** but not **Loaded**, unless appropriate instructions have been given by **The Company** to the **Network Operator** under **BC2** which would also be in accordance with the requirements of the **Distribution Restoration Contract**.

iii) In respect of **Anchor HVDC Systems**, the above tests defined in OC5.7.4.3(a) – (c) shall be in accordance with the requirements of, ECC.6.1.2, ECC.6.1.4, ECC.6.2.2.9.4 and ECC.6.3.5.4.

iv) In respect of **Anchor DC Converter Stations**, the above tests defined in OC5.7.4.3(a) – (c) shall be in accordance with the requirements of, CC.6.1.2, CC.6.1.3 and CC.6.1.4.

OC5.7.4.4 Quick Re-synchronisation Unit Test

(a) The relevant **Anchor Generating Unit** shall be **Synchronised** and **Loaded**;

(b) All the **Auxiliary Energy Supplies** in the **Anchor Power Station** in which that **Anchor Generating Unit** is situated, shall be **Shutdown**.

(c) The **Anchor Generating Unit** shall be tripped to house load**.**

(d) The relevant **Anchor Generating Unit** shall be **Synchronised** to the **System** but not **Loaded**, unless the appropriate instruction has been given by **The Company** to the **Network Operator** under **BC2** which would also be in accordance with the requirements of the **Distribution Restoration Zone Plan**.

In respect of **EU Generators**, the above tests defined in OC5.7.4.4(a) – (d) shall be in accordance with the requirements of ECC.6.3.5.6.

OC5.7.4.6 Test Failures/Re-Tests and Disputes

The relevant **Network Operator** shall:

(a) ensure that **Anchor Plant** is capable of meeting the requirements of OC5.7.4 of the Grid Code and **Distribution Restoration Contract**

(b) notify **The Company** where any such failure has an impact on the **Network Operator**s ability to establish a **Distributed Restoration Zone**.

(c) Permit **The Company** to work with the **Anchor Plant Owner** to undertake tests or investigations where there has been a repeated failure of the **Anchor Plant Owner's Plant** and **Apparatus**.

OC5.8 PROCEDURES APPLYING TO EMBEDDED MEDIUM POWER STATIONS NOT SUBJECT TO A BILATERAL AGREEMENT AND EMBEDDED DC CONVERTER STATIONS NOT SUBJECT TO A BILATERAL AGREEMENT

OC5.8.1 Compliance Statement

Each **Network Operator** shall ensure that each **Embedded Person** provides to the **Network Operator** upon **The Company's** request:

(a) written confirmation that each such **Power Generating Module**, **Generating Unit**, **Power Park Module**, **HVDC Equipment**, or **DC Converter** complies with the requirements of the **CC**; and

(b) evidence, where requested, reasonably satisfactory to **The Company**, of such compliance. Such a request shall not normally be made by **The Company** more than twice in any calendar year in respect of any **Generator's Power Generating Module**, **Generating Unit** or **Power Park Module** or **HVDC System Owner's HVDC System**, or **DC Converter** owner's **DC Converter**.

The **Network Operator** shall provide the evidence or written confirmation required under OC5.8.1 (a) and (b) forthwith upon receipt to **The Company**.

OC5.8.2 Network Operator's Obligations To Facilitate Tests

If:

(a) the **Network Operator** fails to procure the confirmation referred to at OC5.8.1(a); or

(b) the evidence of compliance is not to **The Company's** reasonable satisfaction,

then, **The Company** shall be entitled to require the **Network Operator** to procure access upon terms reasonably satisfactory to **The Company** to enable **The Company** to witness the **Embedded Person** carrying out the tests referred to in OC5.8.3 in respect of the relevant **Embedded Medium Power Station** or **Embedded DC Converter Station** or **Embedded HVDC System**.

OC5.8.3 Testing Of Embedded Medium Power Stations Not Subject To A Bilateral Agreement Or Embedded DC Converter Stations Not Subject To A Bilateral Agreement or Embedded HVDC Equipment Not Subject To A Bilateral Agreement

The Company may, in accordance with the provisions of OC5.8.2, at any time (although not normally more than twice in any calendar year in respect of any particular **Embedded Medium Power Station** not subject to a **Bilateral Agreement** or **Embedded DC Converter Station** or **Embedded HVDC Equipment** not subject to a **Bilateral Agreement**) issue an instruction requiring the **Network Operator** within whose **System** the relevant **Medium Power Station** not subject to a **Bilateral Agreement** or **DC Converter Station** or **HVDC Equipment** not subject to a **Bilateral Agreement** is **Embedded**, to require the **Embedded Person** to carry out a test.

Such test shall be carried out at a time no sooner than 48 hours from the time that the instruction was issued, on any one or more of the **Generating Units**, **Power Generating Module, Power Park Module** or **DC Converter** or **HVDC Equipment** comprising part of the relevant **Embedded Medium Power Station** or **Embedded DC Converter Station or HVDC System** and should only be to demonstrate that:

(a) the relevant **Generating Unit**, **Power Generating Module, Power Park Module** or **DC Converter** or **HVDC Equipment** meets the requirements of the paragraphs in the **CC** or **ECC** which are applicable to such **Generating Units**, **Power Generating Modules**, **Power Park Module** or **DC Converter** or **HVDC Equipment**;

(b) the **Reactive Power** capability registered with **The Company** under **OC2** meets the requirements set out in CC.6.3.2 or ECC.6.3.2 as applicable.

The instruction may only be issued where, following consultation with the relevant **Network Operator**, **The Company** has:

(a) confirmed to the relevant **Network Operator** the manner in which the test will be conducted, which shall be consistent with the principles established in OC5.5.3; and

(b) received confirmation from the relevant **Network Operator** that the relevant **Generating Unit**, **Power Generating Module**, **Power Park Module** or **DC Converter** or **HVDC Equipment** would not then be unavailable by reason of forced outage or **Planned Outage** expected prior to the instruction.

The relevant **Network Operator** is responsible for ensuring the performance of any test so required by **The Company** and the **Network Operator** shall ensure that the **Embedded Person** retains the responsibility for ensuring the safety of personnel and plant during the test.

OC5.8.4 Test Failures/Re-Tests and Disputes

The relevant **Network Operator** shall:

(a) ensure that provisions equivalent to OC5.5.5, OC5.5.6 and OC5.6 apply to **Embedded Medium Power Stations** not the subject of a **Bilateral Agreement**, **Embedded DC Converter Stations** not the subject of a **Bilateral Agreement** or **Embedded HVDC Equipment** not the subject of a **Bilateral Agreement** within its **System** in respect of test failures, re-tests and disputes as to test failures and re-tests;

(b) ensure that the provisions equivalent to OC5.5.5, OC5.5.6 and OC5.6 referred to in OC5.8.4(a) are effective so that **The Company** may require, if it so wishes, the provision to it of any reports or other information equivalent to those or that to which **The Company** would be entitled in relation to test failures, re-tests and disputes as to test failures and re-tests under the provisions of OC5.5.5, OC5.5.6 and OC5.6; and

(c) the provisions equivalent to OC5.5.5, OC5.5.6 and OC5.6 referred to in OC5.8.4(a) are effective to permit **The Company** to conduct itself and take decisions in such a manner in relation to test failures, re-tests and disputes as to test failures and re-tests in respect of **Embedded Medium Power Stations** not the subject of a **Bilateral Agreement**, **Embedded DC Converter Stations** not the subject of a **Bilateral Agreement** or **Embedded HVDC Equipment** not the subject of a **Bilateral Agreement** as it is able to conduct itself and take decisions in relation to test failures, re-tests and disputes as to test failures and re-tests under OC5.5.5, OC5.5.6 and OC5.6.

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Extracts from Operating Code 9

OPERATING CODE NO. 9
(OC9)

CONTINGENCY PLANNING

CONTENTS

OC9.1 INTRODUCTION

Operating Code No.9 ("**OC9**") covers the processes and procedures by which **The Company** in coordination and liaison with **User's**, will restore the **Total System** or parts of the **System** following a **Total Shutdown** or **Partial Shutdown**.

OC9.1.1 Approach to System Restoration~~Black Starts~~

~~The implementation of recovery procedures following a **Total Shutdown** or **Partial Shutdown**.~~

Following a **Total System Shutdown** or **Partial System Shutdown**, there are two ways in which the **Total System** (or de-energised **System** in the case of a **Partial Shutdown**) can be re-established. These being a top down approach using **Local Joint Restoration Plans** or a bottom up approach using one or more **Distribution Restoration Zones**

In the case of a **Local Joint Restoration Plan**, **The Company** (or **Relevant Scottish Transmission Licensee** as applicable) will issue instructions to **Black Start Service Providers** who will then energise parts of the **Total System** to form a **Power Island**.

In the case of a **Distribution Restoration Zone Plan**, **The Company** (or **Relevant Scottish Transmission Licensee** as applicable) will issue instructions to **Network Operators** who in turn will instruct **Anchor Plant Owners** together with **Restoration Service Providers** to energise parts of the **Network Operators System** to form one or more **Power Islands**.

In practice, and in order to re-establish the **Total System** and **User's Demand** to normal operational conditions in the shortest possible time and in the most reliable way, it is expected that **The Company** would initiate **Local Joint Restoration Plans** and **Distribution Restoration Zone Plan's** in parallel.

OC9.1.2 Re-Synchronisation o~~O~~f Power Islands

Following the establishment of **Power Islands** (either through **Local Joint Restoration Plans** or **Distribution Restoration Zone Plans**) **The Company** will then co-ordinate t~~T~~he **Re-Synchronisation** of parts of the **Total System** which have become **Out of Synchronism** with each other irrespective of whether or not a **Total Shutdown** or **Partial Shutdown** has occurred.

OC9.1.3 Joint System Incident Procedure

~~The establishment of a~~ A **Joint System Incident** Procedure is the establishment of communication route~~s~~ and arrangements between senior management representatives of **The Company** and **Users** involved in, or who may be involved in, an actual or potential serious or widespread disruption to the **Total System** or a part of the **Total System**, which requires, or may require, urgent managerial response, day or night, but which does not fall within the provisions of OC9.1.4.

OC9.1.4 It should be noted that under section 96 of the **Act**, the **Secretary of State** may give directions to **The Company** and/or any **Generator** and/or any **Supplier**, for the purpose of "mitigating the effects of any civil emergency which may occur" (ie. for the purposes of planning for a civil emergency); a civil emergency is defined in the **Act** as "any natural disaster or other emergency which, in the opinion of the **Secretary of State**, is or may be likely to disrupt electricity supplies". Under the Energy Act 1976, the **Secretary of State** has powers to make orders and give directions controlling the production, supply, acquisition or use of electricity, where an Order in Council under section 3 is in force declaring that there is an actual or imminent emergency affecting electricity supplies. In the event that any such directions are given, or orders made under the **Energy Act 1976**, the provisions of the **Grid Code** will be suspended in so far as they are inconsistent with them.

OC9.1.5 **The Company** shall procure that **Relevant Transmission Licensees** shall comply with OC9.4 and OC9.5 and any relevant **Local Joint Restoration Plan** or OC9 **De-Synchronised Island Procedure** where and to the extent that such matters apply to them.

OC9.2 OBJECTIVE

The overall objectives of **OC9** are:

OC9.2.1 To achieve, as far as possible, restoration of the **Total System** and associated **Demand** in the shortest possible time, taking into account **Power Station** and **Restoration Service Providers Plant** and **Apparatus** capabilities, including **Embedded Generating Units** and, **External Interconnections** and the operational constraints of the **Total System**.

OC9.2.2 To achieve the **Re-Synchronisation** of parts of the **Total System** which have become **Out of Synchronism** with each other.

OC9.2.3 To ensure that communication routes and arrangements are available to enable senior management representatives of **The Company** and **Users**, who are authorised to make binding decisions on behalf of **The Company** or the relevant **User**, as the case may be, to communicate with each other in the situation described in OC9.1.3.

OC9.2.4 To describe the role that in respect of **Transmission Systems**, **Relevant Transmission Licensees** and **Network Operators** may have in the restoration processes as detailed in the relevant **OC9 De-Synchronised Island Procedures**, and **Local Joint Restoration Plans** and **Distribution Restoration Zone Plans**.

OC9.2.5 To identify and address as far as possible the events and processes necessary to enable the restoration of the **Total System**, after a **Total Shutdown** or **Partial Shutdown**. This is likely to require the following key processes to be implemented, typically, but not necessarily, in the order given below:

(i) Selectively implement **Local Joint Restoration Plans**

(ii) Selectively implement **Distribution Restoration Zone Plans** through **Network Operators**

(iii) Expand and merge **Power Islands** leading to **Total System** energisation

(iv) Selectively reconnect **Demand**

(v) Facilitate and co-ordinate returning the **Total System** back to normal operation

(vi) Resumption of the **Balancing Mechanism** if suspended in accordance with the provisions of the **BSC**.

OC9.3 SCOPE

Distributed ReStart in partnership with

OC9.3.1 **OC9** applies to **The Company** and to **Users**, which in **OC9** means:-

(a) ~~(a)~~ **Generators**;

(b) **HVDC System Owners**

~~(a)~~(c) **DC Converter Station** owners

(d~~b~~) **Network Operators**; and

(e~~c~~) **Non-Embedded Customers**.

(f~~d~~) **Relevant Restoration Service Providers**

OC9.3.2 The procedure for the establishment of emergency support/contingency planning between **The Company** and **Externally Interconnected System Operators** is set out in the **Interconnection Agreement** with each **Externally Interconnected System Operator**.

OC9.3.3 In respect of **Transmission Systems**, OC9.4 and OC9.5 also apply to **Relevant Transmission Licensees**.

OC9.4 SYSTEM RESTORATION~~BLACK START~~

Total Shutdown a~~A~~nd Partial Shutdown

OC9.4.1 A "**Total Shutdown**" is the situation existing when all generation has ceased and there is no electricity supply from **External Interconnections**. Therefore, the **Total System** has shutdown with the result that it is not possible for the **Total System** to begin to function again without **The Company-'s** directions relating to a **Black Start**.

OC9.4.2 A "**Partial Shutdown**" is the same as a **Total Shutdown** except that all generation has ceased in a separate part of the **Total System** and there is no electricity supply from **External Interconnections** or other parts of the **Total System** to that part of the **Total System**. Therefore, that part of the **Total System** is shutdown with the result that it is not possible for that part of the **Total System** to begin to function again without **The Company's** directions relating to a **Black Start**.

OC9.4.3 During a **Total Shutdown** or **Partial Shutdown** and during the subsequent recovery, the **Licence Standards** may not apply and the **Total System** may be operated outside normal voltage and **Frequency** standards.

OC9.4.4 In a **Total Shutdown** and in a **Partial Shutdown** and during the subsequent recovery, it is likely to be necessary for **The Company**- to issue **Emergency Instructions** in accordance with BC2.9.

OC9.4.5 Contribution to System Restoration

The Company will restore the **System** following a **Total Shutdown** or **Partial Shutdown** by issuing instructions to **Black Start Service Providers** through one or more **Local Joint Restoration Plans** as provided for in OC9.4.5.1 and/or by instructing **Network Operators** to establish one or more **Distribution Restoration Zones** as provided for in OC9.4.5.2

OC9.4.5.1 Local Joint Restoration

OC9.4.5.1.1 -**Local Joint Restoration Plans** are dependent upon **Black Start Service Providers** who, are registered pursuant to the **Bilateral Agreement** as having the –ability to **Start-Up** from **Shutdown** and to energise a part of the **Total System**, or be **Synchronised** to the **System**, upon instruction from **The Company** within two hours, without an external electrical power supply ("**Black Start Capability**").

OC9.4.5.1.2 For each **Black Start Station** and **Black Start HVDC System**, a **Local Joint Restoration Plan** will be produced jointly by **The Company**, the relevant **Black Start Service Provider** and **Network Operator** in accordance with the provisions of OC9.4.7.7.1~~OC9.4.7.12~~. The **Local Joint Restoration Plan** will detail the agreed method and procedure by which a **Genset** at a **Black Start Station** (possibly with other **Gensets** at that **Black Start Station**) and **Black Start HVDC Systems** will energise part of the **Total System** and meet complementary local **Demand** so as to form a **Power Island**.

OC9.4.5.1.3 In respect of **Scottish Transmission Systems**, a **Local Joint Restoration Plan** may cover more than one **Black Start Station** or **Black Start HVDC System** and may be produced with and include obligations on **Relevant Scottish Transmission Licensees**, **Generators** responsible for **Gensets** not at a **Black Start Station** and other **Users** including **HVDC System Owners** and **DC Converter Station Owners**. The instruction to initiate a **Local Joint Restoration Plan** will be the responsibility of the **Scottish Transmission Licensee** as provided for in STCP 06-1.

OC9.4.5.2 Distribution Restoration Zones

OC9.4.5.2.1 In a **Distribution Restoration Zone**, **Anchor Plant Owners** are required to have **Anchor Plant** with the capability to **Start-Up** from **Shutdown** and to energise a part of a **Network Operator's System**, upon instruction from **The Network Operator** within 8 hours, without an external electrical power supply.

OC9.4.5.2.2 For each **Distribution Restoration Zone**, a **Distribution Restoration Zone Plan** will be produced jointly by the **Network Operator**, **The Company**, **Anchor Plant Owner** and **Restoration Service Providers** in accordance with the provisions of OC9.4.7.7.2. The **Distribution Restoration Zone Plan** will detail the agreed method and procedure by which an **Anchor Plant** will energise part of the **Network Operator's System** and meet complementary local **Demand** so as to form a **Power Island**.

OC9.4.5.2.3 In respect of **Scottish Transmission Systems**, **Scottish Transmission Licensees**, may instruct relevant **Network Operators** to establish one or more **Distribution Restoration Zones**. In this instance, the instruction to initiate a **Distribution Restoration Zone** to a Scottish **Network Operator** will be the responsibility of the **Scottish Transmission Licensee**.

OC9.4.6 Situations requiring **Black Start** ~~Situation~~

In the event of a **Total Shutdown** or **Partial Shutdown**, **The Company** will, as soon as reasonably practical, inform **Users** (or, in the case of a **Partial Shutdown**, **Users** which in **The Company's** opinion need to be informed) and the **BSCCo** that a **Total Shutdown**, or, as the case may be, a **Partial Shutdown**, exists and that **The Company** intends to implement a **Black Start**. **The Company** shall (as soon as is practicable) determine, in its reasonable opinion, the time and date with effect from which the **Total Shutdown** or **Partial Shutdown** commenced and notify the **BSCCo** of that time and date.

In the event of a **Total Shutdown** and following such notification, in accordance with the provisions of the **BSC**, the **BSCCo** will determine the **Settlement Period** with effect from which the **Balancing Mechanism** is suspended.

In the event of a **Partial Shutdown** and following such notification, the **Balancing Mechanism** will not be suspended until such time and date that the **Market Suspension Threshold** has been met, or deemed to have been met, in accordance with the provisions of the **BSC**. **The Company** shall carry out the monitoring activities required by paragraph G3.1 of the **BSC**.

Following determination by **The Company** pursuant to its obligations under the **BSC** that the **Market Suspension Threshold** has been met, or deemed to have been met, **The Company** shall (as soon as practicable) inform the **BSCCo** of that time and date at which the **Market Suspension Threshold** was met, or deemed to have been met, and the **BSCCo** will determine the **Settlement Period** in accordance with the provisions of the **BSC** with effect from which the **Balancing Mechanism** will be suspended.

Should **The Company** determine that the **Total System** is capable of returning to normal operation without meeting the **Market Suspension Threshold**, **The Company** will follow the procedure given in OC9.4.7.12. ~~OC9.4.7.9~~.

The **Black Start** will conclude with effect from the time and date determined in accordance with OC9.4.7.13~~OC9.4.7.10~~.

In respect of **Scottish Transmission Systems**, in exceptional circumstances, as specified in the **Local Joint Restoration Plan**, **SPT** or **SHETL**, may invoke such **Local Joint Restoration Plan** for its own **Transmission System** and **Scottish Offshore Transmission Systems** connected to it and operate within its provisions. Under such circumstances a **Scottish Transmission Licensee** may also invoke one or more **Distribution Restoration Zone Plans** in coordination with Scottish **Network Operators**.

OC9.4.7 Black Start

OC9.4.7.1 The procedure necessary for a recovery from a **Total Shutdown** or **Partial Shutdown** is known as a "**Black Start**". The procedure for a **Partial Shutdown** is the same as that for a **Total Shutdown** except that it applies only to a part of the **Total System**. It should be remembered that a **Partial Shutdown** may affect parts of the **Total System** which are not themselves shutdown.

OC9.4.7.2 The complexities and uncertainties of recovery from a **Total Shutdown** or **Partial Shutdown** require that **OC9** is sufficiently flexible in order to accommodate the full range of **User's Plant** and **Apparatus** and **Total System** characteristics and operational possibilities, and this precludes the setting out in the **Grid Code** itself of concise chronological sequences. The overall strategy will, in general, include the overlapping phases of establishment of **Genset(s)** at an isolated **Power Station** or isolated **HVDC System** or isolated **DC Converter Station**, together with complementary local **Demand**, termed "**Power Islands**", step by step integration of these **Power Islands** into larger sub-systems which includes utilising the procedures in OC9.5 (**Re-Synchronisation** of **De-Synchronised Island**) and eventually re-establishment of the complete **Total System**.

The Company Instructions

OC9.4.7.3 The procedures for a **Black Start** will, therefore, be those specified by **The Company** at the time. These will normally recognise any applicable **Local Joint Restoration Plan** and/or **Distribution Restoration Zone Plan**. **Users** shall abide by **The Company's** instructions during a **Black Start** situation, even if these conflict with the general overall strategy outlined in OC9.4.7.2 or any applicable **Local Joint Restoration Plan** or any applicable **Distribution Restoration Zone Plan**. **The Company's** instructions may (although this list should not be regarded as exhaustive) be to ~~a~~:-

(a) ~~a~~ a **Black Start Station** or **Black Start HVDC System** relating to the commencement of supplying **Active Power**, to a **Network Operator** or **Non-Embedded Customer** relating to the restoration of **Demand**, and to a **Power Station** or **HVDC System** or **DC Converter Station** relating to preparation for commencement of supplying **Active Power** when an external power supply is made available to it, and in each case may include the requirement to undertake switching and/or:-

~~(a)~~(b) a **Network Operator** to establish a **Distribution Restoration Zone** which would relate to the provision of an **Anchor Plant Owner** to supply **Active Power** to a **Network Operator's System** and supply local **Demand**. The **Distribution Restoration Zone** would comprise **Anchor Plant**, ~~and~~ **Restoration Service Providers** and local **Demand**.

In respect of **Scottish Transmission Systems SPT** and **SHETL** will act on **The Company's** behalf in accordance with its duties under the relevant **Local Joint Restoration Plan** or **Distribution Restoration Zone Plan**. **Scottish Users** shall abide by **SPT's** or **SHETL's** instructions given in accordance with the **Local Joint Restoration Plan** or **Distribution Restoration Zone Plan** during a **Black Start** situation.

OC9.4.7.4 (a) **Black Start** following a **Total Shutdown** or where the **Balancing Mechanism** has been suspended following a **Partial Shutdown**

During a **Black Start** situation where the **Balancing Mechanism** has been suspended, all instructions to **Users** will be deemed to be **Emergency Instructions** under BC2.9.2.2 (iii). All such **Emergency Instructions** will recognise any differing **Black Start** operational capabilities (however termed) set out in the relevant **Ancillary Services Agreement** in preference to the declared operational capability as registered pursuant to **BC1** (or as amended from time to time in accordance with the **BC**). For the purposes of these instructions the **Black Start** will be an emergency circumstance under BC2.9.

In Scotland, **Gensets** or **HVDC Systems** or **DC Converter Station** that are not at **Black Start Stations** or **Black Start HVDC Systems**, but which are part of a **Local Joint Restoration Plan**, may be instructed in accordance with the provisions of that **Local Joint Restoration Plan**.

Instructions issued to **Network Operators** to prepare and establish **a Distribution Restoration Zone** will be issued by **The Company** to **Network Operators** as **Emergency Instructions**. **Network Operators** will then establish a **Distribution Restoration Zone** in accordance with the provisions of the **Distribution Restoration Zone Plan**.

In Scotland, **Scottish Transmission Licensees** will issue instructions to relevant Scottish **Network Operators** to establish a **Distribution Restoration Zone** in accordance with the provisions of the **Distribution Restoration Zone Plan**.

(b) **Black Start** following a **Partial Shutdown** where the **Balancing Mechanism** has not been suspended

During a **Black Start** situation where the **Balancing Mechanism** has not been suspended, instructions in relation to **Black Start Stations** and to **Network Operators**, **Black Start HVDC Systems** which are part of an invoked **Local Joint Restoration Plan** will (unless **The Company** specifies otherwise) be deemed to be **Emergency Instructions** under BC2.9.2.2 (iv) and will recognise any differing **Black Start** operational capabilities (however termed) set out in the relevant **Ancillary Services Agreement** in preference to the declared operational capability as registered pursuant to **BC1** (or as amended from time to time in accordance with the **BC**). For the purposes of these instructions the **Black Start** will be an emergency circumstance under BC2.9.

During a **Black Start** situation where the **Balancing Mechanism** has not been suspended, **The Company** may issue instructions to **Users** other than **Black Start Stations** and **Network Operators** which are part of an invoked **Local Joint Restoration Plan**. Such instructions would be **Emergency Instructions** pursuant to BC2.9.1.2(e)(i) subject to the requirements of

BC2.9.2.2 being met.

~~In Scotland,~~ **Gensets** and **HVDC Systems** or **DC Converter Station** that are not at **Black Start Stations** or **Black Start HVDC Systems**, but which are part of an invoked **Local Joint Restoration Plan**, may be instructed in accordance with the provisions of that **Local Joint Restoration Plan**.

During a **Black Start** situation where the **Balancing Mechanism** has not been suspended, **The Company** may issue instructions to **Network Operators** for the purposes of establishing one or more **Distribution Restoration Zone(s)**. Such instructions will (unless **The Company** specifies otherwise) be deemed to be **Emergency Instructions** under BC2.9.2.2 (iv). The **Network Operator** will be responsible for the establishment of the **Distribution Restoration Zone** which will take into account the capabilities of **Anchor Plant**, **Plant** belonging to **Relevant Restoration Service Providers** and other **Plant** and **Apparatus** within the **Network Operator's System** including the **Distribution Restoration Zone Control System**. Such instructions would be pursuant to the terms of the **Distribution Restoration Zone Plan**.

In Scotland, **Relevant Transmission Licensee's** may issue instructions (which unless specified otherwise, would be deemed to be **Emergency Instructions**) to **Scottish Network Operators**, to establish on one or more **Distribution Restoration Zones** in accordance with the appropriate **Distribution Restoration Zone Plan**.~~:~~

(c) Requirements to inform **The Company** where a **Genset**, **HVDC System** or **DC Converter** cannot operate within its safe operating limits during the **Demand** restoration process

If during the **Demand** restoration process, any **Genset** or **HVDC System** or **DC Converter Station** cannot, because of the **Demand** being experienced, keep within its safe operating parameters, the **Black Start Service Provider** shall, unless a **Local Joint Restoration Plan** is in operation, inform **The Company**. **The Company** will, where possible, either instruct **Demand** to be altered or will re-configure the **National Electricity Transmission System** or will instruct a **User** to re-configure its **System** in order to alleviate the problem being experienced by the **Genset** or **HVDC System** or **DC Converter Station**. If a **Local Joint Restoration Plan** is in operation, then the arrangements set out therein shall apply. However, **The Company** ~~–~~accepts that any decision to keep a **Genset** or **HVDC System** or **DC Converter Station** operating, if outside its safe operating parameters, is one for the **Black Start Service Providers** concerned alone and accepts that the **Black Start Service Provide** may change output on that **Genset** or **HVDC System** or **DC Converter Station** if it believes it is necessary for safety reasons (whether relating to personnel or **Plant** and/or **Apparatus**). If such a change is made without prior notice, then the **Black Start Service Provider** shall inform **The Company** as soon as reasonably practical (unless a **Local Joint Restoration Plan** is in operation in which case the arrangements set out therein shall apply).

OC9.4.7.5 Deployment of Black Start Service Providers, or Network Operators to initiate Distribution Restoration Zones during a Black Start Event

OC9.4.7.5.1 During a **Black Start** event, there are two ways in which **Embedded Plant** can contribute. These being either:-

(a) **The Company** (or in Scotland, **Relevant Transmission Licensee(s)**) will issue instructions directly to **Embedded Black Start Service Providers** which will be part of a **Local Joint Restoration Plan** as provided for in OC9.4.5.1 and OC9.4.7.6.1; or

(b) **The Company** (or in Scotland **Relevant Transmission Licensee(s)**) will issue instructions to **Network Operators** to establish one or more **Distribution Restoration Zones** in accordance with relevant **Distribution Restoration Zone Plans** as provided for in OC9.4.5.2 and OC9.4.7.6.2.

Without prejudice to the provisions of OC9.4.7.10(a)~~OC9.4.7.8~~, **Network Operators** with **Embedded Power Stations** or **Embedded HVDC Systems** or **Embedded DC Converter Stations** who form part of a **Local Joint Restoration Plan** will comply with any directions of **The Company** to restore **Demand** to be met by the **Embedded Power Stations**, **Embedded HVDC Systems** or **Embedded DC Converter Stations**.

OC9.4.7.6 Local Joint Restoration Plan and Distribution Restoration Zone Plan Establishment

OC9.4.7.6.1 Local Joint Restoration Plan Establishment

(a) In England and Wales, in relation to each **Black Start Station** and each **Black Start HVDC System**, **The Company**, **NGET**, **Network Operator** and the relevant **Black Start Service Provider** will discuss and agree a **Local Joint Restoration Plan**. Where at the date of the first inclusion of this OC9.4.7.6.1 into the **Grid Code** a local plan covering the procedures to be covered in a **Local Joint Restoration Plan** is in existence and agreed, **The Company** will discuss this with **NGET**, the **Network Operator** and the relevant **Generator** or **HVDC System Owner** or **DC Converter Station Owner** to agree whether it is consistent with the principles set out in this OC9.4. If it is agreed to be so consistent, then it shall become a **Local Joint Restoration Plan** under this **OC9** and the relevant provisions of OC9.4.7.6.1(b) shall apply. If it is not agreed to be so consistent, then the provisions of OC9.4.7.6.1(b) shall apply as if there is no **Local Joint Restoration Plan** in place. For the avoidance of doubt, a **Local Joint Restoration Plan** would not cover the situation where a **Distribution Restoration Zone** has been established. The requirements covering **Distribution Restoration Zones** which are pursuant to a **Distribution Restoration Zone Plan** are covered under OC9.4.7.6.2.

In respect of **Scottish Transmission Systems** where a requirement for a **Local Joint Restoration Plan** is identified, **The Company**, the **Relevant Scottish Transmission Licensee(s)**, the **Network Operator** and **Black Start Service Provider's** will discuss and agree a **Local Joint Restoration Plan**. In addition, other **Users**, including other **Generators** or **HVDC System Owners** or **DC Converter Station Owners**, may be reasonably required by **The Company** to discuss and agree a **Local Joint Restoration Plan**. For the avoidance of doubt, a **Local Joint Restoration Plan** would not cover the situation where a **Distribution Restoration Zone** has been established. The requirements covering **Distribution Restoration Zones** in Scotland which are pursuant to a Scottish **Distribution Restoration Zone Plan** are covered under OC9.4.7.6.2(b).

(b) In England and Wales, where the need for a **Local Joint Restoration Plan** arises when there is none in place, the following provisions shall apply:

(i) **The Company**, **NGET**, the **Network Operator** and the relevant **Black Start Service Provider** will discuss and agree the detail of the **Local Joint Restoration Plan** as soon as the requirement for a **Local Joint Restoration Plan** is identified by **The Company**. **The Company** will notify all affected **Users** and will initiate these discussions.

(ii) Each **Local Joint Restoration Plan** will be in relation to a specific **Black Start Station** or **Black Start HVDC System**.

(iii) The **Local Joint Restoration Plan** will record which **Users** and which **User Sites** are covered by the **Local Joint Restoration Plan** and set out what is required from **The Company**, **NGET** and each **User** should a **Black Start** situation arise.

(iv) Each **Local Joint Restoration Plan** shall be prepared by **The Company** to reflect the above discussions and agreement.

(v) Each page of the **Local Joint Restoration Plan** shall bear a date of issue and the issue number.

(vi) When a **Local Joint Restoration Plan** has been prepared, it shall be sent by **The Company** to **NGET** and the **Users** involved for confirmation of its accuracy.

(vii) The **Local Joint Restoration Plan** shall then (if its accuracy has been confirmed) be signed on behalf of **The Company** and on behalf of **NGET** and each relevant **User** by way of written confirmation of its accuracy.

(viii) Once agreed under this OC9.4.7.6.1(b), the procedure will become a **Local Joint Restoration Plan** under the **Grid Code** and (subject to any change pursuant to this OC9) will apply between **The Company** and **NGET** and the relevant **Users** as if it were part of the **Grid Code**.

(ix) Once signed, a copy of the **Local Joint Restoration Plan** will be distributed by **The Company** to **NGET** and each **User** which is a party to it accompanied by a note indicating the date of implementation.

(x) **The Company**, **NGET** and **Users** must make the **Local Joint Restoration Plan** readily available to the relevant operational staff.

(xi) If **The Company**, or **NGET** or any **User** which is a party to a **Local Joint Restoration Plan**, becomes aware that a change is needed to that **Local Joint Restoration Plan**, it shall (in the case of **The Company**) initiate a discussion between **The Company** and the relevant **Users** to seek to agree the relevant change. If **NGET** or a **User** becomes so aware, it shall contact **The Company** who will then initiate such discussions. The principles applying to establishing a new **Local Joint Restoration Plan** under this OC9.4.7.6.1(b) shall apply to such discussions and to any consequent changes.

(xii) **The Company**, **NGET**, the **Network Operator** and the relevant **Generator** or **HVDC System Owner** or **DC Converter Station Owner** will conduct regular joint exercises of the **Local Joint Restoration Plan** to which they are parties. The objectives of such exercises include:

- To test the effectiveness of the **Local Joint Restoration Plan**;
- To provide for joint training of the parties in respect of the **Local Joint Restoration Plan**;
- To maintain the parties' awareness and familiarity of the **Local Joint Restoration Plan**;
- To promote understanding of each parties' roles under a **Local Joint Restoration Plan**;
- To identify any improvement areas which should be incorporated in to the **Local Joint Restoration Plan**.
- The principles applying to the establishment of a new **Local Joint Restoration Plan** under this OC9.4.7.6.1(b) shall apply to any changes to the **Local Joint Restoration Plan**.

The Company will propose to the parties of a **Local Joint Restoration Plan** a date for the exercise to take place, to be agreed with the other parties. All the **Local Joint Restoration Plan** parties will jointly share the task of planning, preparing, participating in and facilitating the exercises, which will normally be in desktop format or as otherwise agreed. The precise timing of the exercise for each **Local Joint Restoration Plan** will be agreed by all parties, but will not be less than one every 8 years.

(c) In respect of **Scottish Transmission Systems**, where the need for a **Local Joint Restoration Plan** arises, the following provisions shall apply:

(i) **The Company**, the **Relevant Scottish Transmission Licensee(s)**, the **Network Operator** and the relevant **Black Start Service Provider** will discuss and agree the detail of the **Local Joint Restoration Plan** as soon as the requirement for a **Local Joint Restoration Plan** is identified by **The Company**. In addition, other **Scottish Users**, including other **Generators**, **HVDC System Owners** and **DC Converter Station Owners**, may be reasonably required by **The Company** to discuss and agree details of the **Local Joint Restoration Plan** as soon as the requirement for a **Local Joint Restoration Plan** is identified by **The Company**. **The Company** will notify the **Relevant Scottish Transmission Licensee(s)** and all affected **Scottish Users**, and will initiate these discussions.

(ii) Each **Local Joint Restoration Plan** may be in relation to either a specific **Black Start Station** or a number of **Black Start Stations**, and may include **Gensets** at **Power Stations** other than a **Black Start Station**. Each **Local Joint Restoration Plan** could equally apply to a specific **Black Start HVDC System** or a number of **Black Start HVDC Systems** and may include **HVDC Systems** or **DC Converter Stations** other than a **Black Start HVDC System**. For the avoidance of doubt, this would not preclude a **Local Joint Restoration Plan** from comprising a combination of **Power Stations**, **HVDC Systems** or **DC Converter Stations** irrespective of whether they have a **Black Start Capability**.

(iii) The **Local Joint Restoration Plan** will record which **Scottish Users** and which **Scottish User Sites** are covered by the **Local Joint Restoration Plan** and set out what is required from **The Company**, the **Relevant Scottish Transmission Licensee(s)** and each **Scottish User** should a **Black Start** situation arise.

(iv) Each **Local Joint Restoration Plan** shall be prepared by **The Company** to reflect the above discussions and agreement.

(v) Each page of the **Local Joint Restoration Plan** shall bear a date of issue and the issue number.

(vi) When a **Local Joint Restoration Plan** has been prepared, it shall be sent by **The Company** to the **Relevant Scottish Transmission Licensee(s)** and **Scottish Users** involved for confirmation of its accuracy.

(vii) The **Local Joint Restoration Plan** shall then (if its accuracy has been confirmed) be signed on behalf of **The Company** and on behalf of each relevant **Scottish User** and **Relevant Scottish Transmission Licensee(s)** by way of written confirmation of its accuracy.

(viii) Once agreed under this OC9.4.7.6.1(c), the procedure will become a **Local Joint Restoration Plan** under the **Grid Code** and (subject to any change pursuant to this **OC9**) will apply between **The Company**, **Relevant Scottish Transmission Licensee(s)** and the relevant **Scottish Users** as if it were part of the **Grid Code**.

(ix) Once signed, a copy of the **Local Joint Restoration Plan** will be distributed by **The Company** to the **Relevant Scottish Transmission Licensee(s)** and each **Scottish User** which is a party to it accompanied by a note indicating the date of implementation.

(x) **The Company**, the **Relevant Scottish Transmission Licensee(s)** and **Scottish Users** must make the **Local Joint Restoration Plan** readily available to the relevant operational staff.

(xi) If **The Company**, the **Relevant Scottish Transmission Licensee(s)** or any **Scottish User** which is a party to a **Local Joint Restoration Plan**, becomes aware that a change is needed to that **Local Joint Restoration Plan**, it shall (in the case of **The Company**) initiate a discussion between **The Company**, the **Relevant Scottish Transmission Licensee(s)** and the relevant **Scottish Users** to seek to agree the relevant change. If a **Scottish User** or a **Relevant Scottish Transmission Licensee** becomes so aware, it shall contact **The Company** who will then initiate such discussions. The principles applying to establishing a new **Local Joint Restoration Plan** under this OC9.4.7.6.1(c) shall apply to such discussions and to any consequent changes.

(xii) **The Company**, the **Relevant Scottish Transmission Licensee(s)**, the **Network Operator** and the relevant **Black Start Service Provider** will conduct regular joint exercises of the **Local Joint Restoration Plan** to which they are parties. The objectives of such exercises include:

- To test the effectiveness of the **Local Joint Restoration Plan**;
- To provide for joint training of the parties in respect of the **Local Joint Restoration Plan**;
- To maintain the parties' awareness and familiarity of the **Local Joint Restoration Plan**;
- To promote understanding of each parties' roles under a **Local Joint Restoration Plan**;
- To identify any improvement areas which should be incorporated in to the **Local Joint Restoration Plan**.
- The principles applying to the establishment of a new **Local Joint Restoration Plan** under this OC9.4.7.6.1(c) shall apply to any changes to the **Local Joint Restoration Plan**.

The Company will propose to the parties of a **Local Joint Restoration Plan** a date for the exercise to take place, to be agreed with the other parties. All the **Local Joint Restoration Plan** parties will jointly share the task of planning, preparing, participating in and facilitating the exercises, which will normally be in desktop format or as otherwise agreed. The precise timing of the exercise for each **Local Joint Restoration Plan** will be agreed by all parties, but will not be less than one every 8 years.

OC9.4.7.6.2 Distribution Restoration Zone Plan Establishment

(a) In England and Wales, where the need for a **Distribution Restoration Zone Plan** arises, the following provisions shall apply:

(i) **The Company**, **NGET**, the **Network Operator** and the **Relevant Restoration Service Provider(s)** will discuss and agree the detail of the **Distribution Restoration Zone Plan** as soon as the requirement for a **Distribution Restoration Zone Plan** is identified by **The Company** or **Network Operator**. **The Company** will notify all affected **Network Operators** and will initiate these discussions.

(ii) Each **Distribution Restoration Zone Plan** will be in relation to a specific **Network Operator** and in each case each **Distribution Restoration Zone Plan** will be specific to an **Anchor Plant Owner**.

(iii) The **Distribution Restoration Zone Plan** will record which **Relevant Restoration Service Providers** (including **Anchor Plant Owners**) and which **Relevant Restoration Service Provider's** sites are covered by the **Distribution Restoration Zone Plan** and set out what is required from **The Company**, **NGET**, **Network Operator** and each **Relevant Restoration Service Provider**.

(iv) Each **Distribution Restoration Zone Plan** shall be prepared by the relevant **Network Operator** and agreed with **The Company**, **NGET** and relevant **Restoration Service Providers** to reflect the above discussions and agreement.

(v) Each page of the **Distribution Restoration Zone Plan** shall bear a date of issue and the issue number.

(vi) When a **Distribution Restoration Zone Plan** has been prepared, it shall be sent by the relevant **Network Operator** to **The Company**, **NGET** and the **Relevant Restoration Service Providers** involved for confirmation of its accuracy.

(vii) The **Distribution Restoration Zone Plan** shall then (pending its accuracy being confirmed) be signed on behalf of the **Network Operator**, **The Company**, **NGET** and each **Relevant Restoration Service Provider** as a written confirmation of its accuracy.

(viii) Once agreed under this OC9.4.7.6.2(a), the procedure will become a **Distribution Restoration Zone Plan** under the **Grid Code** and **Distribution Code** (subject to any change pursuant to this OC9 and DOC9 of the **Distribution Code**) and will apply between **The Company**, **NGET**, **Network Operator** and the **Relevant Restoration Service Providers** as if it were part of the **Grid Code**.

(ix) Once signed, a copy of the **Distribution Restoration Zone Plan** will be distributed by the **Network Operator** to **The Company**, **NGET** and each **Relevant Restoration Service Provider** which is a party to it, indicating the date of implementation.

(x) The **Network Operator**, **The Company**, **NGET** and **Relevant Restoration Service Providers** must make the **Distribution Restoration Zone Plan** readily available to the relevant operational staff.

(xi) If the **Network Operator**, **The Company**, **NGET** or any other **Relevant Restoration Service Provider** which is a party to a **Distribution Restoration Zone Plan**, becomes aware that a change is needed to that **Distribution Restoration Zone Plan**, it shall initiate a discussion between the **Network Operator**, **The Company**, **NGET**, and the **Relevant Restoration Service Providers** to seek to agree the relevant change. If a **Network Operator**, or **Relevant Restoration Service Provider** becomes so aware, it shall contact **The Company** in coordination with the **Network Operator** who will then initiate such discussions. The principles applying to establishing a new **Distribution Restoration Zone Plan** under this OC9.4.7.6.2(a) shall apply to such discussions and to any consequent changes.

(xii) **The Company**, **NGET**, the **Network Operator** and the **Relevant Restoration Service Providers** will conduct regular joint exercises of the **Distribution Restoration Zone Plan** to which they are parties. The objectives of such exercises include:

- To test the effectiveness of the **Distribution Restoration Zone Plan**;
- To provide for joint training of the parties in respect of the **Distribution Restoration Zone Plan**;
- To maintain the parties' awareness and familiarity of the **Distribution Restoration Zone Plan**;

- To promote understanding of each parties' roles under a **Distribution Restoration Zone Plan**;
- To identify any improvement areas which should be incorporated in to the **Distribution Restoration Zone Plan**.
- The principles applying to the establishment of a new **Distribution Restoration Zone Plan** under this OC9.4.7.6.2(a) shall apply to any changes to the **Distribution Restoration Zone Plan**.

The Company in coordination with the **Network Operator** will propose to the other parties of a **Distribution Restoration Zone Plan** a date for the exercise to take place to be agreed with the other parties. All the **Distribution Restoration Zone** parties will jointly share the task of planning, preparing, participating in and facilitating the exercises, which will normally be in desktop format or as otherwise agreed. The precise timing of the exercise for each **Distribution Restoration Zone Plan** will be agreed by all parties, but will not be less than one every 8 years.

(b) In respect of **Scottish Transmission Systems**, where the need for a **Distribution Restoration Zone Plan** arises, the following provisions shall apply:

(i) **The Company**, the **Relevant Scottish Transmission Licensee(s)**, the **Network Operator** and the **Relevant Restoration Service Providers** (including **Anchor Plant Owners**) will discuss and agree the detail of the **Distribution Restoration Zone Plan** as soon as the requirement for a **Distribution Restoration Zone Plan** is identified by **The Company**. In addition, other **Relevant Restoration Service Providers** forming part of a **Scottish Distribution Restoration Zone** including other **Generators**, **HVDC System Owners** and **DC Converter Owners**, may be reasonably required by **The Company** and **Network Operator** to discuss and agree details of the **Distribution Restoration Zone Plan** as soon as the requirement for a **Distribution Restoration Zone Plan** is identified by **The Company**. **The Company** will notify the **Relevant Scottish Transmission Licensee(s)** and **Network Operator**. The **Network Operator** will be responsible for notifying all affected **Scottish Restoration Service Providers** forming part of one or more **Distribution Restoration Zones**.

(ii) Each **Distribution Restoration Zone Plan** will be in relation to a specific **Network Operator's System** and will include **The Company**, the **Relevant Scottish Transmission Licensee**, relevant **Network Operator** and **Relevant Restoration Service Providers** (including **Anchor Plant Owners**).

(iii) The **Distribution Restoration Zone Plan** will record which **Relevant Restoration Service Providers** (including **Anchor Plant Owners**) and which **Relevant Restoration Service Provider's** sites are covered by the **Distribution Restoration Zone Plan** and set out what is required from the relevant **Network Operator**, **The Company**, the **Relevant Scottish Transmission Licensee(s)** and each **Relevant Restoration Service Provider** should a **Black Start** situation arise.

(iv) Each **Distribution Restoration Zone Plan** shall be prepared by the relevant **Scottish Network Operator** in coordination with **The Company** to reflect the above discussions and agreement.

(v) Each page of the **Distribution Restoration Zone Plan** shall bear a date of issue and the issue number.

(vi) When a **Distribution Restoration Zone Plan** has been prepared, it shall be sent by the relevant **Network Operator** to **The Company**, **Relevant Scottish Transmission Licensee(s)** and the **Relevant Restoration Service Providers** involved for confirmation of its accuracy.

(vii) The **Distribution Restoration Zone Plan** shall then (if its accuracy has been confirmed) be signed by the relevant **Network Operator**, **The Company**, the **Relevant Scottish Transmission Licensee(s)** and **Relevant Restoration Service Providers** to confirm accuracy.

(viii) Once agreed under this OC9.4.7.6.2(b), the procedure will become a **Distribution Restoration Zone Plan** under the **Grid Code** and **Distribution Code** (subject to any change pursuant to this OC9 and DOC9 of the **Distribution Code**) and will apply between **The Company**, **Scottish Transmission Licensee**, **the Network Operator** and the **Relevant Restoration Service Providers** as if it were part of the **Grid Code**.

(ix) Once signed, a copy of the **Distribution Restoration Zone Plan** will be distributed by the relevant **Network Operator** to **The Company**, the **Relevant Scottish Transmission Licensee(s)** and each **Relevant Restoration Service Provider** which is a party to it accompanied by a note indicating the date of implementation.

(x) The **Network Operator**, **The Company**, the **Relevant Scottish Transmission Licensee(s)** and each **Relevant Restoration Service Provider** must make the **Distribution Restoration Zone Plan** readily available to the relevant operational staff.

(xi) If the relevant **Network Operator**, **The Company**, the **Relevant Scottish Transmission Licensee(s)** or any **Relevant Restoration Service Provider** which is a party to a **Distribution Restoration Zone Plan**, becomes aware that a change is needed to that **Distribution Restoration Zone Plan**, it shall initiate a discussion between the relevant **Network Operator**, **The Company**, the **Relevant Scottish Transmission Licensee(s)** and the **Relevant Restoration Service Providers** to seek to agree the relevant change. If a **Network Operator**, a **Relevant Scottish Transmission Licensee** or **Relevant Restoration Service Provider** becomes so aware, it shall contact **The Company** in coordination with the **Network Operator** who will then initiate such discussions. The principles applying to establishing a new **Distribution Restoration Zone Plan** under this OC9.4.7.6.2(b) shall apply to such discussions and to any consequent changes.

(xii) **The Company**, the **Relevant Scottish Transmission Licensee(s)**, the **Network Operator** and the **Relevant Restoration Service Providers** will conduct regular joint exercises of the **Distribution Restoration Zone Plan** to which they are parties. The objectives of such exercises include:

- To test the effectiveness of the **Distribution Restoration Zone Plan**;
- To provide for joint training of the parties in respect of the **Distribution Restoration Zone Plan**;
- To maintain the parties' awareness and familiarity of the **Distribution Restoration Zone Plan**;
- To promote understanding of each parties' roles under a **Distribution Restoration Zone Plan**;
- To identify any improvement areas which should be incorporated into the **Distribution Restoration Zone Plan**.

- The principles applying to the establishment of a new **Distribution Restoration Zone Plan** under this OC9.4.9 shall apply to any changes to the **Distribution Restoration Zone Plan**.

The Company in coordination with the **Relevant Network Operator** and **Relevant Scottish Transmission Licensee** will propose to the parties of a **Distribution Restoration Zone Plan** a date for the exercise to take place, to be agreed with the other parties. All the **Distribution Restoration Zone Plan** parties will jointly share the task of planning, preparing, participating in and facilitating the exercises, which will normally be in desktop format or as otherwise agreed. The precise timing of the exercise for each **Distribution Restoration Zone Plan** will be agreed by all parties but will not be less than one every 8 years.

OC9.4.7.7 Plan descriptions.

OC9.4.7.7.1. Local Joint Restoration Plan

(a) The following provisions apply in relation to a **Local Joint Restoration Plan**. For the avoidance of doubt, a **Distribution Restoration Zone** would not be considered to form part of a **Local Joint Restoration Plan** but instead would be treated under a **Distribution Restoration Zone Plan** as detailed in OC9.4.7.6.2. As set out in OC9.4.7.3, **The Company** may issue instructions which conflict with a **Local Joint Restoration Plan**. In such cases, these instructions will take precedence over the requirements of the **Local Joint Restoration Plan**. When issuing such instructions, **The Company** shall state whether or not it wishes the remainder of the **Local Joint Restoration Plan** to apply. If, not withstanding that, **The Company** has stated that it wishes the remainder of the **Local Joint Restoration Plan** to apply, the **Black Start Service Provider** or the relevant **Network Operator** consider that **The Company's** instructions mean that it is not possible to operate the **Local Joint Restoration Plan** as modified by those instructions, any of them may give notice to **The Company** and the other parties to the **Local Joint Restoration Plan** to this effect and **The Company** shall immediately consult with all parties to the **Local Joint Restoration Plan**. Unless all parties to the **Local Joint Restoration Plan** reach an agreement forthwith as to how the **Local Joint Restoration Plan** shall operate in those circumstances, operation in accordance with the **Local Joint Restoration Plan** will terminate.

(b) Where **The Company**, as part of a **Black Start**, has given an instruction to a **Black Start Service Provider** to initiate **Start-Up**, the relevant **Genset(s)** at the **Black Start Station** or **Black Start HVDC System** will **Start-Up** in accordance with the **Local Joint Restoration Plan**.

(c) **The Company** will advise the relevant **Network Operator** of the requirement to switch its **User System** so as to segregate its **Demand** and to carry out such other actions as set out in the **Local Joint Restoration Plan**. The relevant **Network Operator** will then operate in accordance with the provisions of the **Local Joint Restoration Plan**.

(d) **The Company** will ensure that switching carried out on the **National Electricity Transmission System** and other actions are as set out in the **Local Joint Restoration Plan**.

(e) Following notification from the **Black Start Service Provider** that the **Black Start Station** or **Black Start HVDC System** is ready to accept load, **The Company** will instruct the **Black Start Service Provider** to energise part of the **Total System**. The **Black Start Service Provider** and the relevant **Network Operator** will then, in accordance with the requirements of the **Local Joint Restoration Plan**, establish communication and agree the output of the relevant **Genset(s)** and/or **HVDC System** and/or **DC Converter Station** and the connection of **Demand** so as to establish a **Power Island**. During this period, the **Black Start Service Provider** will be required to regulate the output of the relevant **Black Start Station** or **Black Start HVDC System** to the **Demand** prevailing in the **Power Island** in which it is situated, on the basis that it will (where practicable) seek to maintain the **Target Frequency**. The **Genset(s)** at the **Black Start Station** or **Black Start HVDC System** will (where practical) also seek to follow the requirements relating to **Reactive Power** (which may include the requirement to maintain a target voltage) set out in the **Local Joint Restoration Plan**.

(f) Operation in accordance with the **Local Joint Restoration Plan** will be terminated by **The Company** (by notifying the relevant **Users**) prior to connecting the **Power Island** to other **Power Islands** (other than, in Scotland, as allowed for in the **Local Joint Restoration Plan**), or to the **User System** of another **Network Operator**, or to the synchronising of **Gensets** at other **Power Stations** or **HVDC Systems** or **DC Converter Station** (other than, in Scotland, those forming part of the **Local Joint Restoration Plan**). Operation in accordance with the **Local Joint Restoration Plan** will also terminate in the circumstances provided for in OC9.4.7.6.1~~(a)~~ if an agreement is not reached or if **The Company** states that it does not wish the remainder of the **Local Joint Restoration Plan** to apply. **Users** will then comply with the **Bid-Offer Acceptances** or **Emergency Instructions** of **The Company**.

(g) In Scotland, **Gensets** or **HVDC Systems** or **DC Converter Stations** included in a **Local Joint Restoration Plan**, but not at a **Black Start Station** or **Black Start HVDC System**, will operate in accordance with the requirements of the **Local Joint Restoration Plan**.

OC9.4.7.7.2 Distribution Restoration Zone Plan

(a) The following provisions apply in relation to a **Distribution Restoration Zone Plan**. For the avoidance of doubt, a **Local Joint Restoration Plan** would not be considered to form part of a **Distribution Restoration Zone Plan** but instead would be treated under a **Local Joint Restoration Plan** as detailed in OC9.4.7.6.1. As set out in OC9.4.7.3, **The Company** may issue instructions which conflict with a **Distribution Restoration Zone Plan**. In such cases, these instructions will take precedence over the requirements of the **Distribution Restoration Zone Plan**. When issuing such instructions, **The Company** shall state whether or not it wishes the remainder of the **Distribution Restoration Zone Plan** to apply. If, notwithstanding that, **The Company** has stated that it wishes the remainder of the **Distribution Restoration Zone Plan** to apply, the **Relevant Restoration Service Provider(s)** or the relevant **Network Operator** consider that **The Company's** instructions mean that it is not possible to operate the **Distribution Restoration Zone Plan** as modified by those instructions, any of them may give notice to **The Company** and the other parties to the **Distribution Restoration Zone Plan** to this effect and **The Company** shall immediately consult with all parties to the **Distribution Restoration Zone Plan**. Unless all parties to the **Distribution Restoration Zone Plan** reach an agreement forthwith as to how the **Distribution Restoration Zone Plan** shall operate in those circumstances, operation in accordance with the **Distribution Restoration Zone Plan** will terminate.

(b) Where **The Company**, as part of a **Black Start** condition, has given an instruction to a **Network Operator** to initiate **Start-Up** of a **Distribution Restoration Zone**, the **Relevant Restoration Service Providers** (which could include **Anchor Plant Owners**) will **Start-Up** their **Plant** in accordance with the **Distribution Restoration Zone Plan**.

(c) **The Company** will ensure that switching carried out on the **National Electricity Transmission System** and other actions are as set out in the **Distribution Restoration Zone Plan**.

(d) Following notification from the **Network Operator** that its network has been configured to form a **Distribution Restoration Zone**, the necessary protection, control and any automatic facilities (including the use of a **Distribution Restoration Zone Control System** if applicable) are ready and **Relevant Restoration Service Providers** are ready including **Anchor Plant Owners**– are ready, **The Company** will instruct the **Network Operator** to energise part of the **Network Operators System**. The relevant **Network Operator** will then, in accordance with the requirements of the **Distribution Restoration Zone Plan**, establish communication and agree the output of the relevant **Anchor Plant** and **Relevant Restoration Service Providers Plant** and the connection of **Demand** so as to establish a **Power Island**. During this period, the **Network Operator** or **Distribution Restoration Control System** will manage the output of the relevant **Anchor Plant** and/or **Relevant Restoration Service Provider's Plant** to the **Demand** prevailing in the **Power Island** in which it is situated, on the basis that it will (where practicable) seek to maintain the **Target Frequency**. **Relevant Restoration Service Providers** (including **Anchor Plant**– **Owners**) will (where practical) also seek to follow the requirements relating to **Reactive Power** (which may include the requirement to maintain a target voltage) set out in the **Distribution Restoration Zone Plan**.

(e) Operation in accordance with the **Distribution Restoration Zone Plan** will be terminated by **The Company** (by notifying the relevant **Users**) when appropriate to do so which would be dependent upon **System** conditions. Operation in accordance with the **Distribution Restoration Zone Plan** will also terminate in the circumstances provided for in OC9.4.7.7.2(a) if an agreement is not reached or if **The Company** states that it does not wish the remainder of the **Distribution Restoration Zone Plan** to apply.

OC9.4.7.8 Distribution Restoration Zone Operation

OC9.4.7.8.1 A **Distribution Restoration Zone** is established where following a **Total Shutdown** or **Partial Shutdown**, **The Company** issues **Emergency Instructions** to one or more **Network Operators** to energise one or more sections of their de-energised network using **Anchor Plant** and a combination of **Relevant Restoration Service Provider's Plant** and **Apparatus** to form one or more **Power Islands**.

OC9.4.7.8.2 It is imperative that where a **Network Operator** has one or more **Distribution Restoration Zones** available for use, the **Anchor Plant** forming part of a **Distribution Restoration Zone** is capable of satisfying the requirements of OC5.7.1.2 and OC.5.7.4 and that the **Network Operator** has confirmed to **The Company** that the **Distribution Restoration Zone** is available and in a state of readiness.

OC9.4.7.8.3 In the case of a **Black Start** event, and **The Company** wishes to initiate one or more **Distribution Restoration Zones**, **The Company** will issue an **Emergency Instruction** to one or more **Network Operators** for them to initiate the relevant **Distribution Restoration Zone**. In Scotland the **Emergency Instruction** to a Scottish **Network Operator** to initiate a **Scottish Distribution Restoration Zone** would be undertaken by the relevant **Scottish Transmission Licensee**. For the avoidance of doubt, **The Company** will issue instructions to initiate **Black Start** in Scotland via STCP 06-1 which will include arrangements for the establishment of Scottish **Distribution Restoration Zones**.

OC9.4.7.8.4 Upon receipt of an **Emergency Instruction** from **The Company** (or relevant **Scottish Transmission Licensee**), **The Network Operator** will confirm and acknowledge receipt of the **Emergency Instruction** in accordance with the requirements of BC2.9.2 and start initiating the establishment of the **Distribution Restoration Zone** in accordance with the **Distribution Restoration Zone Plan**.

OC9.4.7.8.5 Upon receipt of the **Emergency Instruction** from **The Company** (or relevant **Scottish Transmission Licensee**) to the **Network Operator** to establish a **Distribution Restoration Zone** as provided for in OC9.4.7.8.4, all instructions to **Relevant Restoration Service Providers** including **Anchor Plant Owners** forming part of the **Distribution Restoration Zone** will be issued by the **Network Operator**. For the avoidance of doubt, instructions to **Restoration Service Providers** forming part of the **Distribution Restoration Zone** will be issued by the **Relevant Network Operator** unless **The Company** or relevant **Scottish Transmission Licensee** as a matter of urgency needs to contact that **Restoration Service Provider** directly, in which case **The Company** will notify the **Relevant Network Operator** as soon as possible as to why it has had to instruct that **Restoration Service Provider** directly. These arrangements will remain in place until the **Distribution Restoration Zone** is **Re-synchronised** to the **National Electricity Transmission System** and **The Company** and **Network Operator** agree that the **Distribution Restoration Zone** can be terminated, from when instructions to **Users** and **Restoration Service Providers** will revert back to the provisions of the Grid Code **Operating Codes** and **Balancing Codes** covering normal operating conditions.

OC9.4.7.8.6 Where **The Company** (or relevant **Scottish Transmission Licensee**) issues an **Emergency Instruction** to a **Network Operator** to establish a **Distribution Restoration Zone**, the **Network Operator** will first issue instructions to **Anchor Plant Owners** informing them of the requirement to prepare their **Plant** and **Apparatus** to re- energise part of the **Network Operators System** in accordance with the **Distribution Restoration Zone Plan**. The **Network Operator** in liaison with the **Anchor Plant Owner** will discuss when their **Plant** is expected to be available and ready to start energising the **Network Operator's System**. For the avoidance of doubt, **Anchor Plant Owners** shall not start to energise sections of the **Network Operators System** until given a formal instruction by the **Network Operator** in accordance with OC9.4.7.8.12 and this instruction would only take place once the **Network Operator** has configured its **System** and taken the necessary additional actions to prepare its **System** to be re-energised unless automatic switching takes place through the action of a **Distribution Restoration Zone Control System**.

OC9.4.7.8.7 Following completion of OC9.4.7.8.6, the **Network Operator** will then issue instructions to **Relevant Restoration Service Providers**, forming part of the **Distribution Restoration Zone** to inform them of the requirement that a **Distribution Restoration Zone** is to be established in accordance with the **Distribution Restoration Zone Plan** and to prepare their **Plant** and **Apparatus** so that it is in a state of readiness for contributing to the establishment of the **Distribution Restoration Zone**. **Relevant Restoration Service Provider(s)** will inform the **Network Operator** of the indicative time of when their **Plant** and **Apparatus** will be in a state of readiness to energise and synchronise to the **System**. For the avoidance of doubt, **Relevant Restoration Service Providers** shall not start to synchronise to the **Network Operators System** until given a formal instruction by the **Network Operator** in accordance with OC9.4.7.8.12 and these instructions would only take place once the **Network Operator** has energised part of its **System** by issuing instructions to **Anchor Plant Owners** and the **Network Operators System** is in a position to expand and supply more **Demand** unless automatic instructions take place by a **Distribution Restoration Zone Control System**.

OC9.4.7.8.8 The **Network Operator** shall contact **The Company** (and relevant **Scottish Transmission Licensee** in the case of a Scottish **Distribution Restoration Zone**) advising that it has contacted the appropriate **Anchor Plant Owners** and **Restoration Service Providers** in accordance with the **Distribution Restoration Zone Plan** and provided an indicative time of when its **System** and associated **Plant** and **Apparatus** is in a position to be re-energised and the expected time of when the **Anchor Plant Owner** in a position to re-energise sections of the **Network Operators System**.

OC9.4.7.8.9 In addition to the requirements of OC9.4.7.8.6 to OC9.4.7.8.8, the **Network Operator** shall start to reconfigure its **System** such that it is in an appropriate state of readiness to enable the **Anchor Plant Owner** to re-energise part of its **System** in accordance with the **Distribution Restoration Zone Plan**. To enable this process to take place, the **Network Operator** may need to change the topology and status of its **System** which may include but shall not be limited to changing the status of circuit breakers in addition to adjusting control system and protection settings. Reconfiguration of the **Network Operator's System** prior to energisation of the **Network Operator's System**, may be achieved by instructions carried out by manual means, switching carried out automatically from the **Network Operators Control Centre** or via fully automatic means which could include a **Distribution Restoration Zone Control System**.

OC9.4.7.8.10 Once the **Network Operator** has reconfigured its **System** and associated **Plant** and **Apparatus** (including but not limited to **Protection** and control system settings) it will contact the **Anchor Plant Owner** (which could also be achieved by the **Distribution Restoration Zone Control System**) to confirm and agree a time for the **Anchor Plant Owner** to operate their **Plant** so as to energise a section of the **Network Operators System**. Where the **Anchor Plant Owner** or **Network Operator** needs to change the agreed energisation time as a result of an unforeseen event such as, but not limited to, a faulty item of **Plant** or **Apparatus**, safety issue or unavailability of personnel, the **Anchor Plant Owner** or **Network Operator** will agree a revised energisation time.

OC9.4.7.8.11 The **Network Operator** will inform **The Company** (or relevant **Scottish Transmission Licensee** in the case of a **Scottish Distribution Restoration Zone**) of the time when the **Anchor Plant Owner** is scheduled to energise a section of the **Network Operator's System**. Should this scheduled time vary, the **Network Operator** will inform **The Company** (or relevant **Scottish Transmission Licensee** in the case of a **Scottish Distribution Restoration Zone**) as necessary and provide an indication of any revised re-energisation time and the reason for the change.

OC9.4.7.8.12 At the agreed re-energisation time as detailed in OC.9.4.7.8.11, the **Network Operator** will contact the **Anchor Plant Owner** and issue an **Instruction** for the **Anchor Plant Owner** to energise a section of the **Network Operators System** unless this is achieved via fully automatic means which could include a **Distribution Restoration Zone Control System**. In addition and following the issue of instructions to **Anchor Plant Owners**, the **Network Operator** will instruct other **Restoration Service Providers** in the **Distribution Restoration Zone** as part of the wider restoration phase which again could be achieved through fully automatic means using a **Distribution Restoration Zone Control System**.

OC9.4.7.8.13 With the **Network Operator's System** energised and feeding some local **Demand** or controllable **Demand** provided by a **Relevant Restoration Service Provider**, the **Anchor Plant Owner** will be required to maintain voltage and **Target Frequency** upon instruction from the **Network Operator** or via fully automatic means which could include a **Distribution Restoration Zone Control System**. The **Network Operator** and/or **Distribution Restoration Zone Control System** shall instruct the **Anchor Plant Owner** to ensure the **Network Operator's System** is run in a stable manner. Further additional **Demand Blocks** will be switched into service when it is appropriate to do so. As part of this process, the **Network Operator** in coordination with the **Anchor Plant Owner** shall ensure there is no risk to the **Network Operator's System** or the **Anchor Plant** through disturbances that could arise on the **Distribution Restoration Zone**. This may be achieved through a series of energisation steps between the **Anchor Plant** and sections of the **Network Operator's System**. The requirements of OC9.4.7.8.12 may be achieved via manual instructions, remote switching carried out at the **Network Operator's Control Centre**, a **Distribution** via **a Restoration Zone Control System** or a combination of these options.

OC9.4.7.8.14 It is normal practice for the **Demand** within a **Distribution Restoration Zone** to be restored with a **Distribution Restoration Zone Control System**, however if during the **Demand** restoration process any **Relevant Restoration Service Providers Plant** or **Apparatus** cannot, because of the nature of the **Demand** being supplied, keep within its safe operating parameters, the, **Relevant Restoration Service Provider** shall inform the relevant **Network Operator** and the **Relevant Network Operator** shall inform **The Company**. In the case of a **Distribution Restoration Zone** in Scotland the **Scottish Network Operator** shall inform the relevant Scottish **Transmission Licensee**.

The relevant **Network Operator** or **Distribution Restoration Zone Control System** will, where possible, either instruct **Demand** to be altered or will re-configure the **Distribution Restoration Zone** or will instruct the **Relevant Restoration Service Provider** forming part of the **Distribution Restoration Zone** to re-configure its **System** in order to alleviate the problem being experienced by the **Relevant Restoration Service Provider's Plant** and **Apparatus**. **The Company** and relevant **Network Operator** (and **Relevant Transmission Licensee** in Scotland) accepts that any decision to keep a **Relevant Restoration Service Provider's Plant** and **Apparatus** from operating, if outside its safe operating parameters, is one for the **Restoration Service Provider** concerned alone and accepts that the **Relevant Restoration Service Provider's Plant** and **Apparatus** may change output if it believes it is necessary for safety reasons (whether relating to personnel or **Plant** and/or **Apparatus**). If such a change is made without prior notice, then the **Relevant Restoration Service Provider** shall inform the relevant **Network Operator** as soon as reasonably practical.

OC9.4.7.8.15 To stabilise the voltage and **Frequency** of the **Network Operator's System** and increase the volume of **Demand** fed from within the **Power Island**, the **Network Operator** will subsequently need to instruct further **Relevant Restoration Service Providers** to synchronise to the **Power Island**, either via manual instruction or through the use a **Distribution Restoration Zone Control System**. During this phase the control of **Frequency** and voltage of the **Distribution Restoration Zone** will be the responsibility of the **Network Operator**. For the avoidance of doubt, the overall control of **System Frequency** during the whole **Black Start** phase is the responsibility of **The Company**, although **The Company** will require **Transmission Licensees** in Scotland to manage the **Frequency** and voltage levels of **Power Islands** as provided for in STCP 06-1 or **Network Operators** to manage the **Frequency** and voltage levels of **Power Islands** in the case of **Distribution Restoration Zones**.

OC9.4.7.8.16 With the **Power Island** established as described in OC9.4.7.8.14 and OC9.4.7.8.15 and in accordance with the **Distribution Restoration Zone Plan**, the **Network Operator** shall then undertake a step by step process of energising more elements of its **System** by restoring auxiliary supplies to substations and the restoration of supplies to **Customers**. During this phase, each **Relevant Restoration Service Provider's Plant** and **Apparatus** is to be operated within its designed operational limits. The **Network Operator** and/or **Distribution Restoration Zone Control System** shall ensure **Restoration Service Providers** are able (where applicable) to contribute to voltage and **Frequency** control and adequate positive and negative headroom is maintained on such **Plant** to enable the management of **Power Island** contingences. During this period, there may be a need to initiate **Relevant Restoration Service Provider's Plant** and **Apparatus** to balance the **Power Island**

OC9.4.7.8.17 As the **Distribution Restoration Zone** starts to grow and become more clearly established, the **Network Operator** will need to update the **Protection** and control settings as the need arises.

OC9.4.7.8.18 With the **Distribution Restoration Zone** now operating in a stable manner, the **Network Operator** and/or **Distribution Restoration Zone Control System** shall ensure that that **Relevant Restoration Service Providers Plant** and **Apparatus** are operated within safe operating limits and have a sufficient volume of headroom to be able to contribute to voltage and **Frequency** control. This is an essential pre-requisite to enable th**e Power Island** to withstand volatility in **Demand** and generation, **Network Operator** interaction or credible faults and disturbances.

OC9.4.7.8.19 Expansion of a **Distribution Restoration Zone** to a **Transmission** busbar and to wider parts of the **Transmission System** would fall under the **Distribution Restoration Zone Plan** and the requirements of OC9.5.

ExpansionInterconnection of Power Islands

OC9.4.7.97 **The Company** will instruct the relevant **Users** so as to expandinterconnect **Power Islands** to achieve larger sub-systems, and subsequently the interconnection of these sub-systems to form an integrated system. This should eventually achieve the re-establishment of the **Total System** or that part of the **Total System** subject to the **Partial Shutdown**, as the case may be. The interconnection of **Power Islands** and sub-systems will utilise the provisions of all or part of OC9.5 (**Re-Synchronisation** of **De-synchronised Islands**) and in such a situation, such provisions will be part of the **Black Start**.

OC9.4.7.108 As part of the **Black Start** strategy, each **Network Operator** which:-

(a) hascomprisewith either an **Embedded Black Start Station** or an **Embedded HVDC System** or **Embedded DC Converter Station**, and which has established a **Power Island**, howsoever arising within its **User System** or with any **Embedded Power Stations** or **Embedded HVDC Systems** or **Embedded DC Converter Stations** within its **User System** which have become islanded, may in liaison with **The Company** sustain and expand these islands in accordance with the relevant provisions of OC9.5 which shall apply to this OC9.4 as if set out here. In this instance, the arrangements would fall under the provisions of a **Local Joint Restoration Plan**; and/or.

(b) has established one or more **Distribution Restoration Zones** upon instructions from **The Company** or **Relevant Scottish Transmission Licensee**, will notify **The Company** or **Relevant Scottish Transmission Licensee** when the **Distribution Restoration Zone** is operational and feeding local **Demand**. The **Network Operator** in liaison with **The Company** or **Relevant Scottish Transmission Licensee** may sustain and expand these **Power Islands** in accordance with the relevant provisions of OC9.5 which shall apply to this OC9.4 as if set out here. In this instance, the arrangements would fall under the provisions of a **Distribution Restoration Zone Plan.**

In either case, the **Network Operator**They will inform **The Company** or **Relevant Scottish Transmission Licensee** of their actions and will not **Re-Synchronise** to the **National Electricity Transmission System** or any **User's System** which is already **Synchronised** to the **National Electricity Transmission System** without **The Company's** agreement.

OC9.4.7.11 Interconnection of Power Islands

The Company will subsequently interconnect the expanded **Power Islands** detailed in OC9.4.7.9 and OC9.4.7.10 to form sub-systems which will then be connected to form an integrated system as detailed in OC9.5. This should eventually achieve the re-establishment of the **Total System** or that part of the **Total System** subject to the **Partial Shutdown**, as the case may be. The interconnection of **Power Islands** and sub-systems will utilise the provisions of all or part of OC9.5 (**Re-Synchronisation** of **De-synchronised Islands**) and in such a situation, such provisions will be part of the **Black Start**.

Return the Total System Back to Normal Operation

OC9.4.7.12 **The Company** shall, as soon as reasonably practical, inform **Users** and the **BSCCo** when the **Total System** could return to normal operation. Any such determination by **The Company** does not mean that the provisions of Section G paragraph 3 (Black Start) of the **BSC** shall cease to apply.

In making the determination that the **Total System** could return to normal operation, **The Company**, would consider, amongst other things, the following areas:

(a) the extent to which the **National Electricity Transmission System** is contiguous and energised;

(b) the integrity and stability of the **National Electricity Transmission System** and its ability to operate in accordance with the **Licence Standards**;

(c) the impact that returning to normal may have on transmission constraints and the corresponding ability to maximise the **Demand** connected; and

(d) the volume of generation, **Electricity Storage** or **Demand** not connected to the **National Electricity Transmission System**; and

(e) the functionality of normal communication systems (i.e. electronic data communication facilities, **Control Telephony**, etc).

In the event that the **Balancing Mechanism** has been suspended, it will not resume until the start of the **Settlement Period** determined by the **BSC Panel** in accordance with paragraph G3.1.2(d)(i) of the **BSC**.

For the avoidance of doubt, until resumption of the **Balancing Mechanism**, **The Company** is likely to continue to issue **Emergency Instructions** in accordance with BC2.9.

Users shall use reasonable endeavours to submit **Physical notifications** ten hours prior to the start of the **Settlement Period** determined by the **BSC Panel** in accordance with paragraph G3.1.2(d)(i) of the BSC and as notified by **The Company** to **Users**, in preparation for a return to normal operations.

In the event that the **Balancing Mechanism** has not been suspended and **The Company** has determined that the **Total System** has returned to normal operation, **The Company** shall inform **Users** and the **BSCCo** as soon as possible of the time and date at which (in **The Company's** determination) the **Total System** returned to normal operation.

Conclusion of Black Start

OC9.4.7.13 The provisions of this **OC9** shall cease to apply with effect from either:

(a) Where the **Balancing Mechanism** was suspended, the start of the **Settlement Period** that the **Balancing Mechanism** resumed normal operation, as determined by the **BSC Panel** and notified by the **BSCCo** in accordance with the provisions of the **BSC**; or

(b) Where the **Balancing Mechanism** was not suspended, the end of the **Settlement Period** determined and notified by the **BSCCo** (in accordance with the provisions of the **BSC**) and corresponding to the time and date that **The Company** determined that the **Total System** had returned to normal operation.

Externally Interconnected System Operators

OC9.4.7.14 During a **Black Start**, **The Company** –will, pursuant to the **Interconnection Agreement** with **Externally Interconnected System Operators**, agree with **Externally Interconnected System Operators** when their transmission systems can be **Re-Synchronised** to the **Total System**, if they have become separated.

OC9.5 RE-SYNCHRONISATION OF DE-SYNCHRONISED ISLANDS

The provisions in this OC9.5 do not apply to the parts of the **Total System** that normally operate **Out of Synchronism** with the rest of the **National Electricity Transmission System**.

Further requirements, including the provision of information, applying to **Re-synchronisation** of **De-synchronised Islands** following any **Total Shutdown** or **Partial Shutdown** are detailed in OC9.5.6.

OC9.5.1

(a) Where parts of the **Total System** are **Out of Synchronism** with each other (each such part being termed a "**De-Synchronised Island**"), but there is no **Total Shutdown** or **Partial Shutdown**, **The Company** will instruct **Users** to regulate generation or **Demand**, as the case may be, to enable the **De-Synchronised Islands** to be **Re-Synchronised** and **The Company** will inform those **Users** when **Re-Synchronisation** has taken place.

(b) As part of that process, there may be a need to deal specifically with **Embedded** generation or storage in those **De-Synchronised Islands**. This OC9.5 provides for how such **Embedded** generation or storage should be dealt with. In Scotland, this OC9.5 also provides for how **Transmission** connected generation in **De-Synchronised Islands** should be dealt with.

(c) In accordance with the provisions of the **BC**, **The Company** may decide that, to enable **Re-Synchronisation**, it will issue **Emergency Instructions** in accordance with BC2.9 and it may be necessary to depart from normal **Balancing Mechanism** operation in accordance with **BC2** in issuing **Bid-Offer Acceptances**.

(d) The provisions of this OC9.5 shall also apply during a **Black Start** to the **Re-Synchronising** of parts of the **System** following a **Total** or **Partial Shutdown**, as indicated in OC9.4. In such cases, the provisions of ~~the~~ OC9.5 shall apply following completion and/or termination of the relevant **Local Joint Restoration Plan(s)** process as referred to in OC9.4.7.7.1.~~OC9.4.7.6.1~~(f) or relevant **Distribution Restoration Zone Plans** as referred to in OC9.4.7.7.2(e).

(e) It is possible that a **Network Operator** may establish one or more **Distribution Restoration Zones** within its **Network Operator's System** in accordance with the requirement of OC9.4.7.8.1 to OC9.4.7.8.19. Following notification to **The Company** (and **Scottish Transmission Licensee** where relevant) and following confirmation that both **Distribution Restoration Zones** are in a state of readiness, the **Network Operator** will after checking all relays, **Protection** and control settings, **Synchronise** the two **Distribution Restoration Zones** together by closing the circuit breaker between the two **Power Islands**. For the avoidance of doubt, where two **Distribution Restoration Zones** are joined together to form one larger **Power Island**, the subsequent **Resynchronisation** to the **National Electricity Transmission System** would follow the requirements of OC9.4.7.10(b). Following the successful synchronisation of two or more **Distribution Restoration Zones** the relevant **Network Operator** shall inform **The Company** (and **Scottish Transmission Licensee** where relevant) of the establishment of the larger **Power Island**.

OC9.5.2 Island loading and generation Data ~~Submission~~~~Options~~management

Generation in those **De-Synchronised Islands** may be dealt with in two~~hree~~ different ways, more either~~than one~~ of which may be utilised in relation to any particular incident:-

OC9.5.2.1 Indirect Data

OC9.5.2.1.1 Indirect Data in respect of Black Start and Local Joint Restoration Plans

(a) **The Company**, each **Generator** with **Synchronised** (or connected and available to generate although not **Synchronised**) **Genset(s)** in the **De-Synchronised Island** and the **Network Operator** whose **User System** forms all or part of the **De-Synchronised Island** ~~-~~shall exchange information as set out in this OC9.5.2.1.1 to enable **The Company** to issue a **Bid-Offer Acceptance** or an **Emergency Instruction** to that **Generator** in relation to its **Genset(s)** in the **De-Synchronised Island** until **Re-Synchronisation** takes place, on the basis that it will (where practicable) seek to maintain the **Target Frequency**.

(b) The information to **The Company** from the **Generator** will cover its relevant operational parameters as outlined in the **BC** and from **The Company** to the **Generator** will cover data on **Demand** and changes in **Demand** in the **De-Synchronised Island**.

(c) The information from the **Network Operator** to **The Company** will comprise data on **Demand** in the **De-Synchronised Island**, including data on any constraints within the **De-Synchronised Island**.

(d) **The Company** will keep the **Network Operator** informed of the **Bid-Offer Acceptances** or **Emergency Instructions** it is issuing to **Embedded Genset(s)** within the **Network Operator's User System** forming part of the **De-Synchronised Island**.

OC9.5.2.1.2 Indirect Data in respect of Distribution Restoration Zone and Distribution Restoration Zone Plans

(a~~e~~) **The Network Operator** and each **Relevant Restoration Service Provider** in the **Distribution Restoration Zone** shall exchange information as set out in this OC9.5.2.1.2 to enable the **Network Operator** to issue instructions to **Restoration Service Providers** in relation to their~~its~~ **Plant** and **Apparatus** in order for **Target Frequency** to be maintained.~~.~~

(b) T~~t~~he **Network Operator** will request any relevant operational parameters required from the **Restoration Service Provider** which will be relevant for the operation of the **Distribution Restoration Zone**.

(c) **The Network Operator** will keep **The Company** informed of the progress of establishing and running the **Distribution Restoration Zone** within the **Network Operator's System** forming part of the **Power Island**.

OC9.5.2.2 Direct Data

OC9.5.2.2.1 Direct Data in respect of Black Start and Local Joint Restoration Plans

(a) **The Company** will issue an **Emergency Instruction** and/or a **Bid-Offer Acceptance**, to the **Generator** to "float" local **Demand** and maintain **Frequency** at **Target Frequency**. Under this, the **Generator** will be required to regulate the output of its **Genset(s)** at the **Power Station** in question to the **Demand** prevailing in the **De-Synchronised Island** in which it is situated, until **Re-Synchronisation** takes place, on the basis that it will (where practicable) seek to maintain the **Target Frequency**.

(b) The **Network Operator** is required to be in contact with the **Generator** at the **Power Station** so the **Network Operator** can ~~to~~ supply data to the **Generator** on **Demand** changes within the **De-Synchronised Island**.

(c) If more than one **Genset** is **Synchronised** on the **De-Synchronised Island**, or is connected to the **De-Synchronised Island** and available to generate although not **Synchronised**, the **Network Operator** will need to liaise with **The Company** to agree which **Genset(s)** will be utilised to accommodate changes in **Demand** in the **De-Synchronised Island**. The **Network Operator** will then maintain contact with the relevant **Generator** (or **Generators**) in relation to that **Genset(s)**.

(d) The **Generator** at the **Power Station** must contact the **Network Operator** if the level of **Demand** which it has been asked to meet as a result of the **Emergency Instruction** and/or **Bid-Offer Acceptance** to "float" and the detail on **Demand** passed on by the **Network Operator**, is likely to cause problems for safety reasons (whether relating to personnel or **Plant** and/or **Apparatus**) in the operation of its **Genset(s)**, in order that the **Network Operator** can alter the level of **Demand** which that **Generator** needs to meet. Any decision to operate outside any relevant parameters is one entirely for the **Generator**.

OC9.5.2.2.2 Direct Data in respect of Distribution Restoration Zone and Distribution Restoration Zone Plans

(a) Once a **Distribution Restoration Zone** has been established a **Network Operator** will issue ~~i~~Instructions to **Anchor Plant** to "float" local **Demand** and maintain **Frequency** at **Target Frequency**. **Anchor Plant Owners** shall regulate the output of their **Plant** to the **Demand** prevailing in the **De-Synchronised Island** in which it is situated, until **Re-Synchronisation** takes place, on the basis that it will (where practicable) seek to maintain the **Target Frequency**.

(b) The **Network Operator** shall be in contact with the **Anchor Plant Owner** to supply data on **Demand** changes within the **De-Synchronised Island**.

(c) The **Anchor Plant Owner** must contact the **Network Operator** if the level of **Demand** which it has been asked to meet as a result of the **Instruction** to "float", is likely to cause problems for safety reasons (whether relating to personnel or **Plant** and/or **Apparatus**) in the operation of its **Anchor Plant**, in order that the **Network Operator** can alter the level of **Demand** which that **Anchor Plant** needs to meet. Any decision to operate outside any relevant parameters is one entirely for the **Anchor Plant Owner**.

OC9.5.2.3 Control Features

(a) A system may be established in relation to a part of the **National Electricity Transmission System** and a **Network Operator's User System**, if agreed between **The Company** and the **Network Operator** and any relevant **Generator(s)**, whereby upon a defined fault(s) occurring, manual or automatic control features will operate to protect the **National Electricity Transmission System** and relevant **Network Operator's User System** and **Genset(s)** and simplify the restoration of **Demand** in the **De-Synchronised Island**.

(b) In agreeing the establishment of such a system of control features **The Company** will need to consider its impact on the operation of the **National Electricity Transmission System**.

(c) In the case of a **Distribution Restoration Zone**, **The Company** (or **Relevant Scottish Transmission Licensee**) will instruct a **Network Operator** to establish a **Distribution Restoration Zone**. In establishing a **Distribution Restoration Zone**, the **Network Operator** will use a combination of instructions to **Relevant Restoration Service Providers** and the use of one or more **Distribution Restoration Zone Control Systems** to ensure the integrity and safety of plant and personnel forming the established **Power Island**.

OC9.5.2.4 Absence of Control Features System

If a system of control features under OC9.5.2.3 has not been agreed as part of an **OC9 De-Synchronised Island Procedure** under OC9.5.4 below, **The Company** may choose to utilise the procedures set out in OC9.5.2.1 or OC9.5.2.2, or may instruct the **Genset(s)** (or some of them) in the **De-Synchronised Island** to **De-Synchronise**.

OC9.5.3 Choice Of Option

In relation to either~~each~~ of the methods set out in OC9.5.2, where a **De-Synchronised Island** has come into existence and where an **OC9 De-Synchronised Island Procedure** under OC9.5.4 has been agreed, **The Company**, the **Network Operator** and relevant **Generator(s)** will operate in accordance with that **OC9 De-Synchronised Islands Procedure** unless **The Company** considers that the nature of the **De-Synchronised Island** situation is such that either:-

(i) the **OC9 De-Synchronised Island Procedure** does not cover the situation; or

(ii) the provisions of the **OC9 De-Synchronised Island Procedure** are not appropriate,

in which case **The Company** will instruct the relevant **Users** and the **Users** will comply with **The Company's** instructions (which in the case of **Generators** will relate to generation and in the case of **Network Operators** will relate to **Demand**). For the avoidance of doubt, where **The Company** (or **Relevant Scottish Transmission Licensee**) has instructed a **Network Operator** to establish a **Distribution Restoration Zone** to be established, the requirements of OC9.4.5.2 shall apply.

OC9.5.4 Agreeing Procedures

In relation to each relevant part of the **Total System**, **The Company**, the **Network Operator** and the relevant **Generator** will discuss and may agree a local procedure (an "**OC9 De-Synchronised Island Procedure**").

OC9.5.4.1 Where ~~there is no relevant local procedure in place at 12th May 1997, or in the case where~~ the need for an **OC9 De-Synchronised Island Procedure** arises for the first time, the following provisions shall apply:

(a) **The Company**, the **Network Operator(s)** and the relevant **Generator(s)** will discuss the need for, and the detail of, the **OC9 De-Synchronised Island Procedure**. As soon as the need for an **OC9 De-Synchronised Island Procedure** is identified by **The Company** or a **User**, and the party which identifies such a need will notify all affected **Users** (and **The Company**, if that party is a **User**), and **The Company** will initiate these discussions.

(b) Each **OC9 De-Synchronised Island Procedure** will be in relation to a specific **Grid Supply Point**, but if there is more than one **Grid Supply Point** between **The Company** and the **Network Operator** then the **OC9 De-Synchronised Island Procedure** may cover all relevant **Grid Supply Points**. In Scotland, the **OC9 De-Synchronised Island Procedure** may also cover parts of the **National Electricity Transmission System** connected to the **User's System(s)** and **Power Stations** directly connected to the **National Electricity Transmission System** which are also likely to form part of the **Power Island**.

(c) The **OC9 De-Synchronised Island Procedure** will:

(i) record which **Users** and which **User Sites** are covered by the **OC9 De-Synchronised Island Procedure**;

(ii) record which of the three methods set out in OC9.5 (or combination of the three) shall apply, with any conditions as to applicability being set out as well;

(iii) set out what is required from **The Company** and each **User** should a **De-Synchronised Island** arise;

(iv) set out what action should be taken if the **OC9 De-Synchronised Island Procedure** does not cover a particular set of circumstances and will reflect that in the absence of any specified action, the provisions of OC9.5.3 will apply;

(v) in respect of **Scottish Transmission Systems**, the **OC9 De-Synchronised Island Procedure** may be produced with and include obligations on the **Relevant Scottish Transmission Licensee(s)** ; and

(vi) in respect of **Scottish Transmission Systems**, where the **OC9 De-Synchronised Island Procedure** includes the establishment of a **De-synchronised Island**, describe the route for establishment of the **De-Synchronised Island**.

(d) Each **OC9 De-Synchronised Island Procedure** shall be prepared by **The Company** to reflect the above discussions.

(e) Each page of the **OC9 De-Synchronised Island Procedure** shall bear a date of issue and the issue number.

(f) When an **OC9 De-Synchronised Island Procedure** is prepared, it shall be sent by **The Company** to the **Users** involved for confirmation of its accuracy.

(g) The **OC9 De-Synchronised Island Procedure** shall then be signed on behalf of **The Company** and on behalf of each relevant **User** by way of written confirmation of its accuracy.

(h) Once agreed under this OC9.5.4.1, the procedure will become an **OC9 De-Synchronised Island Procedure** under the **Grid Code** and (subject to any change pursuant to this OC9) will apply between **The Company**, **Relevant Transmission Licensee** and the relevant **Users** as if it were part of the **Grid Code**.

(i) Once signed, a copy will be distributed by **The Company** to each **User** which is a party accompanied by a note indicating the issue number and the date of implementation.

(j) **The Company** and **Users** must make the **OC9 De-Synchronised Island Procedure** readily available to the relevant operational staff.

(k) If a new **User** connects to the **Total System** and needs to be included with an existing **OC9 De-Synchronised Island Procedure**, **The Company** will initiate a discussion with that **User** and the **Users** which are parties to the relevant **OC9 De-Synchronised Island Procedure**. The principles applying to a new **OC9 De-Synchronised Island Procedure** under this OC9.5.4.1 shall apply to such discussions and to any consequent changes.

(l) If **The Company**, or any **User** which is a party to an **OC9 De-Synchronised Island Procedure**, becomes aware that a change is needed to that **OC9 De-Synchronised Island Procedure**, it shall (in the case of **The Company**) initiate a discussion between **The Company** and the relevant **Users** to seek to agree the relevant change. The principles applying to establishing a new **OC9 De-Synchronised Island Procedure** under this OC9.5.4.1 shall apply to such discussions and to any consequent changes. If a **User** becomes so aware, it shall contact **The Company** who will then initiate such discussions.

(m) If in relation to any discussions, agreement cannot be reached between **The Company** and the relevant **Users**, **The Company** will operate the **System** on the basis that it will discuss which of the three methods set out in OC9.5.2.1 to OC9.5.2.3 would be most appropriate at the time, if practicable. The complexities and uncertainties of recovery from a **De-Synchronised Island** means that **The Company** will decide, having discussed the situation with the relevant **Users** and taking into account the fact that the three methods may not cover the situation or be appropriate, the approach which is to be followed. **The Company** will instruct the relevant **Users** and the **Users** will comply with **The Company 's** instructions as provided in OC9.5.3.

OC9.5.4.2 Where there is a relevant local procedure in place at 12th May 1997, the following provisions shall apply:

(a) **The Company** and the **Network Operator** and the relevant **Generator(s)** will discuss the existing procedure to see whether it is consistent with the principles set out in this OC9.5.

(b) If it is, then it shall become an **OC9 De-Synchronised Island Procedure** under this **OC9**, and the relevant provisions of OC9.5.4.1 shall apply.

(c) If it is not, then the parties will discuss what changes are needed to ensure that it is consistent, and once agreed the procedure will become an **OC9 De-Synchronised Island Procedure** under this **OC9**, and the relevant provisions of OC9.5.4.1 shall apply.

(d) If agreement cannot be reached between **The Company** and the relevant **Users** after a reasonable period of time, the existing procedure will cease to apply and **The Company** will operate the **System** on the basis that it will discuss which of the three methods set out in OC9.5.2.1 to OC9.5.2.3 would be most appropriate at the time, if practicable. The complexities and uncertainties of recovery from a **De-Synchronised Island** means that **The Company** will decide, having discussed the situation with the relevant **Users** and taking into account the fact that the three methods may not cover the situation or be appropriate, the approach which is to be followed. **The Company** will instruct the relevant **Users** and the **Users** will comply with **The Company's** instructions as provided in OC9.5.3.

OC9.5.5 Where the **National Electricity Transmission System** is **Out of Synchronism** with the **Transmission System** of an **Externally Interconnected System Operator**, **The Company** will, pursuant to the **Interconnection Agreement** with that **Externally Interconnected System Operator**, agree with that **Externally Interconnected System Operator** when its **Transmission System** can be **Re-Synchronised** to the **National Electricity Transmission System**.

OC9.5.6 Further requirements regarding **Re-synchronisation** of **De-synchronised Islands** following any **Total Shutdown** or **Partial Shutdown**

Following any **Total Shutdown** or **Partial Shutdown**, **The Company** expects that it will be necessary to interconnect **Power Islands** utilising the provisions of OC9.5. The complexities and uncertainties of recovery from a **Total Shutdown** or **Partial Shutdown** requires the provisions of OC9.5 to be flexible, however, the strategies which **The Company** will, where practicable, be seeking to follow when **Re-synchronising De-synchronised Islands** following any **Total Shutdown** or **Partial Shutdown**, include the following:

(a) the provision of supplies to appropriate **Power Stations** to facilitate their synchronisation as soon as practicable;

(b) energisation of a skeletal **National Electricity Transmission System**;

(c) the strategic restoration of **Demand** in co-ordination with relevant **Network Operators**.

(d) the establishment by ~~a~~ **Network Operator(s)** of one or more~~a~~ **Distribution Restoration Zones** upon instruction from **The Company** (or **Relevant Scottish Transmission Licensee**).

As highlighted in OC9.4.3, during a **Total Shutdown** or **Partial Shutdown** and during the subsequent recovery, which includes any period during which the procedures in this OC9.5 apply, the **Licence Standards** may not apply and the **Total System** may be operated outside normal voltage and **Frequency** standards.

OC9.5.7 To manage effectively and co-ordinate the restoration strategies of the **Total System** (any **Re-Synchronisation** of **De-Synchronised Islands**) following any **Total Shutdown** or **Partial Shutdown**, requires **The Company** and relevant **Users** to undertake certain planning activities as set out below:

(a) **The Company** and **Network Operators** shall review on a regular basis the processes by which each **Power Island** will be interconnected. This is likely to cover an exchange of information regarding the typical size, location and timing requirements for **Demand** to be reconnected and also include details (ability to change/disable) of the low frequency trip relay settings of the **Demand** identified. There may also be a requirement for specific **Protection Settings** to be used during and immediately after a **Black Start** event

(b) Each **Generator** shall provide to **The Company** information to assist **The Company** in the formulation of the restoration strategies of **Power Island** expansion. This information shall be provided in accordance with PC.A.5.7.

(c) Where a **Distribution Restoration Zone Plan** is to be established, each **Network Operator** shall provide to **The Company** (and **Relevant Transmission Licensee**) the formulation of how the **Distribution Restoration Zone** will be established from a de-energised state. This information shall be provided in accordance with PC.A.5.8

OC9.6 JOINT SYSTEM INCIDENT PROCEDURE

OC9.6.1 A "**Joint System Incident**" is

(a) an **Event**, wherever occurring (other than on an **Embedded Small Power Station** or **Embedded Medium Power Station**), which, in the opinion of **The Company** or a **User**, has or may have a serious and/or widespread effect.

(b) In the case of an **Event** on a **User(s) System(s)** (other than on an **Embedded Small Power Station** or **Embedded Medium Power Station**), the effect must be on the **National Electricity Transmission System**, and in the case of an **Event** on the **National Electricity Transmission System**, the effect must be on a **User(s) System(s)** (other than on an **Embedded Small Power Station** or **Embedded Medium Power Station**).

Where an **Event** on a **User(s) System(s)** has or may have no effect on the **National Electricity Transmission System**, then such an **Event** does not fall within **OC9** and accordingly **OC9** shall not apply to it.

OC9.6.2 (a) (i) Each **User** (other than **Generators** which only have **Embedded Small Power Stations** and/or **Embedded Medium Power Stations**) will provide in writing to **The Company**, and

(ii) **The Company** will provide in writing to each **User** (other than **Generators** which only have **Embedded Small Power Stations** and/or **Embedded Medium Power Stations**), a telephone number or numbers at which, or through which, senior management representatives nominated for this purpose and who are fully authorised to make binding decisions on behalf of **The Company** or the relevant **User**, as the case may be, can be contacted day or night when there is a **Joint System Incident**.

(b) The lists of telephone numbers will be provided in accordance with the timing requirements of the **Bilateral Agreement** and/or **Construction Agreement** with that **User**, prior to the time that a **User** connects to the **National Electricity Transmission System** and must be up-dated (in writing) as often as the information contained in them changes.

OC9.6.3 Following notification of an **Event** under **OC7**, **The Company** or a **User**, as the case may be, will, if it considers necessary, telephone the **User** or **The Company**, as the case may be, on the telephone number referred to in OC9.6.2, to obtain such additional information as it requires.

OC9.6.4 Following notification of an **Event** under **OC7**, and/or the receipt of any additional information requested pursuant to OC9.6.3, **The Company** or a **User**, as the case may be, will determine whether or not the **Event** is a **Joint System Incident**, and, if so, **The Company** and/or the **User** may set up an **Incident Centre** in order to avoid overloading the existing **The Company** or that **User's**, as the case may be, operational/control arrangements.

OC9.6.5 Where **The Company** has determined that an **Event** is a **Joint System Incident**, **The Company** shall, as soon as possible, notify all relevant **Users** that a **Joint System Incident** has occurred and, if appropriate, that it has established an **Incident Centre** and the telephone number(s) of its **Incident Centre** if different from those already supplied pursuant to OC9.6.2.

OC9.6.6 If a **User** establishes an **Incident Centre** it shall, as soon as possible, notify **The Company** that it has been established and the telephone number(s) of the **Incident Centre** if different from those already supplied pursuant to OC9.6.2.

OC9.6.7 **The Company's Incident Centre** and/or the **User's Incident Centre** will not assume any responsibility for the operation of the **National Electricity Transmission System** or **User's System**, as the case may be, but will be the focal point in **The Company** or the **User**, as the case may be, for:

(a) the communication and dissemination of information between **The Company** and the senior management representatives of **User(s)**; or

(b) between the **User** and the senior management representatives of **The Company**, as the case may be,

relating to the **Joint System Incident**. The term "**Incident Centre**" does not imply a specially built centre for dealing with **Joint System Incidents**, but is a communications focal point. During a **Joint System Incident**, the normal communication channels, for operational/control communication between **The Company** and **Users** will continue to be used.

OC9.6.8 All communications between the senior management representatives of the relevant parties with regard to **The Company's** role in the **Joint System Incident** shall be made via **The Company's Incident Centre** if it has been established.

OC9.6.9 All communications between the senior management representatives of **The Company** and a **User** with regard to that **User's** role in the **Joint System Incident** shall be made via that **User's Incident Centre** if it has been established.

OC9.6.10 **The Company** will decide when conditions no longer justify the need to use its **Incident Centre** and will inform all relevant **Users** of this decision.

OC9.6.11 Each **User** which has established an **Incident Centre** will decide when conditions no longer justify the need to use that **Incident Centre** and will inform **The Company** of this decision.

< END OF OPERATING CODE NO. 9 >

Extracts from BC2

BALANCING CODE NO. 2
(BC2)

POST GATE CLOSURE PROCESS

CONTENTS

BC2.1 INTRODUCTION

Balancing Code No 2 (**BC2**) sets out the procedure for:

(a) the physical operation of **BM Units** and **Generating Units** (which could be part of a **Power Generating Module**) in the absence of any instructions from **The Company**;

(b) the acceptance by **The Company** of **Balancing Mechanism** Bids and Offers,

(c) the calling off by **The Company** of **Ancillary Services**;

(d) the issuing and implementation of **Emergency Instructions**; and

(e) the issuing by **The Company** of other operational instructions and notifications.

In addition, **BC2** deals with any information exchange between **The Company** and **BM Participants** or specific **Users** that takes place after **Gate Closure**.

In this **BC2**, "consistent" shall be construed as meaning to the nearest integer MW level.

In this **BC2**, references to "a **BM Unit** returning to its **Physical Notification**" shall take account of any **Bid-Offer Acceptances** already issued to the **BM Unit** in accordance with BC2.7 and any **Emergency Instructions** already issued to the **BM Unit** or **Generating Unit** (which could be part of a **Power Generating Module**) in accordance with BC2.9.

BC2.2 OBJECTIVE

The procedure covering the operation of the **Balancing Mechanism** and the issuing of instructions to **Users** is intended to enable **The Company** as far as possible to maintain the integrity of the **National Electricity Transmission System** together with the security and quality of supply.

Where reference is made in this **BC2** to **Power Generating Modules** or **Generating Units** (unless otherwise stated) it only applies:

(a) to each **Generating Unit** which forms part of the **BM Unit** of **a Cascade Hydro Scheme**; and

(b) at an **Embedded Exemptable Large Power Station** where the relevant **Bilateral Agreement** specifies that compliance with **BC2** is required:

(i) to each **Generating Unit** which could be part of a **Synchronous Power Generating Module**, or

(ii) to each **Power Park Module** where the **Power Station** comprises **Power Park Modules**.

BC2.3 SCOPE

BC2 applies to **The Company** and to **Users**, which in this **BC2** means:-

(a) **BM Participants**;

(b) **Externally Interconnected System Operators**, and

(c) **Network Operators**.

BC2.4 INFORMATION USED

BC2.4.1 The information which **The Company** shall use, together with the other information available to it, in assessing:

(a) which bids and offers to accept;

(b) which **BM Units** and/or **Generating Units** to instruct to provide **Ancillary Services**;

(c) the need for and formulation of **Emergency Instructions**; and

(d) other operational instructions and notifications which **The Company** may need to issue

will be:

(a) the **Physical Notification** and **Bid-Offer Data** submitted under **BC1**;

(b) **Export and Import Limits** in respect of that **BM Unit** and/or **Generating Unit** supplied under **BC1** (and any revisions under **BC1** and **BC2** to the data); and

(c) **Dynamic Parameters** submitted or revised under this **BC2**.

BC2.4.2 As provided for in BC1.5.4, **The Company** will monitor the total of the Maximum Export Limit component of the **Export and Import Limits** against forecast **Demand** and the **Operating Margin** and will take account of **Dynamic Parameters** to see whether the anticipated level of **System Margin** is insufficient. This will reflect any changes in **Export and Import Limits** which have been notified to **The Company**, and will reflect any **Demand Control** which has also been so notified. **The Company** may issue new or revised **National Electricity Transmission System Warnings – Electricity Margin Notice** or **High Risk of Demand Reduction** in accordance with BC1.5.4.

BC2.5 PHYSICAL OPERATION OF BM UNITS

BC2.5.1 Accuracy Of Physical Notifications

As described in BC1.4.2(a), **Physical Notifications** must represent the **BM Participant's** best estimate of expected input or output of **Active Power** and shall be prepared in accordance with **Good Industry Practice**.

Each **BM Participant** must, applying **Good Industry Practice**, ensure that each of its **BM Units** follows the **Physical Notification** in respect of that **BM Unit** (and each of its **Generating Units** follows the **Physical Notification** in the case of **Physical Notifications** supplied under BC1.4.2(a)(2)) that is prevailing at **Gate Closure** (the data in which will be utilised in producing the **Final Physical Notification Data** in accordance with the **BSC**) subject to variations arising from:

(a) the issue of **Bid-Offer Acceptances** which have been confirmed by the **BM Participant**; or

(b) instructions by **The Company** in relation to that **BM Unit** (or a **Generating Unit**) which require, or compliance with which would result in, a variation in output or input of that **BM Unit** (or a **Generating Unit**); or

(c) compliance with provisions of **BC1**, **BC2** or **BC3** which provide to the contrary.

Except where variations from the **Physical Notification** arise from matters referred to at (a),(b) or (c) above, in respect only of **BM Units** (or **Generating Units**) powered by an **Intermittent Power Source**, where there is a change in the level of the **Intermittent Power Source** from that forecast and used to derive the **Physical Notification**, variations from the **Physical Notification** prevailing at **Gate Closure** may, subject to remaining within the **Registered Capacity**, occur providing that the **Physical Notification** prevailing at **Gate Closure** was prepared in accordance with **Good Industry Practice**.

If variations and/or instructions as described in (a),(b) or (c) apply in any instance to **BM Units** (or **Generating Units**) powered by an **Intermittent Power Source** (e.g. a **Bid Offer Acceptance** is issued in respect of such a **BM Unit** and confirmed by the **BM Participant**) then such provisions will take priority over the third paragraph of BC2.5.1 above such that the **BM Participant** must ensure that the **Physical Notification** as varied in accordance with (a), (b) or (c) above applies and must be followed, subject to this not being prevented as a result of an unavoidance event as described below.

For the avoidance of doubt, this gives rise to an obligation on each **BM Participant** (applying **Good Industry Practice**) to ensure that each of its **BM Units** (and **Generating Units**), follows the **Physical Notifications** prevailing at **Gate Closure** as amended by such variations and/or instructions unless in relation to any such obligation it is prevented from so doing as a result of an unavoidable event (existing or anticipated) in relation to that **BM Unit** (or a **Generating Unit**) which requires a variation in output or input of that **BM Unit** (or a **Generating Unit**).

Examples (on a non-exhaustive basis) of such an unavoidable event are:

- plant breakdowns;
- events requiring a variation of input or output on safety grounds (relating to personnel or plant);
- events requiring a variation of input or output to maintain compliance with the relevant Statutory Water Management obligations; and
- uncontrollable variations in output of **Active Power**.

Any anticipated variations in input or output post **Gate Closure** from the **Physical Notification** for a **BM Unit** (or a **Generating Unit**) prevailing at **Gate Closure** (except for those arising from instructions as outlined in (a), (b) or (c) above) must be notified to **The Company** without delay by the relevant **BM Participant** (or the relevant person on its behalf). For the avoidance of doubt, where a change in the level of the **Intermittent Power Source** from that forecast and used to derive the **Physical Notification** results in the **Shutdown** or **Shutdown** of part of the **BM Unit** (or **Generating Unit**), the change must be notified to **The Company** without delay by the relevant **BM Participant** (or the relevant person on its behalf).

Implementation of this notification should normally be achieved by the submission of revisions to the **Export and Import Limits** in accordance with BC2.5.3 below.

BC2.5.2 Synchronising And De-Synchronising Times

BC2.5.2.1 The **Final Physical Notification Data** provides indicative **Synchronising** and **De-Synchronising** times to **The Company** in respect of any **BM Unit** which is **De-Synchronising** or is anticipated to be **Synchronising** post **Gate Closure**.

Any delay of greater than five minutes to the **Synchronising** or any advancement of greater than five minutes to the **De-Synchronising** of a **BM Unit** must be notified to **The Company** without delay by the submission of a revision of the **Export and Import Limits**.

BC2.5.2.2 Except in the circumstances provided for in BC2.5.2.3, BC2.5.2.4, BC2.5.5.1 or BC2.9, no **BM Unit** (nor a **Generating Unit**) is to be **Synchronised** or **De-Synchronised** unless:-

(a) a **Physical Notification** had been submitted to **The Company** prior to **Gate Closure** indicating that a **Synchronisation** or **De-Synchronisation** is to occur; or

(b) **The Company** has issued a **Bid-Offer Acceptance** requiring **Synchronisation** or **De-Synchronisation** of that **BM Unit** (or a **Generating Unit**).

BC2.5.2.3 **BM Participants** must only **Synchronise** or **De-Synchronise BM Units** (or a **Generating Unit**);

(a) at the times indicated to **The Company**, or

(b) at times consistent with variations in output or input arising from provisions described in BC2.5.1,

(within a tolerance of +/- 5 minutes) or unless that occurs automatically as a result of **Operational Intertripping** or **Low Frequency Relay** operations or an **Ancillary Service** pursuant to an **Ancillary Services Agreement**

BC2.5.2.4 **De-Synchronisation** may also take place without prior notification to **The Company** as a result of plant breakdowns or if it is done purely on safety grounds (relating to personnel or plant). If that happens **The Company** must be informed immediately that it has taken place and a revision to **Export and Import Limits** must be submitted in accordance with BC2.5.3.3. Following any **De-Synchronisation** occurring as a result of plant failure, no **Synchronisation** of that **BM Unit** (or a **Generating Unit**) is to take place without **The Company's** agreement, such agreement not to be unreasonably withheld.

In the case of **Synchronisation** following an unplanned **De-Synchronisation** within the preceding 15 minutes, a minimum of 5 minutes notice of its intention to **Synchronise** should normally be given to **The Company** (via a revision to **Export and Import Limits**). In the case of any other unplanned **De-Synchronisation** where the **User** plans to **Synchronise** before the expiry of the current **Balancing Mechanism** period, a minimum of 15 minutes notice of **Synchronisation** should normally be given to **The Company** (via a revision to **Export and Import Limits**). In addition, the rate at which the **BM Unit** is returned to its **Physical Notification** is not to exceed the limits specified in **BC1**, Appendix 1 without **The Company's** agreement.

The Company will either agree to the **Synchronisation** or issue a **Bid-Offer Acceptance** in accordance with BC2.7 to delay the **Synchronisation**. **The Company** may agree to an earlier **Synchronisation** if **System** conditions allow.

BC2.5.2.5 Notification Of Times To Network Operators

The Company will make changes to the **Synchronising** and **De-Synchronising** times available to each **Network Operator**, but only relating to **BM Units Embedded** within its **User System** and those **BM Units** directly connected to the **National Electricity Transmission System** which **The Company** has identified under **OC2** and/or **BC1** as being those which may, in the reasonable opinion of **The Company**, affect the integrity of that **User System** and shall inform the relevant **BM Participant** that it has done so, identifying the **BM Unit** concerned.

Each **Network Operator** must notify **The Company** of any changes to its **User System** Data as soon as practicable in accordance with BC1.6.1(c).

BC2.5.3 Revisions To BM Unit Data

Following **Gate Closure** for any **Settlement Period**, no changes to the **Physical Notification** or to **Bid-Offer Data** for that **Settlement Period** may be submitted to **The Company**.

BC2.5.3.1 At any time, any **BM Participant** (or the relevant person on its behalf) may, in respect of any of its **BM Units**, submit to **The Company** the data listed in **BC1**, Appendix 1 under the heading of **Dynamic Parameters** from the **Control Point** of its **BM Unit** to amend the data already held by **The Company** (including that previously submitted under this BC2.5.3.1) for use in preparing for and operating the **Balancing Mechanism**. The change will take effect from the time that it is received by **The Company**. For the avoidance of doubt, the **Dynamic Parameters** submitted to **The Company** under BC1.4.2(e) are not used within the current **Operational Day**. The **Dynamic Parameters** submitted under this BC2.5.3.1 shall reasonably reflect the true current operating characteristics of the **BM Unit** and shall be prepared in accordance with **Good Industry Practice**.

Following the **Operational Intertripping** of a **System** to **Generating Unit** or a **System** to **CCGT Module** and/or a **System** to **Power Generating Module**, the **BM Participant** shall as soon as reasonably practicable re-declare its MEL to reflect more accurately its output capability.

BC2.5.3.2 Revisions to **Export and Import Limits** or **Other Relevant Data** supplied (or revised) under **BC1** must be notified to **The Company** without delay as soon as any change becomes apparent to the **BM Participant** (or the relevant person on its behalf) via the **Control Point** for the **BM Unit** (or a **Generating Unit**) to ensure that an accurate assessment of **BM Unit** (or a **Generating Unit**) capability is available to **The Company** at all times. These revisions should be prepared in accordance with **Good Industry Practice** and may be submitted by use of electronic data communication facilities or by telephone.

BC2.5.3.3 Revisions to **Export and Import Limits** must be made by a **BM Participant** (or the relevant person on its behalf) via the **Control Point** in the event of any **De-Synchronisation** of a **BM Unit** (or a **Generating Unit**) in the circumstances described in BC2.5.2.4 if the **BM Unit** (or a **Generating Unit**) is no longer available for any period of time. Revisions must also be submitted in the event of plant failures causing a reduction in input or output of a **BM Unit** (or a **Generating Unit**) even if that does not lead to **De-Synchronisation**. Following the correction of a plant failure, the **BM Participant** (or the relevant person on its behalf) must notify **The Company** via the **Control Point** of a revision to the **Export and Import Limits**, if appropriate, of the **BM Unit** (or a **Generating Unit**), using reasonable endeavours to give a minimum of 5 minutes notice of its intention to return to its **Physical Notification**. The rate at which the **BM Unit** (or a **Generating Unit**) is returned to its **Physical Notification** is not to exceed the limits specified in **BC1**, Appendix 1 without **The Company's** agreement.

BC2.5.4 Operation In The Absence Of Instructions From The Company

In the absence of any **Bid-Offer Acceptances**, **Ancillary Service** instructions issued pursuant to BC2.8 or **Emergency Instructions** issued pursuant to BC2.9:

(a) as provided for in BC3, each **Synchronised Genset** producing **Active Power** must operate at all times in **Limited Frequency Sensitive Mode** (unless instructed in accordance with BC3.5.4 to operate in **Frequency Sensitive Mode**);

(b) (i) in the absence of any MVAr **Ancillary Service** instructions, the MVAr output of each **Synchronised Genset** located **Onshore** should be 0 MVAr upon **Synchronisation** at the circuit-breaker where the **Genset** is **Synchronised**. For the avoidance of doubt, in the case of a **Genset** located **Onshore** comprising of **Non-Synchronous Generating Units**, **Power Park Modules**, **HVDC Systems** or **DC Converters** the steady state tolerance allowed in CC.6.3.2(b) or ECC.6.3.2.4.4 may be applied

(ii) In the absence of any MVAr **Ancillary Service** instructions, the MVAr output of each **Synchronised Genset** comprising **Synchronous Generating Units** located **Offshore** (which could be part of a **Synchronous Power Generating Module**) should be 0MVAr at the **Grid Entry Point** upon **Synchronisation**. For the avoidance of doubt, in the case of a **Genset** located **Offshore** comprising of **Non-Synchronous Generating Units**, **Power Park Modules**, **HVDC Systems** or **DC Converters** the steady state tolerance allowed in CC.6.3.2(e) or ECC.6.3.2.5.1 or ECC.6.3.2.6.2 (as applicable) may be applied;

(c) (i) subject to the provisions of 2.5.4(c) (ii) and 2.5.4 (c) (iii) below, the excitation system or the voltage control system of a **Genset** located **Offshore** which has agreed an alternative **Reactive Power** capability range under CC.6.3.2 (e) (iii) or ECC.6.3.2.5.2 or ECC.6.3.2.6.3 (as applicable) or a **Genset** located **Onshore**, unless otherwise agreed with **The Company**, must be operated only in its constant terminal voltage mode of operation with VAR limiters in service, with any constant **Reactive Power** output control mode or constant **Power Factor** output control mode always disabled, unless agreed otherwise with **The Company**. In the event of any change in **System** voltage, a **Generator** must not take any action to override automatic MVAr response which is produced as a result of constant terminal voltage mode of operation of the automatic excitation control system unless instructed otherwise by **The Company** or unless immediate action is necessary to comply with **Stability Limits** or unless constrained by plant operational limits or safety grounds (relating to personnel or plant);

(ii) In the case of all **Gensets** comprising **Non-Synchronous Generating Units**, **DC Converters**, **HVDC Systems** and **Power Park Modules** that are located **Offshore** and which have agreed an alternative **Reactive Power** capability range under CC.6.3.2 (e) (iii), or ECC.6.3.2.5.2 or ECC.6.3.2.6.3 (as applicable) or that are located **Onshore** only when operating below 20 % of the **Rated MW** output, the voltage control system shall maintain the **Reactive Power** transfer at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**) to 0 MVAr. For the avoidance of doubt, the relevant steady state tolerance allowed for **GB Generators** in CC.6.3.2(b) or CC.6.3.2 (e) and for **EU Generators** in ECC.6.3.2.4.4, ECC.6.3.2.5.1 and ECC.6.3.2.6.2 and ECC.6.3.2.8.2.may be applied. In the case of any such **Gensets** owned or operated by **GB Code Users** comprising current source **DC Converter** technology or comprising **Power Park Modules** connected to the **Total System** by a current source **DC Converter** when operating at any power output, the voltage control system shall maintain the **Reactive Power** transfer at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**) to 0 MVAr. For the avoidance of doubt the relevant steady state tolerance allowed in CC.6.3.2(b) or CC.6.3.2 (c) (i) may be applied.

(iii) In the case of all **Gensets** located **Offshore** which are not subject to the requirements of BC2.5.4 (c) (i) or BC2.5.4 (c) (ii) the control system shall maintain the **Reactive Power** transfer at the **Offshore Grid Entry Point** at 0MVAr. For the avoidance of doubt the steady state tolerance allowed by CC.6.3.2 (e) or ECC.6.3.2.4.4, ECC.6.3.2.5.1 and ECC.6.3.2.6.2 may be applied.

(d) In the absence of any MVAr **Ancillary Service** instructions,

(i) the MVAr output of each **Genset** located **Onshore** should be 0 MVAr immediately prior to **De-Synchronisation** at the circuit-breaker where the **Genset** is **Synchronised**, other than in the case of a rapid unplanned **De-Synchronisation** or in the case of a **Genset** comprising of **Power Generating Modules** and/or **Non-Synchronous Generating Units** and/or **Power Park Modules** and/or **HVDC Converters** or **DC Converters** which is operating at less than 20% of its **Rated MW** output where the requirements of BC2.5.4 (c) part (ii) apply, or;

(ii) the MVAr output of each **Genset** located **Offshore** should be 0MVAr immediately prior to **De-Synchronisation** at the **Offshore Grid Entry Point**, other than in the case of a rapid unplanned **De-Synchronisation** or in the case of a **Genset** comprising of **Non-Synchronous Generating Units**, **Power Park Modules**, **HVDC Converters** or **DC Converters** which is operating at less than 20% of its **Rated MW** output and which has agreed an alternative **Reactive Power** capability range (for **GB Code Users**) under CC.6.3.2 (e) (iii) or ECC.6.3.2.4.4, ECC.6.3.2.5.1 and ECC.6.3.2.6.2 (for EU **Code Users**) where the requirements of BC2.5.4 (c) (ii) apply.

(e) a **Generator** should at all times operate its **CCGT Units** in accordance with the applicable **CCGT Module Matrix**;

(f) in the case of a **Range CCGT Module**, a **Generator** must operate that **CCGT Module** so that power is provided at the single **Grid Entry Point** identified in the data given pursuant to PC.A.3.2.1 or at the single **Grid Entry Point** to which **The Company** has agreed pursuant to BC1.4.2(f);

(g) in the event of the **System Frequency** being above 50.3Hz or below 49.7Hz, **BM Participants** must not commence any reasonably avoidable action to regulate the input or output of any **BM Unit** in a manner that could cause the **System Frequency** to deviate further from 50Hz without first using reasonable endeavours to discuss the proposed actions with **The Company**. **The Company** shall either agree to these changes in input or output or issue a **Bid-Offer Acceptance** in accordance with BC2.7 to delay the change.

(h) a **Generator** should at all times operate its **Power Park Units** in accordance with the applicable **Power Park Module Availability Matrix**.

BC2.5.5 Commencement oOr Termination oOf Participation iIn tThe Balancing Mechanism

BC2.5.5.1 In the event that a **BM Participant** in respect of a **BM Unit** with a **Demand Capacity** with a magnitude of less than 50MW in **NGET's Transmission Area** or less than 10MW in **SHETL's Transmission Area** or less than 30MW in **SPT's Transmission Area** or comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC2.2) and/or **Power Generating Modules** and/or **CCGT Modules** and/or **Power Park Modules** at a **Small Power Station** notifies **The Company** at least 30 days in advance that from a specified **Operational Day** it will:

(a) no longer submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** no longer has to meet the requirements of BC2.5.1 nor the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**. Also, with effect from that **Operational Day**, any defaulted **Physical Notification** and defaulted **Bid-Offer Data** in relation to that **BM Unit** arising from the **Data Validation**, **Consistency and Defaulting Rules** will be disregarded and the provisions of BC2.5.2 will not apply;

(b) submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** will need to meet the requirements of BC2.5.1 and the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**.

BC2.5.5.2 In the event that a **BM Participant** in respect of a **BM Unit** with a **Demand Capacity** with a magnitude of 50MW or more in **NGET's Transmission Area** or 10MW or more in **SHETL's Transmission Area** or 30MW or more in **SPT's Transmission Area** or comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC2.2) and/or **Power Generating Modules** and/or **CCGT Modules** and/or **Power Park Modules** at a **Medium Power Station** or **Large Power Station** notifies **The Company** at least 30 days in advance that from a specified **Operational Day** it will:

(a) no longer submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** no longer has to meet the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**; Also, with effect from that **Operational Day**, any defaulted **Bid-Offer Data** in relation to that **BM Unit** arising from the **Data Validation**, **Consistency and Defaulting Rules** will be disregarded;

(b) submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** will need to meet the requirements of CC.6.5.8(b) or ECC.6.5.8(b) (as applicable) in relation to that **BM Unit**.

BC2.6 COMMUNICATIONS

Electronic communications are always conducted in GMT. However, the input of data and display of information to **Users** and **The Company** and all other communications are conducted in London time.

BC2.6.1 Normal Communication With Control Points

(a) With the exception of BC2.6.1(c) below, **Bid-Offer Acceptances** and, unless otherwise agreed with **The Company**, **Ancillary Service** instructions shall be given by automatic logging device and will be given to the **Control Point** for the **BM Unit**. For all **Planned Maintenance Outages** the provisions of BC2.6.5 will apply. For **Generating Units** (including **DC Connected Power Park Modules** (if relevant)) communications under **BC2** shall be by telephone unless otherwise agreed by **The Company** and the **User**.

(b) **Bid-Offer Acceptances** and **Ancillary Service** instructions must be formally acknowledged immediately by the **BM Participant** (or the relevant person on its behalf) via the **Control Point** for the **BM Unit** or **Generating Unit** in respect of that **BM Unit** or that **Generating Unit**. The acknowledgement and subsequent confirmation or rejection, within two minutes of receipt, is normally given electronically by automatic logging device. If no confirmation or rejection is received by **The Company** within two minutes of the issue of the **Bid-Offer Acceptance**, then **The Company** will contact the **Control Point** for the **BM Unit** by telephone to determine the reason for the lack of confirmation or rejection. Any rejection must be given in accordance with BC2.7.3 or BC2.8.3.

(c) In the event of a failure of the logging device or an outage of **The Company's** computer system ~~outage~~, **Bid-Offer Acceptances** and instructions will be given, acknowledged, and confirmed or rejected by telephone. The provisions of BC2.9.7 are also applicable.

(d) In the event that in carrying out the **Bid-Offer Acceptances** or providing the **Ancillary Services**, or when operating at the level of the **Final Physical Notification Data** as provided in BC2.5.1, an unforeseen problem arises, caused on safety grounds (relating to personnel or plant), **The Company** must be notified without delay by telephone.

(e) The provisions of BC2.5.3 are also relevant.

(f) Submissions of revised MVAr capability may be made by facsimile transmission, using the format given in Appendix 3 to **BC2**.

(g) Communication will normally be by telephone for any purpose other than **Bid-Offer Acceptances**, in relation to **Ancillary Services** or for revisions of MVAr Data.

(h) Submissions of revised availability of **Frequency Sensitive Mode** may be made by facsimile transmission, using the format given in Appendix 4 to **BC2**. This process should only be used for technical restrictions to the availability of **Frequency Sensitive Mode**.

BC2.6.2 Communication With Control Points In Emergency Circumstances

The Company will issue **Emergency Instructions** direct to the **Control Point** for each **BM Unit** [or **Generating Unit**] in **Great Britain**. **Emergency Instructions** to a **Control Point** will normally be given by telephone (and will include an exchange of operator names).

BC2.6.3 Communication With Network Operators In Emergency Circumstances

The Company will issue **Emergency Instructions** direct to the **Network Operator** at each **Control Centre** in relation to actions including special actions as set out in BC1.7, actions in the categories set out under BC2.9.3.3, and **Demand Control actions**. **Emergency Instructions** to a **Network Operator** will normally be given by telephone (and will include an exchange of operator names). **OC6** contains further provisions relating to **Demand Control** instructions.

BC2.6.4 Communication With Externally Interconnected System Operators In Emergency Circumstances

The Company will issue **Emergency Instructions** directly to the **Externally Interconnected System Operator** at each **Control Centre**. **Emergency Instructions** to an **Externally Interconnected System Operator** will normally be given by telephone (and will include an exchange of operator names).

BC2.6.5 Communications During Planned Outages Of Electronic Data Communication Facilities

Planned Maintenance Outages will normally be arranged to take place during periods of low data transfer activity. Upon any such **Planned Maintenance Outage** in relation to a post **Gate Closure** period:-

(a) **BM Participants** should operate in relation to any period of time in accordance with the **Physical Notification** prevailing at **Gate Closure** current at the time of the start of the **Planned Maintenance Outage** in relation to each such period of time. Such operation shall be subject to the provisions of BC2.5.1, which will apply as if set out in this BC2.6.5. No further submissions of **BM Unit Data** (other than data specified in BC1.4.2(c) and BC1.4.2(e)) should be attempted or **Generating Unit Data**. **Plant** failure or similar problems causing significant deviation from **Physical Notification** should be notified to **The Company** by the submission of a revision to **Export and Import Limits** in relation to the **BM Unit** or **Generating Unit** so affected;

(b) during the outage, revisions to the data specified in BC1.4.2(c) and BC1.4.2(e) may be submitted. Communication between **Users Control Points** and **The Company** during the outage will be conducted by telephone;

(c) **The Company** will issue **Bid-Offer Acceptances** by telephone; and

(d) no data will be transferred from **The Company** to the **BMRA** until the communication facilities are re-established.

(e) The provisions of BC2.9.7 may also be relevant.

BC2.7 BID-OFFER ACCEPTANCES

BC2.7.1 Acceptance oOf Bids aAnd Offers bBy The Company

Bid-Offer Acceptances may be issued to the **Control Point** at any time following **Gate Closure**. Any **Bid-Offer Acceptance** will be consistent with the **Dynamic Parameters** and **Export and Import Limits** of the **BM Unit** in so far as the **Balancing Mechanism** timescales will allow (see BC2.7.2).

(a) **The Company** is entitled to assume that each **BM Unit** is available in accordance with the **BM Unit Data** submitted unless and until it is informed of any changes.

(b) **Bid-Offer Acceptances** sent to the **Control Point** will specify the data necessary to define a MW profile to be provided (ramp rate break-points are not normally explicitly sent to the **Control Point**) and to be achieved consistent with the respective **BM Unit's Export and Import Limits** provided or modified under **BC1** or **BC2**, and **Dynamic Parameters** given under BC2.5.3 or, if agreed with the relevant **User**, such rate within those **Dynamic Parameters** as is specified by **The Company** in the **Bid-Offer Acceptances**.

(c) All **Bid-Offer Acceptances** will be deemed to be at the current "**Target Frequency**", namely where a **Genset** is in **Frequency Sensitive Mode** they refer to target output at **Target Frequency**.

(d) The form of and terms to be used by **The Company** in issuing **Bid-Offer Acceptances** together with their meanings are set out in Appendix 1 in the form of a non-exhaustive list of examples.

BC2.7.2 Consistency With Export And Import Limits And Dynamic Parameters

(a) **Bid-Offer Acceptances** will be consistent with the **Export and Import Limits** provided or modified under **BC1** or **BC2** and the **Dynamic Parameters** provided or modified under **BC2**. **Bid-Offer Acceptances** may also recognise **Other Relevant Data** provided or modified under **BC1** or **BC2**

(b) In the case of consistency with **Dynamic Parameters** this will be limited to the time until the end of the **Settlement Period** for which **Gate Closure** has most recently occurred. If **The Company** intends to issue a **Bid-Offer Acceptance** covering a period after the end of the **Settlement Period** for which **Gate Closure** has most recently occurred, based upon the then submitted **Dynamic Parameters**, **Export and Import Limits**, and **Bid-Offer Data** applicable to that period, **The Company** will indicate this to the **BM Participant** at the **Control Point** for the **BM Unit**. The intention will then be reflected in the issue of a **Bid-Offer Acceptance** to return the **BM Unit** to its previously notified **Physical Notification** after the relevant **Gate Closure** provided the submitted data used to formulate this intention has not changed and subject to **System** conditions which may affect that intention. Subject to that, assumptions regarding **Bid-Offer Acceptances** may be made by **BM Participants** for **Settlement Periods** for which **Gate Closure** has not yet occurred when assessing consistency with **Dynamic Parameters** in **Settlement Periods** for which **Gate Closure** has occurred. If no such subsequent **Bid–Offer Acceptance** is issued, the original **Bid-Offer Acceptance** will include an instantaneous return to **Physical Notification** at the end of the **Balancing Mechanism** period.

BC2.7.3 Confirmation And Rejection Of Acceptances

Bid-Offer Acceptances may only be rejected by a **BM Participant** :

(a) on safety grounds (relating to personnel or plant) as soon as reasonably possible and in any event within five minutes; or

(b) because they are not consistent with the **Export and Import Limits** or **Dynamic Parameters** applicable at the time of issue of the **Bid-Offer Acceptance**.

A reason must always be given for rejection by telephone.

Where a **Bid-Offer Acceptance** is not confirmed within two minutes or is rejected, **The Company** will seek to contact the **Control Point** for the **BM Unit**. **The Company** must then, within 15 minutes of issuing the **Bid-Offer Acceptance**, withdraw the **Bid-Offer Acceptance** or log the **Bid-Offer Acceptance** as confirmed. **The Company** will only log a rejected **Bid-Offer Acceptance** as confirmed following discussion and if the reason given is, in **The Company's** reasonable opinion, not acceptable and **The Company** will inform the **BM Participant** accordingly.

BC2.7.4 Action Required From BM Participants

(a) Each **BM Participant** in respect of its **BM Units** will comply in accordance with BC2.7.1 with all **Bid-Offer Acceptances** given by **The Company** with no more than the delay allowed for by the **Dynamic Parameters** unless the **BM Unit** has given notice to **The Company** under the provisions of BC2.7.3 regarding non-acceptance of a **Bid-Offer Acceptance**.

(b) Where a **BM Unit's** input or output changes in accordance with a **Bid-Offer Acceptance** issued under BC2.7.1, such variation does not need to be notified to **The Company** in accordance with BC2.5.1.

(c) In the event that while carrying out the **Bid-Offer Acceptance** an unforeseen problem arises caused by safety reasons (relating to personnel or plant), **The Company** must be notified immediately by telephone and this may lead to revision of **BM Unit Data** in accordance with BC2.5.3

BC2.7.5 Additional Action Required when responding to Bid-Offer Acceptances

(a) When complying with **Bid-Offer Acceptances** for a **CCGT Module** a **Generator** will operate its **CCGT Units** in accordance with the applicable **CCGT Module Matrix**.

(b) When complying with **Bid-Offer Acceptances** for a **CCGT Module** which is a **Range CCGT Module**, a **Generator** must operate that **CCGT Module** so that power is provided at the single **Grid Entry Point** identified in the data given pursuant to PC.A.3.2.1 or at the single **Grid Entry Point** to which **The Company** has agreed pursuant to BC1.4.2 (f).

(c) On receiving a new MW **Bid-Offer Acceptance**, no tap changing shall be carried out to change the MVAr output unless there is a new MVAr **Ancillary Service** instruction issued pursuant to BC2.8.

(d) When complying with **Bid-Offer Acceptances** for a **Power Park Module** a **Generator** will operate its **Power Park Units** in accordance with the applicable **Power Park Module Availability Matrix**.

(e) When complying with **Bid-Offer Acceptances** for a **Synchronous Power Generating Module** a **Generator** will operate its **Generating Units** in accordance with the applicable **Synchronous Power Generating Module Availability Matrix**.

(f) When complying with **Bid-Offer Acceptances** for an **Additional BM** unit or **Secondary BM Unit** they will operate in accordance with the applicable **Aggregator Impact Matrix**.

BC2.8 ANCILLARY SERVICES

This section primarily covers the call-off of **System Ancillary Services**. The provisions relating to **Commercial Ancillary Services** will normally be covered in the relevant **Ancillary Services Agreement**.

BC2.8.1 Call-Off Of Ancillary Services By The Company

(a) **Ancillary Service** instructions may be issued at any time.

(b) **The Company** is entitled to assume that each **BM Unit** (or **Generating Unit**) is available in accordance with the **BM Unit Data** (or the **Generating Unit Data**) and data contained in the **Ancillary Services Agreement** unless and until it is informed of any changes.

(c) **Frequency** control instructions may be issued in conjunction with, or separate from, a **Bid-Offer Acceptance**.

(d) The form of and terms to be used by **The Company** in issuing **Ancillary Service** instructions together with their meanings are set out in Appendix 2 in the form of a non-exhaustive list of examples including **Reactive Power** and associated instructions.

(e) In the case of **Generating Units** that do not form part of a **BM Unit** any change in **Active Power** as a result of, or required to enable, the provision of an **Ancillary Service** will be dealt with as part of that **Ancillary Service Agreement** and/or provisions under the **CUSC**.

(f) A **System to Generator Operational Intertripping Scheme** will be armed in accordance with BC2.10.2(a).

BC2.8.2 Consistency With Export And Import Limits And Dynamic Parameters

Ancillary Service instructions will be consistent with the **Export and Import Limits** provided or modified under **BC1** or **BC2** and the **Dynamic Parameters** provided or modified under **BC2**. **Ancillary Service** instructions may also recognise **Other Relevant Data** provided or modified under **BC**1 or **BC2**.

BC2.8.3 Rejection Of Ancillary Service Instructions

(a) **Ancillary Service** instructions may only be rejected, by automatic logging device or by telephone, on safety grounds (relating to personnel or plant) or because they are not consistent with the applicable **Export and Import Limits**, **Dynamic Parameters**, **Other Relevant Data** or data contained in the **Ancillary Services Agreement** and a reason must be given immediately for non-acceptance.

(b) The issue of **Ancillary Service** instructions for **Reactive Power** will be made with due regard to any resulting change in **Active Power** output. The instruction may be rejected if it conflicts with any **Bid-Offer Acceptance** issued in accordance with BC2.7 or with the **Physical Notification**.

(c) Where **Ancillary Service** instructions relating to **Active Power** and **Reactive Power** are given together, and to achieve the **Reactive Power** output would cause the **BM Unit** to operate outside **Dynamic Parameters** as a result of the **Active Power** instruction being met at the same time, then the timescale of implementation of the **Reactive Power** instruction may be extended to be no longer than the timescale for implementing the **Active Power** instruction but in any case to achieve the MVAr **Ancillary Service** instruction as soon as possible.

BC2.8.4 Action Required From BM Units

(a) Each **BM Unit** (or **Generating Unit**) will comply in accordance with BC2.8.1 with all **Ancillary Service** instructions relating to **Reactive Power** properly given by **The Company** within 2 minutes or such longer period as **The Company** may instruct, and all other **Ancillary Service** instructions without delay, unless the **BM Unit** or **Generating Unit** has given notice to **The Company** under the provisions of BC2.8.3 regarding non-acceptance of **Ancillary Service** instructions.

(b) Each **BM Unit** may deviate from the profile of its **Final Physical Notification Data**, as modified by any **Bid-Offer Acceptances** issued in accordance with BC2.7.1, only as a result of responding to **Frequency** deviations when operating in **Frequency Sensitive Mode** in accordance with the **Ancillary Services Agreement**.

(c) Each **Generating Unit** that does not form part of a **BM Unit** may deviate from the profile of its **Final Physical Notification Data** where agreed by **The Company** and the **User**, including but not limited to, as a result of providing an **Ancillary Service** in accordance with the **Ancillary Service Agreement**.

(d) In the event that while carrying out the **Ancillary Service** instructions an unforeseen problem arises caused by safety reasons (relating to personnel or plant), **The Company** must be notified immediately by telephone and this may lead to revision of **BM Unit Data** or **Generating Unit Data** in accordance with BC2.5.3.

BC2.8.5 Reactive Despatch Network Restrictions

Where **The Company** has received notification pursuant to the Grid Code that a **Reactive Despatch to Zero MVAr Network Restriction** is in place with respect to any **Embedded Power Generating Module** and/or **Embedded Generating Unit** and/or **Embedded Power Park Module** or **HVDC Converter** at an **Embedded HVDC Converter Station** or **DC Converter** at an **Embedded DC Converter Station**, then **The Company** will not issue any **Reactive Despatch Instruction** with respect to that **Power Generating Module** and/or **Generating Unit** and/or **Power Park Module** or **DC Converter or HVDC Converter** until such time as notification is given to **The Company** pursuant to the Grid Code that such **Reactive Despatch to Zero MVAr Network Restriction** is no longer affecting that **Power Generating Module** and/or **Generating Unit** and/or **Power Park Module** or **DC Converter** or **HVDC Converter**.

BC2.9 EMERGENCY CIRCUMSTANCES

BC2.9.1 Emergency Actions

BC2.9.1.1 In certain circumstances (as determined by **The Company** in its reasonable opinion) it will be necessary, in order to preserve the integrity of the **National Electricity Transmission System** and any synchronously connected **External System**, for **The Company** to issue **Emergency Instructions**. In such circumstances, it may be necessary to depart from normal **Balancing Mechanism** operation in accordance with BC2.7 in issuing **Bid-Offer Acceptances**. **BM Participants** must also comply with the requirements of **BC3**.

BC2.9.1.2 Examples of circumstances that may require the issue of **Emergency Instructions** include:-

(a) **Events** on the **National Electricity Transmission System** or the **System** of another **User**; or

(b) the need to maintain adequate **System** and **Localised NRAPM** in accordance with BC2.9.4 below; or

(c) the need to maintain adequate frequency sensitive **Gensets** in accordance with BC2.9.5 below; or

(d) the need to implement **Demand Control** in accordance with OC6; or

(e) (i) the need to invoke the **Black Start** process or the **Re-Synchronisation of De-Synchronised Island** process or **Distribution Restoration Zone Plans** in accordance with OC9; or

(ii) the need to request provision of a **Maximum Generation Service**; or

(iii) the need to issue an **Emergency Deenergisation Instruction** in circumstances where the condition or manner of operation of any **Transmission Plant** and/or **Apparatus** is such that it may cause damage or injury to any person or to the **National Electricity Transmission System**.

BC2.9.1.3 In the case of **BM Units** and **Generating Units** in **Great Britain**, **Emergency Instructions** will be issued by **The Company** direct to the **User** at the **Control Point** for the **BM Unit** or **Generating Unit** and may require an action or response which is outside its **Other Relevant Data** or **Export and Import Limits** submitted under **BC1**, or revised under **BC1** or **BC2**, or **Dynamic Parameters** submitted or revised under **BC2**.

BC2.9.1.4 In the case of a **Network Operator** or an **Externally Interconnected System Operator**, **Emergency Instructions** will be issued to its **Control Centre**.

BC2.9.2 Implementation oOf Emergency Instructions

BC2.9.2.1 **Users** will respond to **Emergency Instructions** issued by **The Company** without delay and using all reasonable endeavours to so respond. **Emergency Instructions** may only be rejected by an **User** on safety grounds (relating to personnel or plant) and this must be notified to **The Company** immediately by telephone.

BC2.9.2.2 **Emergency Instructions** will always be prefixed with the words "This is an **Emergency Instruction**" except in the case of:

(i) **Maximum Generation Service** instructed by electronic data communication facilities where the instruction will be issued in accordance with the provisions of the **Maximum Generation Service Agreement**; and

(ii) an **Emergency Deenergisation Instruction**, where the **Emergency Deenergisation Instruction** will be pre-fixed with the words 'This is an **Emergency Deenergisation Instruction'**; and

(iii) during a **Black Start** situation where the **Balancing Mechanism** has been suspended, any instruction given by **The Company** will (unless **The Company** specifies otherwise) be deemed to be an **Emergency Instruction** and need not be pre-fixed with the words 'This is an **Emergency Instruction**'; and

(iv) during a **Black Start** situation where the **Balancing Mechanism** has not been suspended, any instruction in relation to **Black Start Stations**, **Black Start HVDC Systems** and to **Network Operators** which are part of an invoked **Local Joint Restoration Plan** will (unless **The Company** specifies otherwise) be deemed to be an **Emergency Instruction** and need not be prefixed with the words 'This is an **Emergency Instruction**'. Equally during a **Black Start** situation where the **Balancing Mechanism** has not been suspended, any instruction in relation to **Network Operators** which are part of an invoked **Distribution Restoration Zone Plan** will (unless **The Company** specifies otherwise) be deemed to be an **Emergency Instruction** and need not be prefixed with the words 'This is an **Emergency Instruction**'.

In Scotland, any instruction in relation to **Gensets** that are not at **Black Start Stations** or to **HVDC Systems** or **DC Converter Stations** that are not part of **Black Start HVDC Systems**, but which are part of an invoked **Local Joint Restoration Plan** and are instructed in accordance with the provisions of that **Local Joint Restoration Plan,** will be deemed to be an **Emergency Instruction** and need not be prefixed with the words 'This is an **Emergency Instruction**'. Equally in Scotland, any instruction in relation to **Network Operators** who are part of an invoked **Distribution Restoration Zone Plan** and are instructed in accordance with the provisions of that **Distribution Restoration Zone Plan**, will be deemed to be an **Emergency Instruction** and need not be prefixed with the words 'This is an **Emergency Instruction**'.

BC2.9.2.3 In all cases under this BC2.9 except BC2.9.1.2 (e) where **The Company** issues an **Emergency Instruction** to a **BM Participant** which is not rejected under BC2.9.2.1, the **Emergency Instruction** shall be treated as a **Bid-Offer Acceptance**. For the avoidance of doubt, any **Emergency Instruction** issued to a **Network Operator** or to an **Externally Interconnected System Operator** or in respect of a **Generating Unit** that does not form part of a **BM Unit**, will not be treated as a **Bid-Offer Acceptance**.

BC2.9.2.4 In the case of BC2.9.1.2 (e) (ii) where **The Company** issues an **Emergency Instruction** pursuant to a **Maximum Generation Service Agreement** payment will be dealt with in accordance with the **CUSC** and the **Maximum Generation Service Agreement**.

BC2.9.2.5 In the case of BC2.9.1.2 (e) (iii) where **The Company** issues an **Emergency Deenergisation Instruction** payment will be dealt with in accordance with the **CUSC**, Section 5.

BC2.9.2.6 In the of BC2.9.1.2 (e) (i) upon receipt of an **Emergency Instruction** by a **Generator** during a **Black Start** the provisions of Section G of the **BSC** relating to compensation shall apply.

BC2.9.3 Examples oOf Emergency Instructions

BC2.9.3.1 In the case of a **BM Unit** or a **Generating Unit**, **Emergency Instructions** may include an instruction for the **BM Unit** or the **Generating Unit** to operate in a way that is not consistent with the **Dynamic Parameters** and/or **Export and Import Limits**.

BC2.9.3.2 In the case of a **Generator**, **Emergency Instructions** may include:

(a) an instruction to trip one or more **Gensets** (excluding **Operational Intertripping**); or

(b) an instruction to trip **Mills** or to **Part Load** a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2); or

(c) an instruction to **Part Load** a **Power Generating Module** and/or **CCGT Module** or **Power Park Module**; or

(d) an instruction for the operation of **CCGT Units** within a **CCGT Module** (on the basis of the information contained within the **CCGT Module Matrix**) when emergency circumstances prevail (as determined by **The Company** in **The Company's** reasonable opinion); or

(e) an instruction to generate outside normal parameters, as allowed for in 4.2 of the **CUSC**; or

(f) an instruction for the operation of **Generating Units** within a **Cascade Hydro Scheme** (on the basis of the additional information supplied in relation to individual **Generating Units**) when emergency circumstances prevail (as determined by **The Company** in **The Company's** reasonable opinion); or

(g) an instruction for the operation of a **Power Park Module** (on the basis of the information contained within the **Power Park Module Availability Matrix**) when emergency circumstances prevail (as determined by **The Company** in **The Company's** reasonable opinion).

BC2.9.3.3 Instructions to **Network Operators** relating to the **Operational Day** may include:

(a) a requirement for **Demand** reduction and disconnection or restoration pursuant to **OC6**;

(b) an instruction to effect a load transfer between **Grid Supply Points**;

(c) an instruction to switch in a **System to Demand Intertrip Scheme**;

(d) an instruction to split a network;

(e) an instruction to disconnect an item of **Plant** or **Apparatus** from the **System**.

(f) until October 25 2020, an instruction requiring a **Network Operator** to disconnect **Embedded Power Stations** from their **System**. For the avoidance of doubt, this includes the disconnection of **Embedded Power Station(s)** connected to the **Network Operator's System** which are owned or operated by generators that are not **BM Participants**. Such an instruction may:

i) be specific and require the **Network Operator** to disconnect specified **Embedded Power Station(s)**;
ii) be for the **Network Operator** to disconnect **Embedded Power Stations** supplied via one or more specified **Grid Supply Point(s)** with an aggregate **Registered Capacity** of a specified value; or
iii) be for the **Network Operator** to disconnect **Embedded Power Stations** supplied via

one or more specified **Grid Supply Point(s)** such that a specified proportion of the aggregate **Registered Capacity** is disconnected.

(g) an instruction to establish a **Distribution Restoration Zone** in accordance with the **Distribution Restoration Zone Plan** as provided for in OC9.4.7.7.2.

~~In any such~~ In the case of BC2.9.3.3(f), the **Network Operator** will not be required to disconnect **Embedded Power Stations** with an aggregated **Registered Capacity** greater than that of the **Embedded Power Stations** supplied via the specified **Grid Supply Point(s)**. An instruction from **The Company** to the **Network Operator** will be given to commence reconnection. Reconnection shall not take place until such an instruction has been received and be carried out in accordance with the instruction.

BC2.9.4 Maintaining a~~A~~dequate System a~~A~~nd Localised NRAPM (Negative Reserve Active Power Margin)

BC2.9.4.1 Where **The Company** is unable to satisfy the required **System NRAPM** or **Localised NRAPM** by following the process described in BC1.5.5, **The Company** will issue an **Emergency Instruction** to exporting **BM Units** for **De-Synchronising** on the basis of **Bid-Offer Data** submitted to **The Company** in accordance with BC1.4.2(d). If **The Company** is still unable to satisfy the required **System NRAPM** or **Localised NRAPM** then **The Company** may issue **Emergency Instructions** to **Network Operator(s)** as set out under BC2.9.3.3(f) to disconnect **Embedded Power Station(s)** from their **System**.

BC2.9.4.2 In the event that **The Company** is unable to differentiate between exporting **BM Units** according to **Bid-Offer Data**, **The Company** will instruct a **BM Participant** to **Shutdown** a specified exporting **BM Unit** for such period based upon the following factors:

(a) effect on power flows (resulting in the minimisation of transmission losses);

(b) reserve capability;

(c) **Reactive Power** worth;

(d) **Dynamic Parameters**;

(e) in the case of **Localised NRAPM**, effectiveness of output reduction in the management of the **System Constraint**.

BC2.9.4.3 Where **The Company** is still unable to differentiate between exporting **BM Units**, having considered all the foregoing, **The Company** will decide which exporting **BM Unit** to **Shutdown** by the application of a quota for each **BM Participant** in the ratio of each **BM Participant's Physical Notifications**.

BC2.9.4.4 Other than as provided in BC2.9.4.5 and BC2.9.4.6 below, in determining which exporting **BM Units** to **De-Synchronise** under this BC2.9.4, **The Company** shall not consider in such determination (and accordingly shall not instruct to **De-Synchronise**) any **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2) within an **Existing Gas Cooled Reactor Plant**.

BC2.9.4.5 **The Company** shall be permitted to instruct a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2) within an **Existing AGR Plant** to **De-Synchronise** if the relevant **Generating Unit** within the **Existing AGR Plant** has failed to offer to be flexible for the relevant instance at the request of **The Company** within the **Existing AGR Plant Flexibility Limit**.

BC2.9.4.6 Notwithstanding the provisions of BC2.9.4.5 above, if the level of **System NRAPM** (taken together with **System** constraints) or **Localised NRAPM** is such that it is not possible to avoid instructing a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2) within an **Existing Magnox Reactor Plant** and/or an **Existing AGR Plant** whether or not it has met requests within the **Existing AGR Flexibility Limit** to **De-Synchronise The Company** may, provided the power flow across each **External Interconnection** is either at zero or results in an export of power from the **Total System**, so instruct a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2) within an **Existing Magnox Reactor Plant** and/or an **Existing AGR Plant** to **De-Synchronise** in the case of **System NRAPM**, in all cases and in the case of **Localised NRAPM**, when the power flow would have a relevant effect.

BC2.9.4.7 When instructing exporting **BM Units** which form part of an **On-Site Generator Site** to reduce generation or export under this BC2.9.4, **The Company** will not issue an instruction which would reduce generation or export below the reasonably anticipated **Demand** of the **On-Site Generator Site**. For the avoidance of doubt, it should be noted that the term "**On-Site Generator Site**" only relates to Trading Units which have fulfilled the Class 1 or Class 2 requirements.

BC2.9.5 Maintaining Adequate Frequency Sensitive Generation

BC2.9.5.1 If, post **Gate Closure**, **The Company** determines, in its reasonable opinion, from the information then available to it (including information relating to a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC2.2) breakdown) that the number of and level of **Primary**, **Secondary** and **High Frequency Response** available from **Gensets** (other than those units within **Existing Gas Cooled Reactor Plant**, which are permitted to operate in **Limited Frequency Sensitive Mode** at all times under BC3.5.3) available to operate in **Frequency Sensitive Mode** is such that it is not possible to avoid **De-Synchronising Existing Gas Cooled Reactor Plant** then provided that:

(a) there are (or, as the case may be, that **The Company** anticipates, in its reasonable opinion, that at the time that the instruction is to take effect there will be) no other **Gensets** generating and exporting on to the **Total System** which are not operating in **Frequency Sensitive Mode** (or which are operating with only a nominal amount in terms of level and duration) (unless, in **The Company's** reasonable opinion, necessary to assist the relief of **System** constraints or necessary as a result of other **System** conditions); and

(b) the power flow across each **External Interconnection** is (or, as the case may be, is anticipated to be at the time that the instruction is to take effect) either at zero or results in an export of power from the **Total System**,

then **The Company** may instruct such of the **Existing Gas Cooled Reactor Plant** to **De-Synchronise** as it is, in **The Company's** reasonable opinion, necessary to **De-Synchronise** and for the period for which the **De-Synchronising** is, in **The Company's** reasonable opinion, necessary.

BC2.9.5.2 If in **The Company's** reasonable opinion it is necessary for both the procedure in BC2.9.4 and that set out in BC2.9.5.1 to be followed in any given situation, the procedure in BC2.9.4 will be followed first, and then the procedure set out in BC2.9.5.1. For the avoidance of doubt, nothing in this sub-paragraph shall prevent either procedure from being followed separately and independently of the other.

BC2.9.6 Emergency Assistance To And From External Systems

(a) An **Externally Interconnected System Operator** (in its role as operator of the **External System**) may request that **The Company** takes any available action to increase the **Active Energy** transferred into its **External System**, or reduce the **Active Energy** transferred into the **National Electricity Transmission System** by way of emergency assistance if the alternative is to instruct a demand reduction on all or part of its **External System** (or on the system of an **Interconnector User** using its **External System**). Such request must be met by **The Company** providing this does not require a reduction of **Demand** on the **National Electricity Transmission System**, or lead to a reduction in security on the **National Electricity Transmission System**.

(b) **The Company** may request that an **Externally Interconnected System Operator** takes any available action to increase the **Active Energy** transferred into the **National Electricity Transmission System**, or reduce the **Active Energy** transferred into its **External System** by way of emergency assistance if the alternative is to instruct a **Demand** reduction on all or part of the **National Electricity Transmission System**. Such request must be met by the **Externally Interconnected System Operator** providing this does not require a reduction of **Demand** on its **External System** (or on the system of **Interconnector Users** using its **External System**), or lead to a reduction in security on such **External System** or system.

BC2.9.7 Unplanned Outages Of Electronic Communication And Computing Facilities

BC2.9.7.1 In the event of an unplanned outage of the electronic data communication facilities or of **The Company's** associated computing facilities or in the event of a **Planned Maintenance Outage** lasting longer than the planned duration, in relation to a post-**Gate Closure** period **The Company** will, as soon as it is reasonably able to do so, issue a **The Company** Computing System Failure notification by telephone or such other means agreed between **Users** and **The Company** indicating the likely duration of the outage.

BC2.9.7.2 During the period of any such outage, the following provisions will apply:

(a) **The Company** will issue further **The Company** Computing System Failure notifications by telephone or such other means agreed between **Users** and **The Company** to all **BM Participants** to provide updates on the likely duration of the outage;

(b) **BM Participants** should operate in relation to any period of time in accordance with the **Physical Notification** prevailing at **Gate Closure** current at the time of the computer system failure in relation to each such period of time. Such operation shall be subject to the provisions of BC2.5.1, which will apply as if set out in this BC2.9.7.2. No further submissions of **BM Unit Data** or **Generating Unit Data** (other than data specified in BC1.4.2(c) (**Export and Import Limits**) and BC1.4.2(e) (**Dynamic Parameters**) should be attempted. Plant failure or similar problems causing significant deviation from **Physical Notification** should be notified to **The Company** by telephone by the submission of a revision to **Export and Import Limits** in relation to the **BM Unit** or **Generating Unit Data** so affected;

(c) Revisions to **Export and Import Limits** and to **Dynamic Parameters** should be notified to **The Company** by telephone and will be recorded for subsequent use;

(d) **The Company** will issue **Bid-Offer Acceptances** by telephone which will be recorded for subsequent use;

(e) No data will be transferred from **The Company** to the **BMRA** until the communication facilities are re-established.

BC2.9.7.3 **The Company** will advise **BM Participants** of the withdrawal of **The Company** Computing System Failure notification following the re-establishment of the communication facilities.

BC2.10 OTHER OPERATIONAL INSTRUCTIONS AND NOTIFICATIONS

BC2.10.1 **The Company** may, from time to time, need to issue other instructions or notifications associated with the operation of the **National Electricity Transmission System**.

BC2.10.2 Such instructions or notifications may include:

Intertrips

(a) an instruction to arm or disarm an **Operational Intertripping** scheme;

Tap Positions

(b) a request for a **Genset** step-up transformer tap position (for security assessment);

Tests

(c) an instruction to carry out tests as required under **OC5**, which may include the issue of an instruction regarding the operation of **CCGT Units** within a **CCGT Module** at a **Large Power Station**;

Future BM Unit Requirements

(d) a reference to any implications for future **BM Unit** requirements and the security of the **National Electricity Transmission System**, including arrangements for change in output to meet post fault security requirements;

Changes to Target Frequency

(e) a notification of a change in **Target Frequency**, which will normally only be 49.95, 50.00, or 50.05Hz but in exceptional circumstances as determined by **The Company** in its reasonable opinion, may be 49.90 or 50.10Hz.

BC2.10.3 Where an instruction or notification under BC2.10.2 (c) or (d) results in a change to the input or output level of the **BM Unit** then **The Company** shall issue a **Bid-Offer Acceptance** or **Emergency Instruction** as appropriate.

BC2.11 LIAISON WITH GENERATORS FOR RISK OF TRIP AND AVR TESTING

BC2.11.1 A **Generator** at the **Control Point** for any of its **Large Power Stations** may request **The Company's** agreement for one of the **Gensets** at that **Power Station** to be operated under a risk of trip. **The Company's** agreement will be dependent on the risk to the **National Electricity Transmission System** that a trip of the **Genset** would constitute.

BC2.11.2 (a) Each **Generator** at the **Control Point** for any of its **Large Power Stations** will operate its **Synchronised Gensets** (excluding **Power Park Modules**) with:

(i) **AVRs** in constant terminal voltage mode with VAR limiters in service at all times. **AVR** constant **Reactive Power** or **Power Factor** mode should, if installed, be disabled; and

(ii) its generator step-up transformer tap changer selected to manual mode,

unless released from this obligation in respect of a particular **Genset** by **The Company**.

(b) Each **Generator** at the **Control Point** for any of its **Large Power Stations** will operate its **Power Park Modules** with a **Completion Date** before 1st January 2006 at unity power factor at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**).

(c) Each **Generator** at the **Control Point** for any of its **Large Power Stations** will operate its **Power Park Modules** with a **Completion Date** on or after 1st January 2006 in voltage control mode at the **Grid Entry Point** (or **User System Entry Point** if **Embedded**). Constant **Reactive Power** or **Power Factor** mode should, if installed, be disabled.

(d) Where a **Power System Stabiliser** is fitted as part of the excitation system or voltage control system of a **Genset**, it requires on-load commissioning which must be witnessed by **The Company**. Only when the performance of the **Power System Stabiliser** has been approved by **The Company** shall it be switched into service by a **Generator** and then it will be kept in service at all times unless otherwise agreed with **The Company**. Further reference is made to this in CC.6.3.8 and ECC.6.3.8.

BC2.11.3 A **Generator** at the **Control Point** for any of its **Power Stations** may request **The Company's** agreement for one of its **Gensets** at that **Power Station** to be operated with the **AVR** in manual mode, or **Power System Stabiliser** switched out, or VAR limiter switched out. **The Company's** agreement will be dependent on the risk that would be imposed on the **National Electricity Transmission System** and any **User System**. Provided that in any event a **Generator** may take such action as is reasonably necessary on safety grounds (relating to personnel or plant) .

BC2.11.4 Each **Generator** shall operate its dynamically controlled **OTSDUW Plant and Apparatus** to ensure that the reactive capability and voltage control performance requirements as specified in CC.6.3.2, CC.6.3.8, CC.A.7 or ECC.6.3.2, ECC.6.3.8, ECC.A.7, ECC.A.8 and the **Bilateral Agreement** can be satisfied in response to the Setpoint Voltage and Slope as instructed by **The Company** at the **Transmission Interface Point**.

BC2.12 LIAISON WITH EXTERNALLY INTERCONNECTED SYSTEM OPERATORS

BC2.12.1 Co-Ordination Role Of Externally Interconnected System Operators

(a) The **Externally Interconnected System Operator** will act as the **Control Point** for **Bid-Offer Acceptances** on behalf of **Interconnector Users** and will co-ordinate instructions relating to **Ancillary Services** and **Emergency Instructions** on behalf of **Interconnector Users** using its **External System** in respect of each **Interconnector Users BM Units**.

(b) **The Company** will issue **Bid-Offer Acceptances** and instructions for **Ancillary Services** relating to **Interconnector Users BM Units** to each **Externally Interconnected System Operator** in respect of each **Interconnector User** using its **External System**.

(c) If, as a result of a reduction in the capability (in MW) of the **External Interconnection**, the total of the **Physical Notifications** and **Bid-Offer Acceptances** issued for the relevant period using that **External Interconnection**, as stated in the **BM Unit Data** exceeds the reduced capability (in MW) of the respective **External Interconnection** in that period then **The Company** shall notify the **Externally Interconnected System Operator** accordingly. The **Externally Interconnected System Operator** should seek a revision of **Export and Import Limits** from one or more of its **Interconnector Users** for the remainder of the **Balancing Mechanism** period during which **Physical Notifications** cannot be revised.

BC2.13 LIAISON WITH INTERCONNECTOR OWNERS

(a) Calculate the Interconnector Scheduled Transfer

i) **Interconnector Owners** shall use best endeavours to deliver an updated **Interconnector Scheduled Transfer** to **NGET** by 10 minutes after each **Intraday Cross-Zonal Gate Closure Time**.

ii) The updated **Interconnector Scheduled Transfer** shall fully reflect the results of the **Single Intraday Coupling**.

iii) **Interconnector Owners** must ensure that the updated **Interconnector Scheduled Transfer** is received in its entirety and logged into **NGET's** computer systems by the time of 10 minutes after each **Intraday Cross-**

zonal Gate Closure Time.

APPENDIX 1 - FORM OF BID-OFFER ACCEPTANCES

BC2.A.1.1 This Appendix describes the forms of **Bid-Offer Acceptances**. As described in BC2.6.1 **Bid-Offer Acceptances** are normally given by an automatic logging device, but in the event of failure of the logging device, **Bid-Offer Acceptances** will be given by telephone.

BC2.A.1.2 For each **BM Unit** the **Bid-Offer Acceptance** will consist of a series of MW figures and associated times.

BC2.A.1.3 The **Bid-Offer Acceptances** relating to **CCGT Modules** will assume that the **CCGT Units** within the **CCGT Module** will operate in accordance with the **CCGT Module Matrix**, as required by **BC1**. The **Bid-Offer Acceptances** relating to **Cascade Hydro Schemes** will assume that the **Generating Unit** forming part of the **Cascade Hydro Scheme** will operate, where submitted, in accordance with the **Cascade Hydro Scheme Matrix** submitted under **BC1**. The **Bid-Offer Acceptances** relating to **Synchronous Power Generating Modules** will assume that the **Synchronous Generating Units** within the **Synchronous Power Generating Module** will operate in accordance with the **Synchronous Power Generating Module Matrix**, as required by **BC1**.

BC2.A.1.4 Bid-Offer Acceptances Given By Automatic Logging Device

(a) The complete form of the **Bid-Offer Acceptance** is given in the EDL Message Interface Specification which can be made available to **Users** on request.

(b) **Bid-Offer Acceptances** will normally follow the form:

(i) **BM Unit** Name

(ii) Instruction Reference Number

(iii) Time of instruction

(iv) Type of instruction

(v) **BM Unit Bid-Offer Acceptance** number

(vi) Number of MW/Time points making up instruction (minimum 2, maximum 5)

(vii) MW value and Time value for each point identified in (vi)

The times required in the instruction are input and displayed in London time, but communicated electronically in GMT.

BC2.A.1.5 Bid-Offer Acceptances Given By Telephone

(a) All run-up/run-down rates will be assumed to be constant and consistent with **Dynamic Parameters**. Each **Bid-Offer Acceptance** will, wherever possible, be kept simple, drawing as necessary from the following forms and BC2.7

(b) **Bid-Offer Acceptances** given by telephone will normally follow the form:

(i) an exchange of operator names;

(ii) **BM Unit** Name;

(iii) Time of instruction;

(iv) Type of instruction;

(v) Number of MW/Time points making up instruction (minimum 2, maximum 5)

(vi) MW value and Time value for each point identified in (v)

The times required in the instruction are expressed in London time.

For example, for a **BM Unit** ABCD-1 acceptance logged with a start time at 1400 hours and with a FPN at 300MW:

"**BM Unit** ABCD-1 **Bid-Offer Acceptance** timed at 1400 hours. Acceptance consists of 4 MW/Time points as follows:

300MW at 1400 hours

400MW at 1415 hours

400MW at 1450 hours

300MW at 1500 hours"

BC2.A.1.6 Submission Of Bid-Offer Acceptance Data To The Bmra

The relevant information contained in **Bid-Offer Acceptances** issued by **The Company** will be converted into "from" and "to" MW levels and times before they are submitted to the **BMRA** by **The Company**.

APPENDIX 2 - TYPE AND FORM OF ANCILLARY SERVICE INSTRUCTIONS

BC2.A.2.1 This part of the Appendix consists of a non-exhaustive list of the forms and types of instruction for a **Genset** to provide **System Ancillary Services**. There may be other types of **Commercial Ancillary Services** and these will be covered in the relevant **Ancillary Services Agreement**. In respect of the provision of **Ancillary Services** by **Generating Units** the forms and types of instruction will be in the form of this Appendix 2 unless amended in the **Ancillary Services Agreement**.

As described in CC.8 and ECC.8, **System Ancillary Services** consist of Part 1 and Part 2 **System Ancillary Services**.

Part 1 System Ancillary Services Comprise:

(a) **Reactive Power** supplied other than by means of synchronous or static compensators. This is required to ensure that a satisfactory **System** voltage profile is maintained and that sufficient **Reactive Power** reserves are maintained under normal and fault conditions. **Ancillary Service** instructions in relation to **Reactive Power** may include:

(i) MVAr Output

(ii) Target Voltage Levels

(iii) Tap Changes

(iv) Maximum MVAr Output ('maximum excitation')

(v) Maximum MVAr Absorption ('minimum excitation')

(b) **Frequency** Control by means **of Frequency** sensitive generation. **Gensets** may be required to move to or from **Frequency Sensitive Mode** in the combinations agreed in the relevant **Ancillary Services Agreement**. They will be specifically requested to operate so as to provide **Primary Response** and/or **Secondary Response** and/or **High Frequency Response**.

Part 2 System Ancillary Services Comprise:

(c) **Frequency** Control by means of **Fast Start**.

(d) **Black Start Capability**

(e) **Restoration Service Providers** forming part of a **Distribution Restoration Zone**.

(fe) **System to Generator Operational Intertripping**

BC2.A.2.2 As **Ancillary Service** instructions are not part of **Bid-Offer Acceptances** they do not need to be closed instructions and can cover any period of time, not just limited to the period of the **Balancing Mechanism**.

BC2.A.2.3 As described in BC2.6.1, unless otherwise agreed with **The Company**, **Ancillary Service** instructions are normally given by automatic logging device, but in the absence of, or in the event of failure of the logging device, instructions will be given by telephone.

BC2.A.2.4 Instructions gGiven bBy Automatic Logging Device

(a) The complete form of the **Ancillary Service** instruction is given in the EDL Message Interface Specification which is available to **Users** on request from **The Company**.

(b) **Ancillary Service** instructions for **Frequency** Control will normally follow the form:

(i) **BM Unit** Name

(ii) Instruction Reference Number

(iii) Time of instruction

(iv) Type of instruction (REAS)

(v) Reason Code

(vi) Start Time

(c) **Ancillary Service** instructions for **Reactive Power** will normally follow the form:

(i) **BM Unit** Name

(ii) Instruction Reference Number

(iii) Time of instruction

(iv) Type of instruction (MVAr, VOLT or TAPP)

(v) Target Value

(vi) Target Time

The times required in the instruction are input and displayed in London time, but communicated electronically in GMT.

BC2.A.2.5 Instructions Given By Telephone

(a) **Ancillary Service** instructions for **Frequency** Control will normally follow the form:

(i) an exchange of operator names;

(ii) **BM Unit** Name;

(iii) Time of instruction;

(iv) Type of instruction;

(v) Start Time.

The times required in the instruction are expressed in London time.

For example, for **BM Unit** ABCD-1 instructed at 1400 hours to provide **Primary** and **High Frequency** response starting at 1415 hours:

"**BM Unit** ABCD-1 message timed at 1400 hours. Unit to **Primary and High Frequency Response** at 1415 hours"

(b) **Ancillary Service** instructions for **Reactive Power** will normally follow the form:

(a) an exchange of operator names;

(b) **BM Unit** Name;

(c) Time of instruction;

(d) Type of instruction (MVAr, VOLT, SETPOINT, **SLOPE** or TAPP)

(e) Target Value

(f) Target Time.

The times required in the instruction are expressed as London time.

For example, for **BM Unit** ABCD-1 instructed at 1400 hours to provide 100MVAr by 1415 hours:

"**BM Unit** ABCD-1 message timed at 1400 hours. MVAr instruction. Unit to plus 100 MVAr target time 1415 hours."

BC2.A.2.6 Reactive Power

As described in BC2.A.2.4 and BC2.A.2.5 instructions for **Ancillary Services** relating to **Reactive Power** may consist of any of several specific types of instruction. The following table describes these instructions in more detail:

Instruction Name	Description	Type of Instruction
MVAr Output	The individual MVAr output from the **Genset** onto the **National Electricity Transmission System** at the **Grid Entry Point** (or onto the **User System** at the **User System Entry Point** in the case of **Embedded Power Stations**), namely on the higher voltage side of the generator step-up transformer or **Grid Entry Point** or **User System Entry Point** in the case of a **Power Generating Module**. In relation to each **Genset**, where there is no HV indication, **The Company** and the **Generator** will discuss and agree equivalent MVAr levels for the corresponding LV indication. Where a **Genset** is instructed to a specific MVAr output, the **Generator** must achieve that output within a tolerance of +/- 25 MVAr (for **Gensets** in England and Wales) or the lesser of +/-5% of rated output or 25MVAr (for **Gensets** in Scotland) (or such other figure as may be agreed with **The Company**) by tap changing on the generator step-up transformer, or adjusting the **Genset** terminal voltage, subject to compliance with CC.6.3.8 (a) (v), or ECC.6.3.8.3.3 (as applicable) to a value that is equal to or higher than 1.0p.u. of the rated terminal voltage, or a combination of both. Once this has been achieved, the **Generator** will not tap again and will not readjust the **Genset** terminal voltage without prior consultation with and the agreement of **The Company**, on the basis that MVAr output will be allowed to vary with **System** conditions.	MVAr

Instruction Name	Description	Type of Instruction
Target Voltage Levels	Target voltage levels to be achieved by the **Genset** on the **National Electricity Transmission System** at the **Grid Entry Point** (or on the **User System** at the **User System Entry Point** in the case of **Embedded Power Stations**, namely on the higher voltage side of the generator step-up transformer or **Grid Entry Point** or **User System Entry Point** in the case of a **Power Generating Module**. Where a **Genset** is instructed to a specific target voltage, the **Generator** must achieve that target within a tolerance of ±1 kV (or such other figure as may be agreed with **The Company**) by tap changing on the generator step-up transformer, or adjusting the **Genset** terminal voltage, subject to compliance with CC.6.3.8 (a) (v) or ECC.6.3.8.3.3 (as applicable), to a value that is equal to or higher than 1.0p.u. of the rated terminal voltage, or a combination of both. In relation to each **Genset**, where there is no HV indication, **The Company** and the **Generator** will discuss and agree equivalent voltage levels for the corresponding LV indication. Under normal operating conditions, once this target voltage level has been achieved the **Generator** will not tap again and will not readjust the **Genset** terminal voltage without prior consultation with, and with the agreement of, **The Company**. However, under certain circumstances the **Generator** may be instructed to maintain a target voltage until otherwise instructed and this will be achieved by tap changing on the generator step-up transformer, or adjusting the **Genset** terminal voltage, subject to compliance with CC.6.3.8 (a) (v) or ECC.6.3.8.3.3 (as applicable), to a value that is equal to or higher than 1.0p.u. of the rated terminal voltage, or a combination of both without reference to **The Company**.	VOLT
Setpoint Voltage	Where a **Non-Synchronous Generating Unit**, **DC Converter** or **Power Park Module** or **HVDC Converter** is instructed to a specific **Setpoint Voltage**, the **Generator** must achieve that **Setpoint Voltage** within a tolerance of ±0.25% (or such other figure as may be agreed with **The Company**). The **Generator** must maintain the specified **Setpoint Voltage** target until an alternative target is received from **The Company**.	SETPOINT

Instruction Name	Description	Type of Instruction
Slope	Where a **Non-Synchronous Generating Unit**, **DC Converter** or **Power Park Module** or **HVDC Converter** is instructed to a specific **Slope**, the **Generator** must achieve that **Slope** within a tolerance of ±0.5% (or such other figure as may be agreed with **The Company**). The **Generator** must maintain the specified **Slope** target until an alternative target is received from **The Company**. The **Generator** will not be required to implement a new **Slope** setting in a time of less than 1 week from the time of the instruction.	SLOPE
Tap Changes	Details of the required generator step-up transformer tap changes in relation to a **Genset**. The instruction for tap changes may be a **Simultaneous Tap Change** instruction, whereby the tap change must be effected by the **Generator** in response to an instruction from **The Company** issued simultaneously to relevant **Power Stations**. The instruction, which is normally preceded by advance notice, must be effected as soon as possible, and in any event within one minute of receipt from **The Company** of the instruction. For a **Simultaneous Tap Change**, change **Genset** generator step-up transformer tap position by one [two] taps to raise or lower (as relevant) **System** voltage, to be executed at time of instruction.	TAPP
Maximum MVAr Output ("maximum excitation")	Under certain conditions, such as low **System** voltage, an instruction to maximum MVAr output at instructed MW output ("maximum excitation") may be given, and a **Generator** should take appropriate actions to maximise MVAr output unless constrained by plant operational limits or safety grounds (relating to personnel or plant).	
Maximum MVAr Absorption ("minimum excitation")	Under certain conditions, such as high **System** voltage, an instruction to maximum MVAr absorption at instructed MW output ("minimum excitation") may be given, and a **Generator** should take appropriate actions to maximise MVAr absorption unless constrained by plant operational limits or safety grounds (relating to personnel or plant).	

BC2.A.2.7 In addition, the following provisions will apply to **Reactive Power** instructions:

(a) In circumstances where **The Company** issues new instructions in relation to more than one **BM Unit** at the same **Power Station** at the same time, tapping will be carried out by the **Generator** one tap at a time either alternately between (or in sequential order, if more than two), or at the same time on, each **BM Unit**.

(b) Where the instructions require more than two taps per **BM Unit** and that means that the instructions cannot be achieved within 2 minutes of the instruction time (or such longer period at **The Company** may have instructed), the instructions must each be achieved with the minimum of delay after the expiry of that period.

(c) It should be noted that should **System** conditions require, **The Company** may need to instruct maximum MVAr output to be achieved as soon as possible, but (subject to the provisions of paragraph (BC2.A.2.7(b) above) in any event no later than 2 minutes after the instruction is issued.

(d) An **Ancillary Service** instruction relating to **Reactive Power** may be given in respect of **CCGT Units** within a **CCGT Module** at a **Power Station** or **Generating Units** within a **Synchronous Power Generating Module** at a **Power Station** where running arrangements and/or **System** conditions require, in both cases where exceptional circumstances apply and connection arrangements permit.

(e) In relation to MVAr matters, MVAr generation/output is an export onto the **System** and is referred to as "lagging MVAr", and MVAr absorption is an import from the **System** and is referred to as "leading MVAr".

(f) It should be noted that the excitation control system constant **Reactive Power** output control mode or constant **Power Factor** output control mode will always be disabled, unless agreed otherwise with **The Company**.

APPENDIX 3 - SUBMISSION OF REVISED MVAr CAPABILITY

BC2.A.3.1 For the purpose of submitting revised MVAr data the following terms shall apply:

Full Output	In the case of a **Synchronous Generating Unit** (as defined in the Glossary and Definitions ((which could be part of a **Synchronous Power Generating Module**) and not limited by BC2.2) is the MW output measured at the generator stator terminals representing the LV equivalent of the **Registered Capacity** at the **Grid Entry Point**, and in the case of a **Non-Synchronous Generating Unit** (excluding **Power Park Units**), **HVDC Converter** or **DC Converter** or **Power Park Module** is the **Registered Capacity** at the **Grid Entry Point**
Minimum Output	In the case of a **Synchronous Generating Unit** (as defined in the Glossary and Definitions ((which could be part of a **Synchronous Power Generating Module**) and not limited by BC2.2-) is the MW output measured at the generator stator terminals representing the LV equivalent of the **Minimum Generation** or **Minimum Stable Operating Level** at the **Grid Entry Point**, and in the case of a **Non-Synchronous Generating Unit** (excluding **Power Park Units**), **HVDC Converter** or **DC Converter** or **Power Park Module** is the **Minimum Generation** or **Minimum Stable Operating Level** or **Minimum Active Power Transmission Capacity** at the **Grid Entry Point**

BC2.A.3.2 The following provisions apply to faxed submission of revised MVAr data:

(a) The fax must be transmitted to **The Company** (to the relevant location in accordance with GC6) and must contain all the sections from the relevant part of Annexure 1 and from either Annexure 2 or 3 (as applicable) but with only the data changes set out. The "notification time" must be completed to refer to the time of transmission, where the time is expressed as London time.

(b) Upon receipt of the fax, **The Company** will acknowledge receipt by sending a fax back to the **User**. The acknowledgement will either state that the fax has been received and is legible or will state that it (or part of it) is not legible and will request re-transmission of the whole (or part) of the fax.

(c) Upon receipt of the acknowledging fax the **User** will, if requested, re-transmit the whole or the relevant part of the fax.

(d) The provisions of paragraphs (b) and (c) then apply to that re-transmitted fax.

APPENDIX 3 - ANNEXURE 1

Optional Logo

Company name **REVISED REACTIVE POWER CAPABILITY DATA**

TO: National Electricity Transmission System Control Centre Fax telephone No.

Number of pages inc. header:.....

Sent By : .....

Return Acknowledgement Fax to .....

For Retransmission or Clarification ring.....

Acknowledged by **The Company**: (Signature)

.....

Acknowledgement time and date
.....

Legibility of FAX :

Distributed ReStart in partnership with

Acceptable		
Unacceptable (List pages if appropriate)		(Resend FAX)

APPENDIX 3 - ANNEXURE 2

To: National Electricity Transmission System Control Centre

From : [Company Name & Location]

REVISED REACTIVE POWER CAPABILITY DATA – GENERATING UNITS EXCLUDING POWER PARK MODULES AND DC CONVERTERS

Notification Time (HH:MM):	Notification Date (DD/MM/YY):
Start Time (HH:MM):	Start Date (DD/MM/YY):
Generating Unit*	

* For a **Synchronous Power Generating Module** and/or **CCGT Module** and/or a **Cascade Hydro Scheme**, the redeclaration is for a **Generating Unit** within a **Synchronous Power Generating Module** and/or **CCGT Module** and/or **Cascade Hydro Scheme**. For **BM Units** quote **The Company** BM Unit id, for other units quote the **Generating Unit** id used for OC2.4.1.2 Outage Planning submissions. **Generating Unit** has the meaning given in the Glossary and Definitions and is not limited by BC2.2.

REVISION TO THE REACTIVE POWER CAPABILITY AT THE GENERATING UNIT STATOR TERMINALS (at rated terminal volts) **AS STATED IN THE RELEVANT ANCILLARY SERVICES AGREEMENT:**

	MW	MINIMUM (MVAr +ve for lag, -ve for lead)	MAXIUM (MVAr +ve for lag, -ve for lead)
AT **RATED MW**			
AT FULL OUTPUT (MW)			
AT MINIMUM OUTPUT (MW)			

COMMENTS *e.g. generator transformer tap restrictions, predicted end time if known*

_____

Redeclaration made by (Signature)

_____

APPENDIX 3 - ANNEXURE 3

To: National Electricity Transmission System Control Centre

From : [Company Name & Location]

REVISED REACTIVE POWER CAPABILITY DATA – POWER PARK MODULES, HVDC CONVERTERS AND DC CONVERTERS

Notification Time (HH:MM):	Notification Date (DD/MM/YY):
Start Time (HH:MM):	Start Date (DD/MM/YY):
Power Park Module / DC Converter*	

* For BM Units quote **The Company** BM Unit id, for other units quote the id used for OC2.4.1.2 Outage Planning submissions

Start Time/Date (if not effective immediately)

REVISION TO THE REACTIVE POWER CAPABILITY AT THE COMMERCIAL BOUNDARY AS STATED IN THE RELEVANT ANCILLARY SERVICES AGREEMENT:

	MINIMUM (MVAr +ve for lag, -ve for lead)	MAXIMUM (MVAr +ve for lag, -ve for lead)
AT RATED MW		
AT 50% OF RATED MW		
AT 20% OF RATED MW		
BELOW 20% OF RATED MW		
AT 0% OF RATED MW		

COMMENTS *e.g. generator transformer tap restrictions, predicted end time if known*

_____

_____

Redeclaration made by (Signature)

_____

APPENDIX 4 - SUBMISSION OF AVAILABILITY OF FREQUENCY SENSITIVE MODE

BC2.A.4.1 For the purpose of submitting availability of **Frequency Sensitive Mode**, this process only relates to the provision of response under the **Frequency Sensitive Mode** and does not cover the provision of response under the **Limited Frequency Sensitive Mode**.

BC2.A.4.2 The following provisions apply to the faxed submission of the **Frequency Sensitive Mode availability**;

(a) The fax must be transmitted to **The Company** (to the relevant location in accordance with GC6) and must contain all the sections relevant to Appendix 4 - Annexure1 but with only the data changes set out. The "notification time" must be completed to refer to the time and date of transmission, where the time is expressed in London time.

(b) Upon receipt of the fax, **The Company** will acknowledge receipt by sending a fax back to the **User**. This acknowledging fax should be in the format of Appendix 4 – Annexure 1. The acknowledgement will either state that the fax has been received and is legible or will state that it (or part of it) is not legible and will request re-transmission of the whole (or part) of the fax.

(c) Upon receipt of the acknowledging fax the **User** will, if requested re-transmit the whole or the relevant part of the fax.

(d) The provisions of paragraph (b) and (c) then apply to the re-transmitted fax.

BC2.A.4.3 The **User** shall ensure the availability of operating in the **Frequency Sensitive Mode** is restored as soon as reasonably practicable and will notify **The Company** using the format of Appendix 4 – Annexure 1. In the event of a sustained unavailability of **Frequency Sensitive Mode**, **The Company** may seek to confirm compliance with the relevant requirements in the **CC** or **ECC** through the process in **OC5** or **ECP**.

APPENDIX 4 - ANNEXURE 1

To: National Electricity Transmission System Control Centre

From : [Company Name & Location]

Submission of availability of Frequency Sensitive Mode

Notification Time (HH:MM):	Notification Date (DD/MM/YY):
Start Time (HH:MM):	Start Date (DD/MM/YY):
Genset or DC Converter	

The availability of the above unit to operate in **Frequency Sensitive Mode** is as follows:

All contract modes: Available / Unavailable *[delete as applicable];* or

Change to the availability of individual contract modes:

Contract Mode e.g. *A*	**Availability for operation in Frequency Sensitive Mode** *[Y/N]*

COMMENTS *e.g. reason for submission, predicted end time if known*

_____

_____

Redeclaration made by (Signature)_____

Receipt Acknowledgement from **The Company**

Legible (tick box)		Illegible (tick box)	
Explanation:			
Time: Date: Signature:			

< END OF BALANCING CODE 2 >

Distributed ReStart in partnership with

Extracts from Data Registration Code

SCHEDULE 16 - BLACK START INFORMATION

PAGE 1 OF 32

PART 1

BLACK START INFORMATION The following data/text items are required from each Generator for each BM Unit at a Large Power Station as detailed in PC.A.5.7. Data is not required for Generating Units that are contracted to provide Black Start Capability, or Electricity Storage Modules which have short cycle times. The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from The Company during a Black Start.		
Data Description *(PC.A.5.7) (■ CUSC Contract)*	Units	Data Category
Assuming all **BM Units** were running immediately prior to the **Total Shutdown** or **Partial Shutdown** and in the event of loss of all external power supplies, provide the following information:		
a) Expected time for the first and subsequent **BM Units** to be **Synchronised**, from the restoration of external power supplies, assuming external power supplies are not available for up to 24hrs	Tabular or Graphical	DPD II
b) Describe any likely issues that would have a significant impact on a **BM Unit' s** time to be **Synchronised** arising as a direct consequence of the inherent design or operational practice of the **Power Station** and/or **BM Unit**, e.g. limited barring facilities, time from a **Total Shutdown** or **Partial Shutdown** at which batteries would be discharged.	Text	
Block Loading Capability:		
c) Provide estimated **Block Loading Capability** from 0MW to **Registered Capacity** of each **BM Unit** based on the unit being ' hot' (run prior to shutdown) and also ' cold' (not run for 48hrs or more prior to the shutdown). The **Block Loading Capability** should be valid for a frequency deviation of 49.5Hz – 50.5Hz. The data should identify any required ' hold' points.	Tabular or Graphical	DPD II

SCHEDULE 16 - BLACK START INFORMATION

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PART II

BLACK START INFORMATION The following data/text items are required from each **HVDC System Owner** or **DC Converter Station Owner** for each **HVDC System** and **DC Converter Station** as detailed in PC.A.5.7. Data is not required for **HVDC Systems** and **DC Converter Stations** that are contracted to provide a **Black Start Capability**. The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from **The Company** during a **Black Start**.		
Data Description *(PC.A.5.7) (■ CUSC Contract)*	Units	Data Category
Assuming all **BM Units** were running immediately prior to the **Total Shutdown** or **Partial Shutdown** and in the event of loss of all external power supplies, provide the following information:		
a) Expected time for the first and subsequent **BM Units** to be **Synchronised**, from the restoration of external power supplies, assuming external power supplies are not available for up to 24hrs	Tabular or Graphical	DPD II
b) Describe any likely issues that would have a significant impact on a **BM Units** time to be **Synchronised** arising as a direct consequence of the inherent design or operational practice of the **HVDC System** or **DC Converter Station** and/or **BM Unit**, e.g. time from a **Total Shutdown** or **Partial Shutdown** at which batteries would be discharged.	Text	
Block Loading Capability:		
c) Provide estimated incremental **Active Power** steps, form no load to **Rated MW** which an **HVDC System** or **DC Converter Station** can instantaneously supply without causing it to trip or go outside the **Frequency** range of 47.5Hz – 52Hz (or an otherwise agreed **Frequency** range). The time between each incremental step shall also be provided. In addition data should be provided from 0MW to **Registered Capacity** of each **BM Unit** based on the **HVDC System** or **DC Converter Station** being (not run for 48hrs or more prior to the shutdown) or run immediately before the **Partial Shutdown** or **Total Shutdown**. The data supplied should be valid for a **Frequency** deviation of 49.5Hz – 50.5Hz and should identify any required ‘ hold’ points.	Tabular or Graphical	DPD II

SCHEDULE 16 - BLACK START INFORMATION

BLACK START INFORMATION The following data/text items are required from **Network Operators** as detailed in PC.A.5.8. The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from **The Company** during a **Black Start**.		
Data Description *(PC.A.5.8) (■ CUSC Contract)*	Units	Data Category
Assuming all **Restoration Service Providers** were running immediately prior to the **Total Shutdown** or **Partial Shutdown** and in the event of loss of all external power supplies, provide the following information:		
a) Expected time for the first and subsequent **Anchor Generators** and/or **Anchor HVDC System Owners** and/or **Anchor DC Converter** owner' s and **Restoration Service Provider' s Plant** to be **Synchronised**, following a **Total Shutdown** or **Partial Shutdown**.	Tabular or Graphical	DPD II
b) Describe any likely issues that would have a significant impact on the **Anchor Generator' s** and/or **Anchor HVDC System Owner' s** and/or **Anchor DC Converter** owner' s and **Restoration Service Provider' s** ability to resynchronise all their **Plant**, if all were running immediately prior to the **Total Shutdown** or **Partial Shutdown**. Additionally, this should highlight any specific issues (i.e. those that would impact the time at which the **Anchor Plant** and **Restoration Service Provider' s Plant** to be **Synchronised**) that may arise, as time progresses without external supplies being restored.	Text	
Block Loading Capability:		
c) Provide estimated **Block Loading Capability** This should be provided in either graphical or tabular format showing the estimated block loading capability from 0MW to **Registered Capacity** or **Maximum Capacity** as the case may be. Any particular ' hold' points should also be identified. The data of each **Anchor Plant** and **Restoration Service Provider's Plant** forming part of a **Distribution Restoration Zone** should be provided for the condition of an **Anchor Plant** or **Restoration Service Provider' s Plant** (which is considered as both a ' hot' unit (run prior to **Shutdown**) and cold unit (not run for 48 hours or more prior to the **Shutdown**) that was **Synchronised** just prior to the **Total Shutdown** or **Partial Shutdown**. In the case of an **Anchor HVDC System** or **Anchor DC Converter**, data should be provided when the **Anchor HVDC System** or **Anchor DC Converter** has been considered to have run immediately before the **Total Shutdown** or **Partial Shutdown** and equally when the **HVDC System** or **DC Converter** has been considered to have been **Shutdown** for a period of 48 hours or more. The block loading assessment should be done against a frequency variation of 49.5Hz – 50.5Hz.	Tabular or Graphical	DPD II

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SCHEDULE 19 – USER DATA FILE STRUCTURE

The structure of the **User Data File Structure** is given below.

i.d.	Folder name	Description of contents
Part A: Commercial & Legal		
A2	Commissioning	Commissioning & Test Programmes
A3	Statements	Statements of Readiness
A9	AS Monitoring	Ancillary Services Monitoring
A10	Self Certification	User Self Certification of Compliance
A11	Compliance statements	Compliance Statement
Part 1: Safety & System Operation		
1.1	Interface Agreements	Interface Agreements
1.2	Safety Rules	Safety Rules
1.3	Switching Procedures	Local Switching Procedures
1.4	Earthing	Earthing
1.5	SRS	Site Responsibility Schedules
1.6	Diagrams	Operational and Gas Zone Diagrams
1.7	Drawings	Site Common Drawings
1.8	Telephony	Control Telephony
1.9	Safety Procedures	Local Safety Procedures
1.10	Co-ordinators	Safety Co-ordinators
1.11	RISSP	Record of Inter System Safety Precautions
1.12	Tel Numbers	Telephone Numbers for Joint System Incidents
1.13	Contact Details	Contact Details (fax, tel, email)
1.14	Restoration Plan	Local Joint Restoration Plan and Distribution Restoration Zone Plan (incl. black start if applicable)
1.15	Maintenance	Maintenance Standards
Part 2: Connection Technical Data		
2.1	DRC Schedule 5	DRC Schedule 5 – Users System Data
2.2	Protection Report	Protection Settings Reports
2.3	Special Automatic Facilities	Special Automatic Facilities e.g. intertrip
2.4	Operational Metering	Operational Metering
2.5	Tariff Metering	Tariff Metering
2.6	Operational Comms	Operational Communications
2.7	Monitoring	Performance Monitoring
2.8	Power Quality	Power Quality Test Results (if required)

Part 3: Generator Technical Data		
3.1	DRC Schedule 1	DRC Schedule 1 - Generating Unit, Power Generating Module, HVDC System and DC Converter Technical Data
3.2	DRC Schedule 2	DRC Schedule 2 - Generation Planning Data
3.3	DRC Schedule 4	DRC Schedule 4 – Frequency Droop & Response
3.4	DRC Schedule 14	DRC Schedule 14 – Fault Infeed Data – Generators
3.5	Special Generator Protection	Special Generator Protection eg Pole slipping; islanding
3.6	Compliance Tests	Compliance Tests & Evidence
3.7	Compliance Studies	Compliance Simulation Studies
3.8	Site Specific	Bilateral Connections Agreement Technical Data & Compliance
Part 4: General DRC Schedules		
4.1	DRC Schedule 3	DRC Schedule 3 – Large Power Station Outage Information
4.2	DRC Schedule 6	DRC Schedule 6 – Users Outage Information
4.3	DRC Schedule 7	DRC Schedule 7 – Load Characteristics
4.4	DRC Schedule 8	DRC Schedule 8 – BM Unit Data (if applicable)
4.5	DRC Schedule 10	DRC Schedule 10 –Demand Profiles
4.6	DRC Schedule 11	DRC Schedule 11 – Connection Point Data
Part 5: OTSDUW Data And Information (if applicable and prior to **OTSUA Transfer Time**)		
		Diagrams Circuits Plant and Apparatus Circuit Parameters Protection Operation and Autoswitching Automatic Control Systems
		Mathematical model of dynamic compensation plant

< END OF DATA REGISTRATION CODE >

Extracts from General Conditions

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GC.A.1.11 The following matters potentially require amendments to the **GB Grid Code**:

(a) The specific detail of the obligations needed to manage implementation in the period up to and following (for a temporary period) **Go-Live** to achieve the change to operation under the **GB Grid Code** (to be included in GC.A.3).

(b) Information (including data) and other requirements under the **GB Grid Code** applicable to **Scottish Users** during the **Transition Period** (to be included in GC.A.2).

(c) The conclusions of Ofgem/DTI in relation to small and/or embedded generator issues under BETTA and allocation of access rights on a GB basis.

(d) Any arrangements required to make provision for operational liaison, including **Black Start** and islanding arrangements in Scotland.

(e) Any arrangements required to make provision for cascade hydro **BM Units**.

(f) Any consequential changes to the safety co-ordination arrangements resulting from **STC** and **STC** procedure development.

(g) Any arrangements required to reflect the **Electrical Standards** for the **Transmission Systems** of **SPT** and **SHETL**.

(h) The conclusions of Ofgem/DTI in relation to planning and operating standards.

GC.A.1.12 **The Company** shall notify the **Authority** of any amendments that **The Company** identifies as needed pursuant to GC.A.1.10 and shall make such amendments as the **Authority** approves.

Distribution Code

Distribution Glossary and Definitions (DGD)

DGD 1. EXPRESSIONS

In this **Distribution Code** the following words and expressions shall, unless the subject matter or context otherwise requires or is inconsistent therewith, bear the listed meanings:-

Act	The Electricity Act 1989 (as amended by the Utilities Act 2000 and the Energy Act 2004).
Active Power	The product of voltage and the in-phase component of alternating current measured in units of watts, normally measured in kilowatts (kW) or megawatts (MW).
Anchor Generator	A **Generator** who owns and operates any **Anchor Power Generating Module**.
Anchor Plant Test	An **Anchor Power Generating Module Test** or an **Anchor Power Station Test**, in both cases to confirm compliance with the requirements of the **Distribution Restoration Contract**.
Anchor Power Generating Module	An **Embedded Power Generating Module** with **Anchor Power Generating Module Capability.**
Anchor Power Generating Module Capability	The ability of **Power Generating Module** to **Start-Up** from **Shutdown** and to energise part of the **DNO**'s **System** forming part of a **Distribution Restoration Zone** within 8 hours (or as otherwise defined in the relevant **Distribution Restoration Contract**), without an external electrical power supply.
Anchor Power Generating Module Test	A test carried out on an **Anchor Power Generating Module** at an **Anchor Power Station** while that **Power Station** remains connected to an external alternating current electrical supply.
Anchor Power Station	An **Embedded Power Station** which contains an **Anchor Power Generating Module.**
Anchor Power Station Test	A test carried out by an **Anchor Generator** on an **Anchor Power Generating Module** at a **Power Station** while that **Power Station** is disconnected from all external electrical power supplies from the **Total System**.
Annex 1 Standard	A electricity industry national standard that implements **Distribution Code r**equirements and which is listed in Annex 1 of the **Distribution Code,** and forms part of the **Distribution Code**.
Annex 2 Standard	A electricity industry national standard that has a material effect on **Users** but does not implement any **Distribution Code** requirements and does not form part of the **Distribution Code** technical requirements.

Annual Average Cold Spell (ACS) Conditions	A particular combination of weather elements that give rise to a level of **Peak Demand** within a financial year which has a 50% chance of being exceeded as a result of weather variation alone.
Apparatus	All **Equipment** in which electrical conductors are used, supported or of which they may form a part.
Authorised Electricity Operator or AEO	Any person (other than the **DNO** in its capacity as an operator of a Distribution System) who is authorised to generate, participate in the transmission of, distribute or supply electricity.
Authority	The Gas and Electricity Markets Authority established under Section 1 of the Utilities Act 2000.
Average Conditions	That combination of weather elements within a period of time which is the average of the observed values of these weather elements during equivalent periods over many years (Sometimes referred to as normal weather).
Balancing and Settlement Code (BSC)	The code of that title as from time to time amended.
Balancing Mechanism	Has the meaning set out in **NGESO**'s **Transmission Licence**.
BM Unit	Has the meaning set out in the **BSC**, except that for the purposes of the **Distribution Code** the reference to "Party" in the **BSC** shall be a reference to a **User**.
BM Participant	A person who is responsible for and controls one or more **BM Units** or where a **CUSC Bilateral Agreement** specifies that a **User** is required to be treated as a **BM Participant** for the purpose of the **Grid Code.** For the avoidance of doubt, it does not imply that they must be active in the **Balancing Mechanism**.
Black Start	The procedure necessary for a recovery from a **Total Shutdown** or **Partial Shutdown.**
Black Start Station	A **Power Station** which is registered pursuant to a **CUSC Bilateral Agreement** with **NGESO**, as having a Black Start Capability.
Block Loading Capability	The incremental **Active Power** steps, from no load to **Registered Capacity**, which an **Anchor Power Generating Module** or relevant **Restoration Service Providers' Plant** can instantaneously supply without causing it to trip or go outside the **Frequency** range of 47.5 – 52Hz (or another **Frequency** range as otherwise agreed). The time between each incremental step shall also be defined by the **Restoration Service Provider**.
CENELEC	European Committee for Electrotechnical Standardisation.
Citizens Advice (CA)	National Association of Citizens Advice Bureaux
Citizens Advice Scotland (CAS)	Scottish Association of Citizens Advice Bureaux

Civil Emergency Direction	Directions given by the **Secretary of State** to **AEOs** for the purpose of mitigating the effects of any natural disaster or other emergency which, in the opinion of the **Secretary of State**, is or may be likely to disrupt electricity supplies.
Committed Project Planning Data	Data relating to a **User Development** once the offer for a **Connection Agreement** is accepted.
Connection Agreement	An agreement between the **DNO** and the **User** or any **Customer** setting out the terms relating to a connection with the **DNO's Distribution System** (excluding any **CUSC Bilateral Agreement**).
Connection Point	An **Entry Point** or an **Exit Point** of the **Distribution System** as the case may be**.**
Control Centre	A location used for the purpose of control and operation of all, or of part of a **Distribution System**, **National Electricity Transmission System** or the **System** of a **User.**
Control Person	A person who has been nominated by an appropriate officer of the **DNO, Transmission Licensee** or a **User** to be responsible for controlling and co-ordinating safety activities necessary to achieve **Safety From The System.**
Control Phase	The period 0-24 hours inclusive ahead of real time operation. The **Control Phase** follows on from the **Programming Phase** and covers the period down to real time.
CUSC	Has the meaning set out in **NGESO's Transmission Licence**
CUSC Bilateral Agreement	An agreement pursuant to the **CUSC Framework Agreement** made between **NGESO** and a **User** of the **National Electricity Transmission System**
CUSC Disputes Resolution Procedure	The procedure described in **CUSC** relating to disputes resolution.
CUSC Framework Agreement	Has the meaning set out in **NGESO's Transmission Licence.**
Customer	Any person supplied or entitled to be supplied with electricity at any premises within **Great Britain** but shall not include any **Authorised Electricity Operator** in its capacity as such.
Customer With Own Generation or CWOG	A **Customer** with one or more **Power Generating Modules** connected to the **Customer's System**, providing all or part of the **Customer's** electricity requirements**,** and which may use the **DNO's Distribution System** for the transport of any surplus of electricity being exported.
DC Converter	Any **Apparatus** used to convert alternating current electricity to direct current electricity, or vice versa. A **DC Converter** is a standalone operative configuration at a single site comprising one or more converter bridges, together with one or more converter transformers, converter control equipment, essential protective and switching devices and auxiliaries, if any, used for conversion. In a bipolar arrangement, a **DC Converter** represents the bipolar configuration.

DNO's Distribution System	The **System** consisting (wholly or mainly) of electric lines owned or operated by the **DNO** and used for the distribution of electricity between the **Grid Supply Points** or **Power Generating Modules** or other **Entry Points** to the points of delivery to **Customer**s or **Authorised Electricity Operators**, or any **Transmission Licensee** within **Great Britain** and **Offshore** in its capacity as operator of the licensee's **Transmission System** or the **National Electricity Transmission System** and includes any **Remote Transmission Assets** (owned by a **Transmission Licensee** within **Great Britain**), operated by the **DNO** and any electrical plant and meters and metering equipment owned or operated by the **DNO** in connection with the distribution of electricity, but shall not include any part of the **National Electricity Transmission System**
Decimal Week	The week numbering system where week 1 commences in the first week of January on a date as advised by the **DNO**.
Demand	The demand of MW or MVAr of electricity (ie both **Active Power** and **Reactive Power** respectively) unless otherwise stated.
Demand Control	Any or all of the following methods of achieving a **Demand** reduction: (a) **Customer** voltage reduction initiated by the **DNO** (other than following an instruction from **NGESO**); (b) **Customer Demand** reduction by disconnection initiated by the **DNO** (other than following an instruction from **NGESO**); (c) **Demand** reduction instructed by **NGESO**; (d) automatic low frequency **Demand** disconnection; (e) emergency manual **Demand** disconnection
Demand Control Notification Level	The level above which the **DNO** has to notify **NGESO** of its proposed or achieved use of **Demand Control** which is 12 MW in England and Wales and 5 MW in Scotland.
Demand Facility	An installation under the control of a **Customer** where electrical energy is consumed and is connected at one or more **Connection Point**s to the **DNO's Distribution System**.
Demand Services Provider	A party who contracts with the **DNO** to provide a demand side service. The party might be a **Customer** contracting bilaterally with the **DNO** for the provision of services, or may be a third party providing an aggregated service from many individual **Customer**s. In the latter case there will be a specific contract for the provision of the services to the **DNO** and will include compliance by that third party with the requirements of DPC9 in relation to each **Demand Unit** included in the aggregated service.

Demand Unit	An appliance or a device whose **Active Power Demand** or **Reactive Power** production or consumption is being actively controlled by the **Customer** in whose **Demand Facilit** it is installed and which has been commissioned on or after 18 August 2019 in pursuance of a contract to this end with the **DNO**. Such an appliance or device commissioned before this date, but which has been materially altered will also be included in this definition. Where there is more than one **Demand Unit** in a **Demand Facilit**, these **Demand Units** shall together be considered as one **Demand Unit** if they cannot be operated independently from each other. **Demand Units** of **Customers** where the **Customer** has concluded a final and binding contract for the purchase of a **Demand Unit** before 07 September 2018 are not included the scope of DPC9. The **Customer** must have notified the **DNO** of the conclusion of this final and binding contract by 07 March 2019. Any **Demand Unit** including storage, with the exception of a pumped storage **Power Generating Module**, as a component part is also excluded from the requirements of DPC9.
Detailed Planning Data (DPD)	Detailed additional data which the **DNO** requires under the **Distribution Planning and Connection Code** in support of **Standard Planning Data.**
Distribution Restoration Contract	An agreement between **Restoration Service Providers**, **NGESO** and the **DNO** under which the **Restoration Service Providers** provide **Anchor Power Generating Module Capability** and other relevant services.
Distribution Business	The authorised business of the **DNO** or any affiliate or related undertaking of the **DNO** (whether the business is undertaken by the **DNO** or another licence holder), comprising: (a) the distribution of electricity through the **DNO's Distribution System**, including any business in providing connections to such **System**; and (b) the provision of Distributor Metering and Data Services as defined in the **Distribution Licence**.
Distribution Code	A code required to be prepared by a **DNO** pursuant to condition 9 (**Distribution Code**) of a **Distribution Licence** and approved by the **Authority** as revised from time to time with the approval of, or by the direction of, the **Authority**.
Distribution Code Review Panel or Panel	The standing body established under the **Distribution General Conditions.**
Distribution Data Registration Code	That portion of the **Distribution Code** which is identified as the **Distribution Data Registration Code.**
Distribution General Conditions or DGC	That portion of the **Distribution Code** which is identified as the **Distribution General Conditions.**
Distribution Glossary and Definitions	That portion of the **Distribution Code** which is identified as the **Distribution Glossary and Definitions.**
Distribution Introduction (DIN)	That portion of the **Distribution Code** which is identified as the **Distribution Introduction**.
Distribution Licence	A distribution licence granted under Section 6(1)(c) of the **Act**.

Distribution Network Operator (DNO)	The person or legal entity named in Part 1 of the **Distribution Licence** and any permitted legal assigns or successors in title of the named party.
Distribution Operating Code (DOC)	That portion of the **Distribution Code** which is identified as the **Distribution Operating Code.**
Distribution Planning and Connection Code (DPC)	That portion of the **Distribution Code** which is identified as the **Distribution Planning and Connection Code.**
Distribution Restoration Zone	Part of a **DNO's System**, which is not part of the **National Electricity Transmission System,** which has been energised by an **Anchor Power Generating Module** following a **Total System Shutdown** or **Partial System Shutdown**. The **Distribution Restoration Zone** shall comprise an **Anchor Power Generating Module** and may also include the **Plant** of one or more **Restoration Service Providers**.
Distribution Restoration Zone Control System	A combined automatic control and supervisory system which assesses the **Equipment** status and operational conditions of a **DNO's System** for the purposes of instructing **Anchor Generators' Power Generating Modules** and **Restoration Service Providers' Plant** and operating items of the **DNO's Equipment** for the purposes of establishing and running a Distribution Restoration Zone.
Distribution Restoration Zone Plan	A plan produced under DOC9.4.6 detailing the agreed method and procedure by which the **DNO** will instruct an **Anchor Generator** to energise part of the **DNO's System,** together with other **Restoration Service Providers,** to meet appropriately sized blocks of local **Demand** so as to form a **Power Island**. A **Distribution Restoration Zone** falls outside the provisions of a **Local Joint Restoration Plan**.
Distribution System	The electrical network operated by an **Other Authorised Distributor.**
Distribution Use of System Agreement	The standard form of agreement of that name, as amended from time to time.
Earthing Device	A means of providing a connection between an **Isolated** conductor and earth.
Electricity Safety, Quality and Continuity Regulations (ESQCR)	The statutory instrument entitled The Electricity Safety, Quality and Continuity Regulations 2002 as amended from time to time and including any further statutory instruments issued under the **Act** in relation to the distribution of electricity.
Embedded	Having a direct electrical connection to a **Distribution System.**
Embedded Generator	A **Generator** including a **Customer With Own Generation** whose **Power Generating Modules** are directly connected to the **DNO's Distribution System** or to an **Other Authorised Distributor** connected to the **DNO's Distribution System.** The definition of **Embedded Generator** also includes the **OTSO** in relation to any **Embedded Transmission System**
Embedded Transmission Licensee	**Offshore Transmission Licensee** for an **Embedded Transmission System**
Embedded Transmission System	An **Offshore Transmission System**directly connected to the **DNO's Distribution System** or to an **Other Authorised Distributor** connected to the **DNO's Distribution System.**

Entry Point	The point at which an **Embedded Generator** or other **Users** connect to the **DNO's Distribution System** where power flows into the **DNO's Distribution System** under normal circumstances**.**
Equipment	**Plant** and/or **Apparatus.**
Electricity Supply Industry (ESI)	Electricity Supply Industry.
Event	An unscheduled or unplanned (although it may be anticipated) occurrence on or relating to a **System** including, without limiting that general description, faults, incidents and breakdowns and adverse weather conditions being experienced. It includes an occurrence where the compliance of **Customer's Equipment** with this **Distribution Code** or where relevant the **Grid Code** is or might be compromised.
Existing Offshore Generators	A **Generator** with a **Power Station**y located in offshore waters that has an agreement for connection to the **DNO's Distribution System** via lines of 132kV or above that are wholly or partly in offshore waters.
Exit Point	The point of supply from the **DNO's Distribution System** to a **User** where power flows out from the **DNO's Distribution System** under normal circumstances**.**
External Interconnection	A connection to a party outside the **Total System.**
Fault Level	Prospective current that would flow into a short circuit at a stated point in the **System** and which may be expressed in kA or, if referred to a particular voltage, in MVA.
Feasibility Project Planning Data	Data relating to a proposed **User Development** until such time that the **User** applies for a **Connection Agreement**.
Frequency	The number of alternating current cycles per second (expressed in Hertz) at which a **System** is running.
Fuel Security Code	The document of that title designated as such by the **Secretary of State**, as from time to time amended.
Generator	A person who generates electricity under licence or exemption under the **Act.** A person who has connected a **Power Generating Module(s)** in accordance with Item 8 Engineering Recommendation G83/2 ("Recommendations For The Connection of Type Tested Small-Scale Embedded Generators (Up To 16 A Per Phase) in Parallel With Public Low-Voltage Distribution Networks") or with Item 9 Engineering Recommendation G98 (Requirements for the connection of type-tested micro generators (up to and including 16 A per phase) in parallel with public low voltage distribution networks on or after 27 April 2019) and where this is (are) their only **Power Generating Module(s)**, is not classed as a **Generator** for the purpose of this **Distribution Code.**
Great Britain or GB	"The landmass of England & Wales and Scotland, including internal waters".
Grid Code	The code which **NGESO** is required to prepare under its **Transmission Licence** and have approved by the **Authority** as from time to time revised with the approval of, or by the direction of, the **Authority**.

Grid Supply Point	Any point at which electricity is delivered from the **National Electricity Transmission System** to the **DNO's Distribution System.**
High Voltage (HV)	A voltage exceeding 1000 Volts**.**
High Voltage Customer	A **Customer** connected to a part of the **Distribution System** which is operating at **HV**.
Implementing Control Person	Pursuant to DOC8, the person implementing **Safety Precautions** at an Operational Boundary.
Individual DNO Standard	A standard adopted by an individual **DNO** and which is published as such by an individual **DNO** and that has a material effect on **Users.**
IEC	International Electrotechnical Commission.
Independent Distribution Network Operator	A **DNO** that does not have a Distribution Services Obligation Area in its **Distribution Licence** and is not an ex Public Electricity Supplier
Industry Codes Technical Group (ITCG)	A standing body comprised of representatives of all the **DNO**s to carry out the functions referred to in its own Constitution and Rules
Isolated	Disconnected from associated **Plant** and **Apparatus** by an **Isolating Device(s)** in the isolating position or by adequate physical separation or sufficient gap.
Isolating Device	A device for rendering **Plant** and **Apparatus Isolated.**
Joint System Incident	Is an **Event** occurring on the **System** or installation, which, in the opinion of the **DNO**, has or may have a serious and/or widespread effect on the **System** or installation of another.
Large Power Station	As defined in the **Grid Code**.
Load Managed Area	Has the meaning given to that term in the **Distribution Use of System Agreement**.
Loaded	Supplying **Active Power** to the **System.** Like terms (ie **Deloaded)** shall be construed accordingly.
Local Joint Restoration Plan	A plan produced under the **Grid Code** detailing the agreed method and procedure by which a **Restoration Service Provider** will energise part of the **Total System** and meet appropriately sized blocks of local **Demand** so as to form a **Power Island**. A **Distribution Restoration Zone** falls outside the provisions of a **Local Joint Restoration Plan**.
Low Voltage or LV	In relation to alternating current, a voltage exceeding 50 volts but not exceeding 1 000 volts**.**
Manufacturers' Information	Information in suitable form provided by a manufacturer in order to demonstrate compliance with one or more of the requirements of the **Distribution Code**. Where equipment certificate(s) as defined in EU 2016/631, or 2016/1388 cover all or part of the relevant compliance points, the equipment certificate(s) demonstrate compliance without need for further evidence for those aspects within the scope of the equipment certificate
Maximum Generation	The additional output obtainable from a **Power Generating Module** in excess of **Registered Capacity.**

Medium Power Station	A **Power Station** which is connected to a **System** notionally connected to a **Grid Supply Point** in **NGET**'s Transmission Area with a **Registered Capacity** of 50 MW or more but less than 100 MW. For the avoidance of doubt an installation comprising one or more **DC Converters** with an aggregate capacity of between 50 and 100MW will be classed as a Medium Power Station for the purposes of this Distribution Code.
Meter Operation Code of Practice Agreement	The agreement of that name, as amended from time to time.
Meter Operator	A person, registered with the Registration **Authority**, appointed by either a **Supplier** or **Customer** to provide electricity meter operation services. (This **Distribution Code** does not place any direct obligation on **Meter Operators** other than through the appointment by either a **Supplier** or a **Customer**.)
Minimum Generation	The minimum output which a **Power Generating Module** can reasonably generate as registered under the **Distribution Data Registration Code**,
National Electricity Transmission System	The **Onshore Transmission System** and **Offshore Transmission System.**
National Electricity Transmission System Demand	As defined in the **Grid Code**.
NGESO	National Grid Electricity System Operator Limited.
NGET	National Grid Electricity Transmission plc.
Normal Operating Frequency	The number of Alternating Current cycles per second, expressed in Hertz at which the **System** normally operates, ie 50 Hertz.
Offshore	Means in Offshore Waters, as defined in Section 90(9) of the Energy Act 2004.
Offshore Transmission Implementation Plan	As defined in the **Transmission Licence**
Offshore Transmission System Operator (OTSO)	The **NGESO** acting as operator of an **Offshore Transmission System.**
Offshore Transmission Licensee	The holder of a licence granted under Section 6 (1)(b) of the **Act** excluding **NGET**,**NGESO**, **SPT** and **SHETL**.
Offshore Transmission System	Has the meaning set out in the **Grid Code**.
Onshore Transmission Licensees	**NGET**, **SHETL** and **SPT**
Onshore Transmission System	Has the meaning set out in the **Grid Code.**
Operation	A scheduled or planned action relating to the operation of the **System.**

Operation Diagrams	Diagrams which are a schematic representation of the **HV Apparatus** and the connections to all external circuits at a **Connection Point,** incorporating its numbering, nomenclature and labelling.
Operational Boundary	The boundary between the **Apparatus** operated by the **DNO** or a **User** and the **Apparatus** operated by **Other Authorised Distributor(s)** or other **User(s)**, as specified in the relevant **Site Responsibility Schedule**.
Operational Data (OD)	Information to be supplied pursuant to the **Distribution Operating Codes** and as set out in the Schedules to the **DDRC**.
Operational Day	The period from 0500 hours on one day to 0500 on the following day.
Operational Effect	Any effect on the **Operation** of the relevant other **System** which causes the **National Electricity Transmission System** or **DNO's Distribution System**or the **System** of the other **User** or **Users,** as the case may be, to operate (or be at a materially increased risk of operating) differently from the way in which they would or may have operated in the absence of such an effect.
Operational Planning	The procedure set out in **Distribution Operating Code** DOC2 comprising, through various timescales, the co-ordination of planned outages of **Users' Plant** and **Apparatus**.
Operational Planning Phase	The period from 8 weeks to 3 years inclusive ahead of real time operation.
Other Authorised Distributor	A **User** authorised by Licence or exemption to distribute electricity and having a **User Distribution System** connected to the **DNO's Distribution System.**
Output Usable or OU	That portion of **Registered Capacity** which is not unavailable due to a **Planned Outage** or breakdown.
Ownership Boundary	The electrical boundary between the **Equipment** owned by one **DNO** or **User** and the **Equipment** owned by another **User**.
Partial Shutdown	The same as a **Total Shutdown** except that all generation has ceased in a separated part of the **Total System** and there is no electricity supply from **External Interconnections** or other parts of **Total System** to that part of the **Total System** and, therefore, that part of the **Total System** is shutdown with the result that it is not possible for that part of the **Total System** to begin to function again without **NGESO's** directions relating to a **Black Start**.
Peak Demand	The highest level of **Demand** recorded/forecast for a 12-month period, as specified in the relevant sections of the **Distribution Code**.
Phase (Voltage) Unbalance	The ratio (in percent) between the rms values of the negative sequence component and the positive sequence component of the voltage.
Planned Outage	An outage of a **Power Generating Module**, its contsitutent units (eg generating transformer) or parts, or a relevant part of a **User**'s **System** or of part of the **National Electricity Transmission System** or of part of a **Distribution System.**
Plant	Fixed and movable items used in the generation and/or supply and/or transmission of electricity other than **Apparatus**.

Power Factor	The ratio of **Active Power** to apparent power (apparent power being the product of voltage and alternating current measured in volt-amperes and standard multiples thereof, ie VA, kVA, MVA).
Power Generating Module	Any **Apparatus** which produces electricity
Power Island	**Power Generating Module**s at an isolated **Power Station**, together with complementary local **Demand.** In Scotland a **Power Island** may include more than one **Power Station**.
Power Station	A **Power Generating Facilit**y
Power Generating Facility	An installation comprising one or more **Power Generating Module**s (even where sited separately) and/or controlled by the same **Generator** and which may reasonably be considered as being managed as one **Power Generating Facility**
Preliminary Project Planning Data	Data relating to a proposed **User Development** at the time the **User** applies for a **Connection Agreement** but before an offer is made.
Programming Phase	The period between the **Operational Planning Phase** and the **Control Phase**. It starts at the 8 weeks ahead stage and finishes at 17:00 on the day ahead of real time
Protection	The provisions for detecting abnormal conditions in a **System** and initiating fault clearance or actuating signals or indications.
Qualifying Standard	Electrical standards in use by **DNO**s and included in the **Distribution Code Review Panel's** governance procedures, and falling into one of the categories below: **i. Annex 1 Standard** **ii. Annex 2 Standard** **iii. Individual DNO Standard**
~~Rapid~~**Quick Re-S~~s~~ynchronization**	The capability of a **Power Generating Module** to **Re-synchronize** to the **System** in a relatively short time under conditions defined in the **Grid Code**.
Reactive Power	The product of voltage and current and the sine of the phase angle between them which is normally measured in kilovar (kVAr) or megavar (MVAr).
Registered Capacity	The normal full load capacity of a **Power Generating Module** as declared by the **Generator** less the MW consumed when producing the same; ie for all **Generators**, including **Customer With Own Generation,** this will relate to the maximum level of **Active Power** deliverable to the **DNO's Distribution System**. For **Power Generating Modules** connected to the **DNO's Distribution System**via an inverter, the inverter rating is deemed to be the **Power Generating Module's** rating.
Registered Data	Data referred to in the schedules to the **Distribution Data Registration Code.**

Remote Transmission Assets.	Any **Plant** and **Apparatus** or meters owned by **NGET** which: a) are **Embedded** in the **DNO's Distribution System** and which are not directly connected by **Plant** and/or **Apparatus** owned by **NGET** to a sub-station owned by **NGET**; and b) are by agreement between **NGET** and the **DNO** operated under thedirection and control of the **DNO.**
Requesting Control Person	Pursuant to DOC8, the person requesting **Safety Precautions** at an **Operational Boundary**.
Restoration Service Provider	A **Generator** or a **Customer** with a legal or contractual obligation to provide services necessary for recovery from a **Black Start**. .
Safety From The System	That condition which safeguards persons working on or testing **Apparatus** from the dangers which are inherent in working on items of **Apparatus** which are used separately or in combination in any process associated with the generation, transmission or distribution of electricity.
Safety Management System	The procedure adopted by the **DNO** or a **User** to ensure the safe **Operation** of the **System** and the safety of personnel required to work on that **System**.
Safety Precautions	The procedures specified within a **Safety Management System.**
Safety Rules	The rules or procedure of the **DNO** or a **User** to ensure **Safety From The System**.
Scheduling	The procedure for determining intended usage of **Power Generating Modules.**
Secretary of State	Has the same meaning as in the **Act**.
SHETL	Scottish Hydro-Electric Transmission Limited
Shutdown	The condition of a **Power Generating Module** where there is no energy conversion occurring, there is no **Active Power** output and there can be no **Active Power** output until the **Power Generating Module** is deliberately and actively returned to a state of readiness.
Significant Incident	An **Event** on the **Transmission System** or **DNO's Distribution System** or in a **User's System** which has or may have a significant effect on the **System** of others.
Site Responsibility Schedule	A schedule defining the ownership, operation and maintenance responsibility of **Plant** and **Apparatus** at a **Connection Point** of the **DNO**.
Small Power Station	As defined in the **Grid Code**.
SPT	Scottish Power Transmission Limited
Standby	The supply of electricity by a **Supplier** to a **Customer** on a periodic or intermittent basis to make good any shortfall between the **Customer's** total supply requirements and that met by his own generation.

Superimposed Signals	Those electrical signals present on a **Distribution System** for the purposes of information transfer.
Supplier	(a) A person supplying electricity under an Electricity Supply Licence; or (b) A person supplying electricity under exemption under the **Act**; in each case acting in its capacity as a supplier of electricity to **Customers** in **Great Britain** .
Supply Agreement	An agreement for the supply of electricity made between a **Supplier** and a consumer of electricity.
Synchronize	The condition where ~~an~~ **Power Generating Module**, is connected to a busbar of ~~the~~a **System** so that the **Frequencies** and phase relationships of that **Power Generating Module** and the **System** to which it is connected are identical. Like terms shall be construed accordingly; eg "Synchronism", "De-Synchronized", Re-Synchronized" It is also used to describe the condition where Customer's Demand is consuming electricity.
System	An electrical network running at various voltages.
System Control	The administrative and other arrangements established to maintain as far as possible the proper safety and security of the **System**.
System Incident Centre	A centre set up by the **DNO** pursuant to the declaration of a **Joint System Incident**, under DOC 9, to assume control of the incident.
System Stability	The ability of the **System** for a given initial operating condition to regain a state of operating equilibrium after being subjected to a given disturbance, with most **System** variables being within acceptable limits so that practically the whole **System** remains intact.
System Test	That test or tests which involve simulating conditions or the controlled application of irregular, unusual or extreme conditions on the **Total System** or any part of it, but not including routine testing, commissioning or recommissioning tests.
Target Frequency	That **Frequency** determined by **NGESO** as the desired operating **Frequency** of the **Total System**, or a relevant **Power Island**. This will normally be 50.00Hz plus or minus 0.05 Hz, except in exceptional circumstances as determined by **NGESO**, when this may be 49.90 Hz or 50.10 Hz. An example of exceptional circumstances may be during a recovery from a **Total Shutdown** or **Partial Shutdown**.
Test Coordinator	A suitably qualified person appointed to coordinate **System Test** pursuant to DOC12.
Test Panel	A panel, the composition of which is detailed in DOC12, and which will be responsible for formulating **System Test** proposals and submitting a test programme.
Top - Up	The supply of electricity by any **Supplier** to the **Customer** on a continuing or regular basis to make good any shortfall between the **Customer's** total supply requirements and that met from other sources.
Total Shutdown	The situation existing when all generation has ceased and there is no electricity supply from **External Interconnections** and therefore the **Total System** has shutdown with the result that it is not possible for the **Total System** to begin to function again without **NGESO's** directions relating to a **Black Start** .

Total System	The **National Electricity Transmission System** and all **Systems** of **Users** of this **National Electricity Transmission System** in **Great Britain and Offshore.**
Transmission Licence	The licence granted under Section 6(1)(b) of the **Act**.
Transmission Licensee	Any **Onshore Transmission Licensee**, **Offshore Transmission Licensee** or **NGESO**.
Transmission System	Has the same meaning as the term "licensee's transmission system" in the **Transmission Licence** of a **Transmission Licensee**.
Unmetered Supply	A supply of electricity to premises which is not, for the purposes of calculating charges for electricity supplied to the **Customer** at such premises, measured by metering equipment.
User	A term used in various sections of the **Distribution Code** to refer to the persons using the **DNO's Distribution System**, more particularly identified in each section of the **Distribution Code**, including for the avoidance of doubt the **OTSO** for **Embedded Transmission System.**
User Development	Either a **User's Plant** and/or **Apparatus** and/or **System** to be connected to the **DNO's Distribution System**, or a modification relating to a **User's Plant** and/or **Apparatus** and/or **System** already connected to the **DNO's Distribution System**, or a proposed new connection or modification to the connection within the **User's System**.
Voltage Reduction	The method to temporarily control **Demand** by reduction of **System** voltage.
Weekly Average Cold Spell (ACS) Condition	That particular combination of weather elements that gives rise to a level of **Peak Demand** within a week, taken to commence on a Monday and end on a Sunday, which has a particular chance of being exceeded as a result of weather variation alone. This particular chance is determined such that the combined probabilities of **Demand** in all weeks of the year exceeding the annual **Peak Demand** under **Annual ACS Conditions** is 50%, and in the week of maximum risk the weekly **Peak Demand** under **Weekly ACS Conditions** is equal to the annual **Peak Demand** under **Annual ACS Conditions.**

Distribution Planning and Connection Code 7

DPC7 REQUIREMENTS FOR Embedded Generators

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DPC7.4.8 **Black Start Capability**

DPC7.4.8.1 Two principal recovery routes from a **Total Shutdown** or **Partial Shutdown** exist, via **Local Joint Restoration Plans**, and via **Distribution Restoration Zone Plans**. Their requirements are described in detail in DOC9.

DPC7.4.8.2 ~~The **National Electricity Transmission System** will be equipped with **Black Start Stations** (in accordance with the **Distribution Operating Code** DOC 9).~~ It will be necessary for each **Embedded Generator** to notify the **DNO** if its **Power Generating Module** has a restart capability without connection to an external power supply, unless the **Embedded Generator** shall have previously notified **NGESO** accordingly under the **Grid Code**. Such generation may be registered by **NGESO** as a **Black Start Station** for **Local Joint Restoration Plans,** or as an **Anchor Power Station** for **Distribution Restoration Zone Plans**.

DPC7.4.8.3 **Distribution Restoration Zones** may also include other **Restoration Service Providers** in addition to **Anchor Power Stations**. In both cases, the relevant **Plant** and **Equipment** will be provided with resilient back up power sources that will allow all the **Plant** and **Equipment** to operate autonomously, or be operated remotely, for at least 72 hours following the start of the **Total Shutdown** or **Partial Shutdown**. In these cases the **DNO** will generally provide power resilient communications to the **Anchor Power Station** or **Restoration Service Provider's** site, unless specifically agreed otherwise. The **Anchor Generator** and **Restoration Service Provider** must ensure that all the communications between the **DNO's** telemetry outstation, or the **DNO's** other terminal equipment, are also resilient to mains power loss for at least 72 hours.

Distribution Planning and Connection Code 8

DPC8 TRANSFER OF PLANNING DATA

DPC8.1 **Introduction**

DPC8.1.1 **Distribution Planning and Connection Code** DPC8 details information to be exchanged between the **DNO** and **Users** that are connected at **High Voltage** including **Embedded Generators** and **Other Authorised Distributors**.
It includes data that is necessary in order for the **DNO's Distribution System** to be developed in an efficient, co-ordinated and economic manner, and to enable the **DNO** to comply with the conditions contained in its **Distribution Licence.**

DPC8.2 **Planning Information to be Provided by Users**

DPC8.2.1 Prospective and existing **Users** of the **DNO's Distribution System** must provide sufficient planning data/information as can reasonably be made available, when requested by the **DNO** from time to time to enable the **DNO** to comply with the requirements under its **Distribution Licence**. For those **Users** from whom **Demand** forecasts are required under **DOC1**, there will be a requirement to prepare an annual submission to the **DNO**. This submission, which is to be in accordance with **DOC1**, should include a development plan covering at least the subsequent 3 years and, where the **User** holds planning data or information relating to subsequent years up to 7 years ahead that data or information, including changes either increasing or decreasing in **Demand**, transfer requirements or generating capacity as appropriate.

DPC8.2.2 In addition to periodic updates of planning information a **User** should give adequate notice of any significant changes to the **User's System** or operating regime to enable the **DNO** to prepare its development plan, budget for, and implement any necessary **System** modifications. Such information should include any changes either increasing or decreasing in **Demand**, transfer requirements or generating capacity

as appropriate. In the event of unplanned changes in a **User's System** or operating regime a **User** shall notify the **DNO** as soon as is practically possible to ensure any contingency measures, as necessary, can be implemented by the **DNO**.

DPC8.2.3 The **DNO** has an obligation under the **CUSC** to submit certain planning data/information relating toExisting **Offshore Generators** to **NGESO**. Any Existing **Offshore Generators** will be required to cooperate with the **DNO** to contribute to the full and timely completion of the **Offshore Transmission Implementation Plan.**

DPC8.3 **Information to be Provided to Users**

DPC8.3.1 Where the **DNO** has received from a **User** any information or data under DPC8.3 or where the **DNO** proposes to make modifications to the **DNO's Distribution System** which, in either case, in the reasonable opinion of the **DNO**, may have an impact upon the **System** of any other **User,** the **DNO** will notify that **User** of the proposals subject to any constraints relating to the timing of release of information or confidentiality provisions.

DPC8.3.2 On request from a **User**, the **DNO** will notify the **User** of all the data submitted by and relating to that **User** that the **DNO** is holding and using for **Distribution Code** purposes.

DPC8.4 **Reactive Compensation Plant**

DPC8.4.1 A **User** shall provide the **DNO** with information on any reactive compensation **Plant** directly or indirectly connected to a **DNO's Distribution System**, other than at **Low Voltage**, including:-

(a) The MVAr capacitive or inductive rating of the **Equipment** and operating range if variable;

(b) Details of any automatic control logic such that the operating characteristics can be determined; and

(c) The point of connection to the **DNO's Distribution System**.

DPC8.5 **Lumped Network Susceptance**

DPC8.5.1 Under certain circumstances it will be necessary for the **User** to provide, at the request of the **DNO**, details of the equivalent lumped network susceptance at **Normal Frequency** of the **User's System** at nominal **Frequency** referred back to the connection with the **DNO's Distribution System**. This should include any shunt reactors which are an integrated part of a cable system and which are not normally in or out of service independent of the cable (ie they are regarded as part of the cable).

DPC8.5.2 It should not include:-

(a) Independently switched reactive compensation plant connected to the **User's System** (covered in DPC8.4.1)

(b) Any susceptance of the **User's System** inherent in the **Reactive Power Demand**.

DPC8.6 **Short Circuit Infeed to the DNO's Distribution System**

DPC8.6.1 Information shall be exchanged between the **DNO** and the **User** on fault infeed levels at the point of connection with the **DNO's Distribution System** in the form of:-

(a) The maximum and minimum 3-phase symmetrical and phase earth short circuit infeed.

(b) The X/R ratio under short circuit conditions.

(c) In the case of interconnected **Systems**, adequate equivalent network information.

DPC8.7 **Interconnection Impedance**

DPC8.7.1 For **User** interconnections that operate in parallel with the **DNO's Distribution System** details of the interconnection impedance shall be exchanged between the **DNO** and the **User.** This information shall include an equivalent single impedance (resistance, reactance and shunt susceptance) of the parallel **User** or **DNO's Distribution System**.

DPC8.8 **Demand Transfer Capability**

DPC8.8.1 Information shall be exchanged on **Demand** transfer capability where the same **Demand** may be supplied from alternative **DNO** or **User** points of supply. This shall include the proportion of **Demand** normally fed from each point of supply and the arrangements (manual or automatic) for transfer under planned/fault outage conditions.

DPC8.9 **Other Authorised Distributor's Distribution System Data**

DPC8.9.1 **Other Authorised Distributors** shall provide the **DNO** with detailed data relating to the interface between their **Distribution System** and that of the **DNO**, covering circuit parameters, switchgear and **Protection** arrangements of equipment directly connected to or affecting the **Distribution System** to enable the **DNO** to assess any implications associated with these points of connection. Reciprocal arrangements will apply between the **DNO** and its **Users**.

DPC8.10 **Transient Overvoltage Effects**

DPC8.10.1 For **User's** busbars connected to the **DNO's Distribution System** sufficient details may need to be exchanged with respect to the **User/DNO Ownership Boundary** to enable an assessment, where necessary, of transient overvoltage effects to be made. This information may relate to physical and electrical layouts, parameters, specifications and **Protection** details.

DPC8.11 **Distribution Restoration Zone Related Information**

DPC8.11.1 Data identified under this DPC8.11 must be submitted by **Restoration Service Providers** as part of the creation of a **Distribution Restoration Zone Plan**, as described in DOC9.4.6, and on subsequent request from the **DNO** for it to be refreshed.

DPC8.11.2 This information may also be requested by the **DNO** during the establishment of a **Distribution Restoration Zone** and shall be provided by **Restoration Service Providers** where reasonably practicable.

DPC8.11.3 The following information must be supplied from each R**estoration Service Provider** in relation to each relevant item of **Plant** which contributes to the **Distribution Restoration Zone Plan**:

a) From each **Anchor Generator** and each other **Restoration Service Provider** the estimated time by when each item of relevant **Plant** identified in the **Distribution Restoration Zone Plan** can be **Synchronized** following a **Total Shutdown** or **Partial Shutdown**. The estimate should include the **Anchor Generator's** and **Restoration Service Provider's** ability to **Re-synchronise** all their **Plant**, assuming all were running immediately prior to the **Total Shutdown** or **Partial Shutdown**. Additionally, the estimate should highlight any specific issues (ie those that would affect the time at which the **Anchor Power Generating Module** and **Restoration Service Provider's Plant** to be **Synchronised**) that may arise, as time progresses without external supplies being restored.

b) The **Block Loading Capability** of the relevant **Plant** shall be provided in either graphical or tabular format showing the estimated **Block Loading Capability** from 0MW to the **Plant's Registered Capacity**. Any particular MW loading points at which the **Anchor Generator's Power Generating Module** or **Restoration Service Provider's Plant** should be operated until further changes in output can be accommodated should also be identified.

The data of each **Anchor Power Generating Module** and **Restoration Service Provider's Plant**

forming part of a **Distribution Restoration Zone** should be provided for the condition of the **Anchor Power Generating Module** or **Restoration Service Provider's Plant** (which are considered as both 'hot' units (running prior to **Shutdown**) and cold units (not run for 48 hours or more prior to the shutdown) that were **Synchronised** immediately prior to the **Total Shutdown** or **Partial Shutdown**. The **Block Loading Capability** assessment should be done against a frequency variation of 49.5Hz – 50.5Hz

DPC8.12 **More Detailed Information**

In certain circumstances more detailed information may be needed and will be provided upon the reasonable request of the **DNO**.

Distribution Operating Code 5

DOC5 TESTING AND MONITORING

DOC5.1 **Introduction**

DOC5.1.1 To ensure that the **DNO's Distribution System** is operated efficiently and within its licence standards and to meet statutory actions the **DNO** will organise and carry out testing and/or monitoring of the effect of **Users**' electrical apparatus on the **DNO's Distribution System**.

DOC5.1.2 The testing and/or monitoring procedures will be specifically related to the technical criteria detailed in the **Distribution Planning and Connection Code**. They will also relate to the parameters submitted by **Users** in the **Distribution Data Registration Code.** Such testing can also be initiated on request from the **User** for the purpose of the **User** ensuring compliance with the above technical criteria.

DOC5.1.3 This DOC5 also covers the testing requirements that might be imposed from time to time on **Embedded Medium Power Stations** owned by a **Generator**s who are not party to the **CUSC**

DOC5.1.4 The testing carried out under this **Distribution Operating Code** (DOC5) should not be confused with the more extensive **System Test** outlined in DOC12.

DOC5.2 **Objective**

DOC5.2.1 The objective of this **Distribution Operating Code** is to specify the **DNO's** requirement to test and/or monitor its **DNO's Distribution System** to ensure that **Users** are not operating outside the technical parameters required by the **Distribution Planning and Connection Code** and/or the **Distribution Operating Codes**.

DOC5.2.2 This DOC5 includes the necessary arrangements and actions to establish that certain **Embedded Generators** and **Customers** can provide the **Black Start** services that they have contracted to provide in accordance with OC9 and DOC9.

DOC5.3 **Scope**

DOC5.3.1 This Distribution Operating Code applies to the following **Users** of the **DNO's Distribution System**:-

(a) **Customers** (it is not intended that the **Distribution Code** will necessarily apply to small **Customers** individually - their obligations will generally be dealt with on their behalf by their **Supplier**).

(b) **Embedded Generators.**

(c) **Other Authorised Distributor** connected to the **DNO's Distribution System.**

(d) **Suppliers**.

(e) **Meter Operators.**

DOC5.4 **Procedure Related to Compliance and Quality of Supply**

DOC5.4.1 The **DNO** will from time to time determine the need to test and/or monitor compliance and/or the quality of supply at various points on its **DNO's Distribution System**.

DOC5.4.2 The requirement for specific testing and/or monitoring may be initiated by reasonable concerns relating to compliance with the **Distribution Code** and/or associated **Annex 1 Standard**s. It may also be initiated by the receipt of complaints as to the quality of supply on the **DNO's Distribution System**.

DOC5.4.3 Where required by the **DNO** the **User** will undertake compliance tests as agreed with the **DNO** and relevant and necessary for proving compliance with the **Distribution Code** and/or associated **Annex 1 Standard**s.

DOC5.4.4 In certain situations the **DNO** may require the testing and/or monitoring to take place at the point of connection of a **User** with the **DNO's Distribution System**.

DOC5.4.5 Where testing and/or monitoring is required at the **Connection Point**, the **DNO** will advise the **User** involved and will make available the results of such tests to the **User**.

DOC5.4.6 Where the results of such tests show that the **User** is operating outside the technical parameters specified in the **Distribution Planning and Connection Code**, the **User** will be informed accordingly.

DOC5.4.7 Where the **User** requests, a retest will be carried out and the test witnessed by a **User** representative.

DOC5.4.8 A **User** shown to be operating outside the limits specified in **Distribution Planning and Connection Code** will rectify the situation or disconnect the **Apparatus** causing the problem from its electrical **System** connected to the **DNO's Distribution System** immediately or within such time as is agreed with the **DNO**.

DOC5.4.9 Continued failure to rectify the situation will result in the **User** being disconnected or de-energised in accordance with the **Connection Agreement** from the **DNO's Distribution System** either as a breach of the **Distribution Code** or through the authority of the **ESQCR**, where appropriate.

DOC5.5 **Procedure Related to Connection Point Parameters**

DOC5.5.1 The **DNO** from time to time will monitor the effect of the **User** on the **DNO's Distribution System**.

DOC5.5.2 The monitoring will normally be related to amount of **Active Power** and **Reactive Power** transferred across the **Connection Point**.

DOC5.5.3 Where the **User** is exporting to or importing from the **DNO's Distribution System Active Power** and **Reactive Power** in excess of the parameters in the **Connection Agreement** the **DNO** will inform the **User** and where appropriate demonstrate the results of such monitoring.

DOC5.5.4 The **User** may request technical information on the method of monitoring and, if necessary, request another method reasonably acceptable to the **DNO**.

DOC5.5.5 Where the **User** is operating outside the specified parameters, the **User** will immediately restrict the **Active Power** and **Reactive Power** transfers to within the specified parameters.

DOC5.5.6 Where the **User** requires increased **Active Power** and **Reactive Power** in excess of the Distributed ReStart in partnership with

physical capacity of the **Connection Point** the **User** will restrict power transfers to those specified in the **Connection Agreement** until a modified **Connection Agreement** has been applied for from the **DNO** and physically established.

DOC5.6 Grid Code Compliance for Medium Power Stations not subject to an embedded generation agreement

DOC5.6.1 Procedure For Compliance

DOC5.6.1.1 **NGESO** may, from time to time, but generally not more than twice in any calendar year, request that the **DNO** procure from the **Generator** a statement confirming compliance with the relevant **Grid Code** Connection Conditions at the **Embedded Medium Power Station** not subject to an embedded generation agreement in question. Such requests will generally, but not necessarily, be contingent on the issues raised in DOC6.5.3.3 below.

DOC5.6.1.2 On request from the **DNO**, in furtherance of DOC5.6.1.1 above or at other times not generally more than twice per calendar year, the **Generator** will provide to the **DNO** a statement with appropriate supporting evidence of compliance with the relevant **Grid Code** requirements. The **DNO** will immediately submit this information to **NGESO**. The **Generator** is at liberty to submit the data directly to **NGESO**, but a copy must be submitted in parallel to the **DNO**.

DOC5.6.1.3 In the event that in **NGESO's** view an **Embedded Medium Power Station** fails persistently to comply with the **Grid Code** Connection Conditions **NGESO** shall notify the **DNO** giving details of the failure and of the monitoring that **NGESO** has carried out.

DOC5.6.1.4 The **DNO** will notify the **Generator** responsible for the **Embedded Medium Power Station** in question as soon as possible, and in any case within 2 working days of all the facts contained in the **NGESO** notice.

DOC5.6.1.5 The **Generator** responsible for the **Embedded Medium Power Station** in question will, as soon as possible, provide the **DNO** with an explanation of the reasons for the failure and details of the action that it proposes to take to comply with the **Grid Code** Connections Conditions within a reasonable period.

DOC 5.6.1.6 **NGESO**, the **DNO** and the **Generator** will then discuss the action the **Generator** proposes to take and will endeavour to reach agreement as to:

(a) any short term operational measures necessary to protect other **Users**; and
(b) the parameters which are to be submitted for the **Power Generating Module** and the effective date(s) for the application of the agreed parameters.

DOC5.6.2 Procedure for Testing

DOC5.6.2.1 Subject to the provisions of DOC5.6.1 should the **DNO** fail to procure a notice of compliance to **NGESO's** reasonable satisfaction**, NGESO** may at any time (although not normally more than twice in any calendar year in respect of any particular **Embedded Medium Power Station** not subject to an embedded generation agreement issue an instruction requiring the **DNO** to facilitate a test, provided **NGESO** has reasonable grounds of justification based upon:

(a) a submission of data in respect of the relevant **Embedded Medium Power Station** indicating a change in performance; or

(b) a statement from the **DNO** or **Generator** indicating a change in performance; or

(c) monitoring by **NGESO**, whether or not carried out in accordance with DOC5.6.1.3 above; or

(d) notification from the **DNO** of completion of an agreed action from DOC5.6.1 above.

DOC5.6.2.2 The test referred to in DOC5.6.2.1 on any one or more of the **Power Generating Modules** comprising part of the relevant **Embedded Medium Power Station** should only be to demonstrate that:

(a) the relevant **Power Generating Module** meets the requirements of the paragraphs in the **Grid Code** Connection Conditions or European Connection Conditions (as applicable) which are applicable to such **Power Generating Module**s or **Power Station**; or

(b) the relevant **Power Generating Module** meets the requirements for operation in limited frequency sensitive mode as describe in the **Grid Code** in accordance with CC.6.3.3 (or ECC6.3.3), BC3.5.2 and BC3.7.2,

DOC5.6.2.3 The instruction referred to in DOC5.6.2.1 may only be issued where, following consultation and the preparation of a mutually agreed testing plan (to include prevailing economic conditions etc) and timetable between the **DNO**, **Generator** and **NGESO**, **NGESO** has:

(a) confirmed to the **DNO** and **Generator** the manner in which the test will be conducted, which shall be consistent with the principles established in DOC5.6.3; and

(b) received confirmation from the **DNO** that the relevant **Power Generating Module** would not then be unavailable by reason of forced outage or **Planned Outage** expected prior to the instruction.

DOC5.6.3 Conduct of Test

DOC5.6.3.1 The **Generator** is responsible for carrying out the test when requested by the **DNO** following a valid request from **NGESO** in accordance with DOC5.6.2.1 and the **Generator** retains the responsibility for the safety of personnel and plant during the test.

DOC5.6.3.2 The performance of the **Power Generating Module** concerned will be recorded at **NGESO** and/or **DNO Control Centres** with monitoring at site as and when necessary during the test.

DOC5.6.3.3 If monitoring at site is undertaken, the performance of the **Power Generating Module** will be recorded on a suitable recorder (with measurements taken as appropriate on the **Power Generating Module** Stator Terminals / on the LV side of the generator transformer or at the **Connection Point** if this has been agreed between the **DNO** and the **Generator**) in the relevant **User's Control Centre**, in the presence of a reasonable number of representatives appointed and authorised by **NGESO**. If **NGESO** or the **DNO** or the **Generator** requests, monitoring at site will include measurement of the following parameters during the test.:

(a) for Steam Turbines: governor pilot oil pressure, valve position and steam pressure; or

(b) for Gas Turbines: Inlet Guide Vane position, Fuel Valve positions, Fuel Demand signal and Exhaust Gas temperature; or

(c) for Hydro Turbines: Governor Demand signal, Actuator Output signal, Guide Vane position; and/or

(d) for Excitation Systems: Generator Field Voltage and Power System Stabiliser signal where appropriate.

DOC5.6.3.4 The relevant test parameters and the pass/fail criteria shall be drawn from Section OC5.5.3 of the **Grid Code**.

DOC5.6.4 Test Failure/Re-test

DOC5.6.4.1 If the **Power Generating Module** concerned fails to pass the test the **Generator** must provide the **DNO** and **NGESO** with a written report specifying in reasonable detail the reasons for any failure of the test so far as they are then known to the **Generator** after due and careful enquiry.

DOC5.6.4.2 The **DNO** has the responsibility under the **Grid Code** to forward the report of DOC5.6.4.1 above to **NGESO.** This report must be provided within five Business Days of the test. If a dispute arises relating to the failure, **NGESO** , the **DNO** and the **Generator** shall seek to resolve the dispute by discussion, and, if they fail to reach agreement, either of the **DNO** or **Generator** may by notice respectively:

(a) require **NGESO** to initiate a re-test on 48 hours' notice which shall be carried out following the procedure set out in OC5.5.2 and OC5.5.3 and subject as provided in OC5.5.1.3, as if **NGESO** had issued an instruction at the time of notice from the relevant **User**; or

(b) confirm that it (or they) will exercise its right to carry out a re-test on 48 hours' notice which shall be carried out following the procedure set out in **Grid Code** Sections OC5.5.2 and OC5.5.3 and subject as provided in **Grid Code** Sections OC5.5.1.6, as if **NGESO** had issued an instruction at the time of notice from the **DNO**.

DOC5.6.5 Dispute following Re-test

DOC5.6.5.1 If the **Power Generating Module** in **NGESO's** view fails to pass the re-test and a dispute arises on that re-test, **NGESO** , the **DNO** and the **Generator** may use the **CUSC Disputes Resolution Procedure**, (which embodies the ESI disputes resolution procedure) for a ruling in relation to the dispute, which ruling shall be binding.

DOC5.6.6 Dispute Resolution

DOC5.6.6.1 If following the procedure set out in DOC5.6.5 it is accepted that the **Power Generating Module** has failed the test or re-test (as applicable), the **Generator** shall within 14 days, or such longer period as **NGESO** may reasonably agree, following such failure, submit in writing to the **DNO** for submission to **NGESO** for approval the date and time by which the **Generator** shall have brought the **Power Generating Module** concerned to a condition where it complies with the relevant requirement.

DOC5.6.6.2 Should **NGESO** not approve the **Generator's,** proposed date or time (or any revised proposal), the **Generator** shall amend such proposal having regard to any comments **NGESO** and/or **the DNO** may have made and re-submit it for approval.

DOC5.6.6.3 If the **Power Generating Module** fails the test the **Generator** shall resubmit to the **DNO** the relevant registered parameters of that **Power Generating Module** for the period of time until the **Power Generating Module** can achieve the parameters previously registered, as demonstrated (if required by **NGESO** in accordance with DOC5.6.6.4) in a re-test. The **DNO** will submit these parameters to **NGESO** as required by the **Grid Code**.

DOC5.6.6.4 Once the **Generator,** has indicated to **NGESO** via the **DNO** the date and time that the **Power Generating Module** can achieve the parameters previously registered or submitted, **NGESO** shall either accept this information or require the **Generator** to demonstrate the restoration of the capability by means of a repetition of the test referred to in DOC5.6.7 by an instruction requiring the **DNO** to ensure on 48 hours' notice that such a test is carried out by the **Generator**.

DOC5.6.6.5 The provisions of this DOC5.6.6 will apply to such further test.

DOC5.7 Black Start Testing

DOC5.7.1 Introduction

DOC5.7.1.1 Two principal recovery routes from a **Black Start** exist; via **Local Joint Restoration Plans**, and via **Distribution Restoration Zone Plans**. Their requirements are described separately in DOC9.

DOC5.7.1.1 This DOC5.7 deals with the testing requirements for **Distribution Restoration Zone Plans** only. Testing of **Local Joint Restoration Plans** is undertaken under the direction of **NGESO** in accordance

with OC5 of the **Grid Code**

DOC5.7.2 General Requirements

DOC5.7.2.1 **NGESO** may require the **DNO** in coordination with an **Anchor Generator** to carry out an **Anchor Power Generating Module Test** in order to demonstrate that an **Anchor Power Generating Module** has the required **Anchor Power Generating Module Capability**. Prior to any test taking place, the **DNO** shall ensure the **DNO's Distribution System** is appropriately configured to undertake the test.

DOC5.7.2.2 **NGESO** will request the **DNO** to instruct the relevant **Anchor Generator** to carry out a test (either an **Anchor Power Generating Module Test** or an **Anchor Power Station Test**) in order to demonstrate that an **Anchor Power Station** has the required **Anchor Plant Capabilty**.

DOC5.7.2.3 Where applicable, **NGESO** may also require the **DNO** to instruct an **Anchor Generator** to carry out the necessary test in order to demonstrate that the **Anchor Power Station** has a **Quick Re-Synchronisation Capability**

DOC5.7.2.4 All **Anchor Plant Tests** shall be carried out at the time agreed between **NGESO** and the **DNO** in the notice periods given in DOC5.7.2.7 and shall be undertaken in the presence of a reasonable number of representatives appointed and authorised by **NGESO** and/or the **DNO**, who shall be given access to all information relevant to the **Anchor Plant Test**.

DOC5.7.2.5 When **NGESO** wishes the **DNO** to instruct an **Anchor Generator** to carry out an **Anchor Plant Test**, the **DNO** shall notify the details of the proposed **Anchor Plant Test** to the relevant **Anchor Generator** at least 7 days prior to the time of the **Anchor Plant Test**.

DOC5.7.2.6 **NGESO** may require the **DNO** to instruct an **Anchor Generator** to carry out an **Anchor Power Generating Module Test** at any time (but will not require an **Anchor Power Generating Module Test** to be carried out more than once in each calendar year in respect of any particular **Anchor Power Generating Module** unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test).

DOC5.7.2.7 When an **Anchor Power Generating Module** is to undertake testing, the following requirements shall apply:

a) Where **NGESO** requires the **DNO** to instruct an **Anchor Generator** to carry out an **Anchor Power Generating Module** test, on each **Anchor Power Generating Module**, within such an **Anchor Power Station**, the **Anchor Generator** shall execute such a test at least once every three years. **NGESO** will not require the **DNO** to instruct the **Anchor Power Generating Module** test to be carried out on more than one **Anchor Power Generating Module** at that **Anchor Power Station** at the same time, and would not, in the absence of exceptional circumstances, expect any of the other **Anchor Power Generating Modules** at the **Anchor Power Station** to be directly affected by the **Anchor Power Generating Module** test.

b) **NGESO** may occasionally require the **DNO** to instruct an **Anchor Generator** to carry out an **Anchor Power Station Test** at any time (but will not require an **Anchor Power Station Test** to be carried out more than once in every three calendar years in respect of any particular **Anchor Power Generating Module** unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test). If successful, this **Anchor Power Station Test** shall count as a successful **Anchor Power Generating Module Test** for the **Anchor Power Generating Module** used in the test.

c) **NGESO** may occasionally require the **DNO** to instruct the **Anchor Generator** to carry out a **Quick Re-synchronisation Unit Test** at any time, but will generally only be required where such an **Anchor Generator** has made a change to its **Plant** and **Apparatus** which has an impact on its houseload operation or after two unsuccessful tripping **Events** in the operational environment.

Tests (a) to (c) will be deemed a success where stable operation is achieved within a time

frame agreed in the **Distribution Restoration Contract**.

DOC5.7.3 Anchor Power Generating Module Testing

DOC5.7.3.1 All tests shall be instructed and coordinated by the **DNO**. The **DNO** shall inform **NGESO** of the progress and completion of the tests following the relevant requirements of **Grid Code** OC7.

DOC5.7.3.2 All tests should respect the technical requirements included in the **Anchor Plant Contract**. By default these will include:

a) The A**nchor Power Generating Module** shall be capable of starting from s**Shutdown** without any external electrical energy supply within a time frame specified in the **Anchor Plant Contract**.

b) Each **Anchor Power Generating Module** shall be able to s**Synchronize** within the frequency limits of EREC G99 section 13.2.

c) Each **Anchor Power Generating Module** shall be capable of connecting to an energizing an unenergized section of the **DNO's Distribution Network**.

d) Each **Anchor Power Generating Module** shall be capable of automatically regulating dips in voltage caused by the connection of demand

e) Each A**nchor Power Generating Module** shall:

i. be capable of **Block Loading Capability**,

ii. be capable of operating in FSM, LFSM-O and LFSM-U, as specified in EREC G99 sections 13.2.6, 13.2.4 and 13.2.5 respectively

iii. control **Frequency** in case of overfrequency and underfrequency within the whole **Active Power** output range between the **Minimum Generation** and **Registered Capacity** as well as at houseload operation levels

iv. be capable of parallel operation with other **Power Generating Modules** within an isolated part of the **Total System** that is still supplying **Customers**, and

v. control voltage automatically.

DOC5.7.3.3 Anchor Power Generating Module Test

(a) Prior to the test, the **DNO** shall have reconfigured the **DNO's Distribution System** to enable the **Anchor Power Generating Module Test** to be completed whilst having due regard for the safety of plant and personnel on its **Distribution System**.

(b) The relevant **Anchor Power Generating Module** shall shall start the test sequence loaded in normal operation;

(c) All the auxiliary power sources used in the **Anchor Power Station** in which that **Anchor Power Generating Module** is situated, shall be **Shutdown**.

(d) The **Anchor Power Generating Module** shall be d**Deloaded** and de-**Synchronised** and all alternating current electrical supplies to its auxiliaries shall be disconnected.

(e) The auxiliary power sources for the relevant **Anchor Power Generating Module** shall be started, and shall re-energise the electrical systems of the relevant **Anchor Power Generating Module**.

(f) The auxiliaries of the relevant **Anchor Power Generating Module** shall be fed by the auxiliary power supplies to enable the relevant **Anchor Power Generating Module** to return to a condistion where it is ready to **Synchronize** to the **Total System**.

(g) The relevant **Anchor Power Generating Module** shall be **Synchronised** to the **System** but not loaded, unless the appropriate instruction has been given by **NGESO** to the **DNO** under BC2 of the **Grid Code** which would also be in accordance with the requirements of the **Distribution Restoration Zone Plan** and **Distribution Restoration Contract**.

(h) **NGESO** and the **DNO** shall agree with the **Anchor Generator** when the test has been completed.

DOC5.7.3.4 Anchor Power Station Test

(a) Prior to the test, the **DNO** shall have reconfigured the **DNO's Distribution System** to enable the **Anchor Power Station Test** to be completed whilst having due regard for the safety of plant and personnel on its **Distribution System**.

(b) All **Anchor Power Generating Modules** at the **Anchor Power Station**, other than the **Anchor Power Generating Module** on which the **Anchor Power Generating Module Test** is to be carried out, and all the auxiliary power supplies at the **Anchor Power Station**, shall be **Shutdown**.

(c) The relevant **Anchor Power Generating Module** shall start the test sequence ~~I~~**Loaded** in normal operation.

(d) The relevant **Anchor Power Generating Module** shall be ~~d~~**De-loaded** and ~~d~~**De-S~~s~~ynchronised**.

(e) All external alternating current electrical supplies to the electrical systems of the relevant **Anchor Power Generating Module**, and to the **Power Station** electrical installation of the relevant **Anchor Power Station**, shall be disconnected.

(f) An independent auxiliary power supply at the **Anchor Power Station** shall be used to re-energise either directly, or via the **Power Station** electrical installation, the electrical supplies to the relevant **Anchor Power Generating Module**.

(g) The provisions of DOC5.7.3.3 (e) and (f) shall thereafter be followed.

(h) **NGESO** and the **DNO** shall agree with the **Anchor Generator** when the test has been completed.

DOC5.7.3.5 Quick Re-synchronisation Unit Test

If required by the **Anchor Plant Contract**, the ~~q~~**Quick- R~~r~~Re-~~sS~~synchronisation Unit Test** will be included as part of the **Anchor Power Generating Module Test** and performed as follows:

(a) The relevant A**nchor Power Generating Module** shall be **Synchronised** and **loaded**;

(b) All the auxiliary power sources used at the **Anchor Power Station** in which that **Anchor Power Generating Module** is situated shall be **Shutdown**.

(c) The **Anchor Power Generating Module** shall be tripped to house load.

(d) The relevant **Anchor Power Generating Module** shall be **Synchronised** to the **System** but not ~~L~~**L~~l~~oaded**, unless so instructed by the **DNO**.

DOC5.7.3.6 Failure of an Anchor Power Generating Module Test

An **Anchor Power Generating Module** shall fail an **Anchor Power Generating Module Test** if the **Anchor Power Generating Module Test** shows that it does not have **Anchor Power Generating Module Capability** (ie if the relevant **Anchor Power Generating Module** fails to be **Synchronised** to the System within the time specified in the **Distribution Restoration Contract** of the auxiliary supplies being required to start unless this is part of a **Distribution Restoration Zone Plan** where the times will be adjusted accordingly).

DOC5.7.3.7 If an **Anchor Power Station** fails to pass an **Anchor Power Station Test**, the **Anchor Generator** must provide the **DNO** with a written report specifying in reasonable detail the reasons for any failure of the test so far as they are then known to the the **Anchor Generator** after due and careful enquiry. This must be provided within five business days of the test. If a dispute arises relating to the failure, the **DNO** and the **Anchor Generator** shall seek to resolve the dispute by discussion, and if they fail to reach agreement, the **Anchor Generator** may require the **DNO** to carry out a further **Anchor Power Station Test** on 48 hours notice which shall be carried out following the procedure set out in DOC5.7.3.3 or DOC5.7.3.4 or DOC5.7.3.5 as the case may be, as if **NGESO** had issued a request at the time of notice

from the **Anchor Generator**.

DOC5.7.3.8 If the **Anchor Generator** concerned fails to pass the re-test and a dispute arises on that re-test, either party may use the **CUSC** Disputes Resolution Procedure for a ruling in relation to the dispute, which ruling shall be binding.

DOC5.7.3.9 If following the procedure in DOC5.7.3.7 and DOC5.7.3.8 it is accepted that the **Anchor Generator** has failed the **Anchor Power Station Test** (or a re-test carried out under DOC5.7.3.6), within 14 days, or such longer period as **NGESO** and the **DNO** may reasonably agree, the relevant **Anchor Generator**, **NGESO** and the **DNO** shall agree in writing the date and time by which that **Anchor Generator** shall have brought that **Anchor Power Station** to a condition where it has a **Anchor Power Generating Module Capability** and would pass the **Anchor Power Station Test**.

DOC5.7.3.10 Once the **Anchor Generator** has indicated to **NGESO** and the **DNO** that the **Anchor Power Station** has the required **Anchor Plant Capability**, **NGESO** and the **DNO** shall either accept this information or require the **Anchor Generator** to demonstrate that the relevant **Anchor Power Station** has its **Anchor Plant Capability** restored, by means of a repetition of the **Anchor Power Station Test** referred to in DOC5.7.2.6 following the same procedure as for the initial **Anchor Power Station Test**. The provisions of this DOC5.7.3 will apply to such test.

Distribution Operating Code 9

DOC9 CONTINGENCY PLANNING

DOC9.1 **Introduction**

This **Distribution Operating Code** DOC9 sets out requirements and procedures relating to the following planning procedures for abnormal situations:

DOC9.1.1 **Black Start**

This **Distribution Operating Code** DOC9 covers the requirements for the implementation of **Black Start** recovery procedures following a **Total Shutdown** or **Partial Shutdown** of the **Total System** as recognised by **NGESO.** The **Black Start** procedure provides for the recovery of the **Total System** in the shortest possible time taking into account **Power Station** capabilities and the operational constraints of the **Total System,** in accordance with the **Grid Code** and the requirements of **NGESO.**

Two principal recovery routes exist, via **Local Joint Restoration Plans**, and via **Distribution Restoration Zone Plans**. Their requirements are described separately in this DOC9.

In practice and in order to re-establish the integrity of the **Total System** and reconnect **Demand** in as short a time as possible, it is expected that **NGESO** will initiate **Local Joint Restoration Plans** and **Distribution Restoration Zone Plans** in parallel whilst noting the operation of **Local Joint Restoration Plans** and **Distribution Restoration Zone Plans** are mutually exclusive and cannot be operated concurrently on the same part of the **Total System**.

DOC9.1.2 **Re-synchronising Islands**

The requirements for ~~re~~**Re-synchronising parts** of the **Total System** where there is no **Total Shutdown** or **Partial Shutdown** but parts of the **Total System** are out of synchronism with each other.

DOC9.1.3 **Joint System Incident Procedure**

The requirements for the establishment of a communication route and arrangements between responsible representatives of the **DNO** and **Users** involved in, or who may be involved in, an actual or potential serious or widespread **Total System** disruption which requires or may require urgent managerial response, day or night.

DOC9.1.4 **Civil Emergencies**

The requirements for dealing with a Civil Emergency which under the **Act** is any natural disaster or other Distributed ReStart in partnership with

emergency which, in the opinion of the **Secretary of State**, is or may be likely to disrupt electricity supplies. The procedures may be similar to, or separate from, the **Demand** reduction schemes in **Distribution Operating Code** DOC6.

DOC9.2 **Objectives**

This **Distribution Operating Code** sets out Contingency Planning procedures to enable co-ordination between all **Users** with a common approach to give uniformity of priorities to restart or to operate the **Total System** in abnormal situations. It also specifies requirements to be met during periods of declared civil emergencies.

DOC9.3 **Scope**

This Distribution Operating Code applies to the **DNO** and to Users which in this Distribution Operating Code means, the Users specified below with a High Voltage connection to the **DNO's Distribution System**:

(a) **Customers** (it is not intended that the **Distribution Code** shall apply to small **Customers** individually).

(b) **Embedded Generators**, but excluding the **OTSO.**

(c) **Other Authorised Distributors** connected to the **DNO's Distribution System.**

Any actions required of **Users** connected at **HV** will be identified by the **DNO** and discussed with **Users**.

DOC9.4 **Black Start**

DOC9.4.1 **Shutdown**

DOC9.4.1.1 During a **Total Shutdown** or **Partial Shutdown** and during the subsequent recovery the Security Standards set out in, or deriving authority pursuant to, the **Transmission Licence** and the **Distribution Licence** may not apply and the **Total System** may be operated outside normal voltage and **Frequency** standards.

DOC9.4.1.2 In a **Total Shutdown** or **Partial Shutdown**, it may be necessary for **NGESO** to issue Emergency Instructions and it may be necessary to depart from the normal **Balancing Mechanism** operation in issuing Bid-Offer Acceptances.

DOC9.4.2 **Local Joint Restoration Plans**

DOC9.4.~~1.3~~2.1 Certain ~~**Embedded**~~ **Power Station**s (which may or may not be **Embedded**) are registered by **NGESO**, as having the ability of at least one of its **Power Generating Modules** to start up from shutdown without connections to external power supplies. Such **Power Station**are to be referred to as **Black Start Stations**.

DOC9.4.~~1.4~~2.2 For each **Black Start Station** plans will be put in place, in accordance with the **Grid Code**, which in the event of a **Partial Shutdown** or **Total Shutdown**, will provide for the establishment of a **Power Island**. These plans are known as Local Joint Restoration Plans produced jointly by **NGESO** the **DNO** and **Generators** and may include **Embedded Generators.** **DNO**s will be party to these Plans irrespective of whether the **Black Start Station** is **Embedded.**

DOC9.4.~~1.5~~2.3 In Scotland a Local Joint Restoration Plan may include more than one **Black Start Station** and may be produced with and include obligations on the relevant **Transmission Licensee**, **Generators** responsible for **Power Generating Module**s not at a **Black Start Station** and other **Users**. Any instruction to initiate a **Local Joint Retoration Plan** will be issued to the **DNO** by the relevant **Transmission Licensee**.

DOC9.4.3 **Distribution Restoration Zone Plans**

DOC9.4.3.1 Certain **Embedded** **Power Station**s are registered by the **DNO** and **NGESO**, as having the

ability of at least one of its **Power Generating Module**s to start up from s**Shutdown** without connections to external power supplies. Such **Power Station**s are to be referred to as **Anchor Power Stations**.

DOC9.4.3.2 For each **Anchor Power Station** plans will be put in place, in accordance with the **Grid Code**, which in the event of a **Partial Shutdown** or **Total Shutdown**, will provide for the establishment of a **Power Island**. These plans are known as **Distribution Restoration Zone Plans** and are produced jointly by **NGESO**, the **DNO** and **Generators.**

DOC9.4.3.3 In Scotland a **Distribution Restoration Zone Plan** will be under the direction of the relevant **Transmission Licensee**. Any instruction to initiate a **Distribution Restoration Zone** will be issued by the relevant **Transmission Licensee**. ~~and DOC9.4.3 should be construed accordingly.~~

DOC9.4.~~2~~4 **Situations requiring Black Start ~~Situation~~**

In the event of a **Total Shutdown** or **Partial Shutdown**, the **DNO** will, as soon as reasonably practicable, inform **Users** which, in the **DNO's** opinion, need to be informed that a **Total Shutdown** or, as the case may be, a **Partial Shutdown**, exists and that **NGESO** intends to implement the **Black Start** procedure.

In Scotland, in exceptional circumstances, as specified in the **Local Joint Restoration Plan** or **Distribution Restoration Zone Plan**, the relevant **Transmission Licensee** may invoke such **Local Joint Restoration Plan** or **Distribution Restoration Zone Plan** for its own **Transmission System** and operate within its provisions.

DOC9.4.~~3~~ 5 **Black Start ~~-~~ Recovery Procedure**

DOC9.4.~~.3~~54.1 The procedure necessary for a recovery from a **Total Shutdown** or **Partial Shutdown** is known as **Black Start,** the main objective of which is the restoration of the **Total System** as an integrated whole as soon as possible bearing in mind the restoration of **Customers**. The procedure for a **Partial Shutdown** is the same as that for a **Total Shutdown** except that it applies only to a part of the **Total System**. It should be remembered that a **Partial Shutdown** may affect parts of the **Total System** which are not themselves shut down.

DOC9.4.~~.3~~54.2 The complexities and uncertainties of recovery from a **Total Shutdown** or **Partial Shutdown** require that **Black Start** is sufficiently flexible in order to accommodate the full range of **Power Generating Module** and **Total System** characteristics and operational possibilities and this precludes the setting out of concise chronological sequences. The overall strategy will in general include the overlapping phases of establishment of isolated groups of **Power Generating Facilities** together with complementary local **Demand** termed **"Power Islands"**, step by step integration of these groups into larger sub-systems and eventually re-establishment of a complete **Total System**.

DOC9.4.~~3~~54.3 Where there are no **Power Generating Facilities** with a contracted **Black Start** or **Anchor Plant Capability** within the **DNO's Distribution System**, then restoration of supply may be substantially delayed while ~~the relevant **Transmission Licensee**~~**NGESO** re-establishes the **National Electricity Transmission System** or part of the **National Electricity Transmission System** from a restored **Power Island** . The **DNO** shall re-appraise the priorities in these situations and restore supplies in accordance with such priorities.

~~DOC9.4.3.4 The procedure for a **Black Start** shall, therefore, be that specified by the **relevant Transmission Licensee** at the time. **Users** shall abide by the **DNO's** instructions during a **Black Start** situation, even if they conflict with the general overall strategy outlined in DOC9.4.3.2.~~

DOC9.4.~~5~~6 **Distribution Restoration Zone Plan Establishment**

DOC9.4.~~5~~6.1 In England and Wales, in relation to each **Distribution Restoration Zone**, The **DNO** with **NGESO**, **NGET** and the relevant **Restoration Service Providers** will discuss and agree a **Distribution Restoration Zone Plan**.

DOC9.4.~~5~~6.2 In respect of Scottish Transmission Systems where a requirement for a **Distribution** Distributed ReStart in partnership with

Restoration Zone Plan is identified, the **DNO**, **NGESO**, the relevant Scottish **Transmission Licensee**(s) and ~~R~~relevant **Restoration Service Providers** will discuss and agree a **Distribution Restoration Zone Plan**.

DOC9.4.~~5~~6.3 Other **Generators** or **Customers**, may be reasonably required by the **DNO** and **NGESO** to discuss and agree the details of a Distribution Restoration Zone Plan.

DOC9.4.~~5~~6.4 In establishing a **Distribution Restoration Zone**, the **DNO** will use a combination of instructions to relevant **Restoration Service Providers** and the use of one or more **Distribution Restoration Zone Control Systems** to ensure the integrity and safety of plant and personnel forming the established **Power Island**.

DOC9.4.~~5~~6.~~4~~5 In England and Wales~~,~~ where the need for a **Distribution Restoration Zone Plan** arises, when there is none in place, the following provisions shall apply:

(a) The **DNO**, **NGESO**, **NGET** and the relevant **Restoration Service Providers** will discuss and agree the detail of the **Distribution Restoration Zone Plan** as soon as the requirement for a **Distribution Restoration Zone Plan** is identified by the **DNO** or **NGESO**. On identification **NGESO** will notify all affected parties and will initiate these discussions.

(b) Each **Distribution Restoration Zone Plan** will be in relation to a specific **Anchor Power Station**.

(c) The **Distribution Restoration Zone Plan** will record which relevant **Restoration Service Providers** and which relevant **Restoration Service Provider's** sites are covered by the **Distribution Restoration Zone Plan** and set out what is required from the **DNO**, **NGESO**, **NGET** and each relevant **Restoration Service Provider**.

(d) Each **Distribution Restoration Zone Plan** shall be prepared by the relevant **DNO** and agreed with **NGESO** and **NGET** to reflect the above discussions and agreement.

(e) Each page of the **Distribution Restoration Zone Plan** shall bear a date of issue and the issue number.

(f) When a **Distribution Restoration Zone Plan** has been prepared, it shall be sent by the **DNO** to **NGESO**, **NGET** and the relevant **Restoration Service Providers** involved, for confirmation of its accuracy.

(g) The **Distribution Restoration Zone Plan** shall then (pending its accuracy being confirmed) be signed on behalf of the **DNO**, **NGESO**, **NGET** and each relevant **Restoration Service Provider** as a written confirmation of its accuracy.

(h) Once agreed under this DOC9.4.6, the procedure will become a **Distribution Restoration Zone Plan** under the **Distribution Code** and **Grid Code** (subject to any change pursuant to this DOC9 and OC9 of the **Grid Code**) and will apply between the **DNO**, **NGESO**, **NGET** and the relevant **Restoration Service Providers** as if it were part of the **Distribution Code**~~.~~.

(i) Once signed, a copy of the **Distribution Restoration Zone Plan** will be distributed by the **DNO** to **NGESO**, **NGET** and each relevant **Restoration Service Provider** which is a party, and stating the date of implementation.

(j) The **DNO**, **NGESO**, **NGET** and relevant **Restoration Service Providers** must make the **Distribution Restoration Zone Plan** readily available to the relevant operational staff.

(k) If the **DNO**, **NGESO**, **NGET** or any other relevant **Restoration Service Provider** which is a party to a **Distribution Restoration Zone Plan**, becomes aware that a change is needed to that **Distribution Restoration Zone Plan**, it shall initiate a discussion between the **DNO**, **NGESO**, **NGET**, and the relevant **Restoration Service Providers** to seek to agree the relevant change. The principles applying to establishing a new **Distribution Restoration Zone Plan** under this DOC9.4.6 shall apply to such discussions and to any consequent changes.

(l) The **DNO**, **NGESO**, **NGET** and the relevant **Restoration Service Providers** will conduct regular joint exercises of the **Distribution Restoration Zone Plan** to which they are parties. The objectives of such exercises include:

- To test the effectiveness of the **Distribution Restoration Zone Plan**;
- To provide for joint training of the parties in respect of the **Distribution Restoration Zone Plan**;
- To maintain the parties' awareness and familiarity of the **Distribution Restoration Zone**

Plan;

- To promote understanding of each parties' roles under a **Distribution Restoration Zone Plan**;
- To identify any improvement areas which should be incorporated in to the **Distribution Restoration Zone Plan**.
- The principles applying to the establishment of a new **Distribution Restoration Zone Plan** under this DOC9.4.3.7 shall apply to any changes to the **Distribution Restoration Zone Plan**.

NGESO in coordination with the **DNO** will propose to the other parties of a **Distribution Restoration Zone Plan** a date for the exercise to take place to be agreed with the other parties. All the **Distribution Restoration Zone Plan** parties will jointly share the task of planning, preparing, participating in and facilitating the exercises, which will normally be in desktop format or as otherwise agreed. The precise timing of the exercise for each **Distribution Restoration Zone Plan** will be agreed by all parties, but will not be less than one every 8 years.

DOC9.4.~~5~~6.~~5~~6 In respect of Scottish Transmission Systems, where the need for a **Distribution Restoration Zone Plan** arises, the following provisions shall apply:

(a) The **DNO**, **NGESO**, the relevant Scottish **Transmission Licensee**(s) and the relevant **Restoration Service Providers** will discuss and agree the detail of the **Distribution Restoration Zone Plan** as soon as the requirement for a **Distribution Restoration Zone Plan** is identified by the **DNO** or **NGESO**. **NGESO** will notify the relevant Scottish **Transmission Licensee**(s). The **DNO** will be responsible for notifying all affected Scottish **Restoration Service Providers** forming part of the **Distribution Restoration Zones**.

(b) Each **Distribution Restoration Zone Plan** will be in relation to a specific Scottish **DNO's System** and will include **NGESO**, the relevant Scottish **Transmission Licensee** and relevant **Restoration Service Providers**.

(c) The **Distribution Restoration Zone Plan** will record which relevant **Restoration Service Providers** and which relevant **Restoration Service Provider's** sites are covered by the **Distribution Restoration Zone Plan** and set out what is required from the **DNO**, **NGESO**, the relevant Scottish **Transmission Licensee**(s) and each relevant **Restoration Service Provider** should a **Black Start** situation arise.

(d) Each **Distribution Restoration Zone Plan** shall be prepared by the **DNO** in coordination with **NGESO**, the relevant Scottish **Transmission Licensee** and the relevant **Restoration Service Providers** to reflect the above discussions and agreement.

(e) Each page of the **Distribution Restoration Zone Plan** shall bear a date of issue and the issue number.

(f) When a **Distribution Restoration Zone Plan** has been prepared, it shall be sent by the **DNO** to **NGESO**, relevant Scottish **Transmission Licensee**(s) and the relevant **Restoration Service Providers** involved for confirmation of its accuracy.

(g) The **Distribution Restoration Zone Plan** shall then (pending its accuracy being confirmed) be signed by the **DNO**, **NGESO**, the relevant Scottish **Transmission Licensee**(s) and relevant **Restoration Service Providers** to confirm accuracy.

(h) Once agreed under this DOC9.4.~~3.7~~6, the procedure will become a **Distribution Restoration Zone Plan** under the **Distribution Code** and **Grid Code** (subject to any change pursuant to this DOC9 and OC9 of the **Grid Code**) and will apply between The **DNO**, **NGESO**, relevant Scottish **Transmission Licensee** and the relevant **Restoration Service Providers** as if it were part of the **Distribution Code** .

(i) Once signed, a copy of the **Distribution Restoration Zone Plan** will be distributed by the **DNO** to **NGESO**, the relevant Scottish **Transmission Licensee**(s) and each relevant **Restoration Service Provider** which is a party to it and stating the date of implementation.

(j) The **DNO**, **NGESO**, the relevant Scottish **Transmission Licensee**(s) and each relevant **Restoration Service Provider** must make the **Distribution Restoration Zone Plan** readily available to the relevant operational staff.

(k) If the **DNO**, **NGESO**, the relevant Scottish **Transmission Licensee**(s) or any relevant **Restoration Service Provider** which is a party to the plan, becomes aware that a change is

needed to that plan, it shall initiate a discussion between the parties to seek to agree the relevant change. If the **DNO**, a relevant Scottish **Transmission Licensee** or relevant **Restoration Service Provider** becomes so aware, it shall contact **NGESO** in coordination with the **DNO** who will then initiate such discussions. The principles applying to establishing a new **Distribution Restoration Zone Plan** under this DOC9.4.~~3.7~~6 shall apply to such discussions and to any consequent changes.

(l) The **DNO**, **NGESO**, the relevant Scottish **Transmission Licensee**(s) and the relevant **Restoration Service Providers** will conduct regular joint exercises of the **Distribution Restoration Zone Plan** to which they are parties. The objectives of such exercises include:

- To test the effectiveness of the **Distribution Restoration Zone Plan**;
- To provide for joint training of the parties in respect of the **Distribution Restoration Zone Plan**;
- To maintain the parties' awareness and familiarity of the **Distribution Restoration Zone Plan**;
- To promote understanding of each parties' roles under a **Distribution Restoration Zone Plan**;
- To identify any improvement areas which should be incorporated into the **Distribution Restoration Zone Plan**.
- The principles applying to the establishment of a new **Distribution Restoration Zone Plan** under this DOC9.4.7.3 shall apply to any changes to the **Distribution Restoration Zone Plan**.

(m) The **DNO** in coordination with **NGESO** and the ~~R~~relevant Scottish **Transmission Licensee** will propose to the parties of a **Distribution Restoration Zone Plan** a date for the exercise to take place and which shall be agreed with the other parties. All the **Distribution Restoration Zone Plan** parties will jointly share the task of planning, preparing, participating in and facilitating the exercises, which will normally be in desktop format or as otherwise agreed. The precise timing of the exercise for each **Distribution Restoration Zone Plan** will be agreed by all parties, but will not be less than one every 8 years.

DOC9.4.~~6~~7 **Local Joint Restoration Plan Execution**

DOC9.4.~~3.5~~6~~7~~.7.1 The **DNO** may, in accordance with the relevant **Local Joint Restoration Plan~~d~~s** and the **Transmission Licensee's** requirements, be required to issue instructions (although this list should not be regarded as exhaustive) to a **Black Start Station** relating to the commencement of generation, to a **User** connected to the **DNO's Distribution System** or **Customers** in the **DNO's** authorised operating area, as appropriate, relating to the restoration of **Demand** and to an **Embedded Power Generating Facilities** relating to their preparation for commencement of generation when an external power supply is made available to them, and in each case may include switching instructions.

DOC9.4.~~3.6~~6~~.~~7.2 Where ~~the **DNO**, as part of the **Black Start** procedure, has given~~ an instruction has been given to a **Black Start Station** to initiate startup the **Black Start Station** shall confirm to the **DNO** when the startup of a **Power Generating Module** has been completed. Following confirmation of startup, the **DNO** will endeavour to stabilise that **Power Generating Module** by the establishment of appropriate **Demand** following which the **DNO** may instruct the **Black Start Station** to start up the remaining available **Power Generating Module**s and auxiliary gas turbines if any at that **Black Start Station** and **synchronise** them to create a **Power Island.**

DOC9.4.~~7~~8 Distribution Restoration Zone Plan Execution.

DOC9.4.~~7~~8.1 **NGESO** may issue instructions to the **DNO** which conflict with a **Distribution Restoration Zone Plan** or its operation. In such cases, these instructions will take precedence over the requirements of the **Distribution Restoration Zone Plan**. When issuing such instructions **NGESO** will state whether or not it wishes the remainder of the **Distribution Restoration Zone Plan** to apply. If, notwithstanding that, **NGESO** has stated that it wishes the remainder of the **Distribution Restoration Zone Plan** to apply, the relevant **Restoration Service Provider** or the **DNO** consider that **NGESO's** instructions mean that it is not possible to

operate the **Distribution Restoration Zone Plan** as modified by those instructions, any of them may give notice to **NGESO** and the other parties to the **Distribution Restoration Zone Plan** to this effect and **NGESO** will immediately consult with all parties to the **Distribution Restoration Zone Plan**. Unless all parties to the **Distribution Restoration Zone Plan** reach an agreement forthwith as to how the **Distribution Restoration Zone Plan** shall operate in those circumstances, operation in accordance with the **Distribution Restoration Zone Plan** will terminate.

DOC9.4.~~7~~8.2 Where **NGESO**, as part of a **Black Start**, has given an instruction to a **DNO** to initiate the start up of a **Distribution Restoration Zone**, the **DNO** will instruct the **Anchor Generator** to start up the relevant **Power Generating Module** in accordance with the **Distribution Restoration Zone Plan**.

DOC9.4.~~7~~8.3 The **DNO** will ensure that switching carried out on the **Distribution System** and other actions are as set out in the **Distribution Restoration Zone Plan**.

DOC9.4.~~7~~8.4 Following initiation of the **Distribution Restoration Zone Plan** and that all necessary protection, control and any automatic facilities (including the use of a **Distribution Restoration Zone Control System** if applicable) are ready and relevant Restoration Service Providers are ready, **NGESO** will instruct the **DNO** to energise an isolated part of the **DNO's System**. The **DNO** will then, in accordance with the requirements of the **Distribution Restoration Zone Plan**, establish communication and agree the output of the relevant **Anchor Generator's Plant** and **Relevant Restoration Service Providers Plant** and the connection of **Demand** so as to establish a **Power Island**. During this period, the **DNO** will be required to manage the output of the relevant **Anchor Generator's Power Generating Module(s)** and/or **Relevant Restoration Service Provider's Plant** to the **Demand** prevailing in the **Power Island** in which it is situated, on the basis that it will (where practicable) seek to maintain the **Target Frequency**. Relevant **Restoration Service Providers** shall (where practical) also seek to follow the requirements relating to **Reactive Power** (which may include the requirement to maintain a target voltage) set out in the **Distribution Restoration Zone Plan.**

DOC9.4.~~7~~85 Operation in accordance with the **Distribution Restoration Zone Plan** will be terminated by **NGESO** (by notifying the relevant **DNO** who will then notify the parties to the **Distribution Restoration Zone Plan**) co-incident with connecting the **Power Island** to other **Power Islands**. Operation in accordance with the **Distribution Restoration Zone Plan** will also terminate in the circumstances provided for in DOC9.4.3.3 if an agreement is not reached or if **NGESO** states that it does not wish the remainder of the **Distribution Restoration Zone Plan** to apply.

DOC9.4.~~7~~8.6 In the event of a **Black Start Event** where **NGESO** wishes to initiate one or more **Distribution Restoration Zones**, **NGESO** will issue an ~~E~~emergency ~~I~~instruction to the **DNO** to initiate the relevant **Distribution Restoration Zone**. In Scotland the ~~E~~emergency ~~I~~instruction to a Scottish **DNO** to initiate a Scottish **Distribution Restoration Zone** would be undertaken by the relevant Scottish **Transmission Licensee**.

DOC9.4.~~7~~8.7 Upon receipt of an ~~E~~emergency ~~I~~instruction from **NGESO** (or the relevant Scottish **Transmission Licensee**) the **DNO** will initiate the establishment of the **Distribution Restoration Zone** in accordance with the **Distribution Restoration Zone Plan**.

DOC9.4.~~7~~8.8 All instructions to relevant **Restoration Service Providers** forming part of the **Distribution Restoration Zone** will be issued by the **DNO**. All instructions to ~~Users~~ **Restoration Service Providers** who are party to the **CUSC** and who are active in the **Distribution Restoration Zone Plan** will be issued by the **DNO** unless **NGESO** (or the relevant Scottish **Transmission Licensee**) as a matter of urgency needs to contact that ~~User~~ **CUSC** party directly, in which case **NGESO** will notify the **DNO** as soon as possible as to why it has had to instruct that ~~User~~ party directly.

DOC9.4.~~7~~8.~~8~~9 These arrangements will remain in place until the **Distribution Restoration Zone** is **Re-synchronised** to other parts of the **National Electricity Transmission System**.

DOC9.4.~~7~~8.~~9~~10 The **DNO** will issue instructions to the relevant **Restoration Service Providers** to inform them of the requirement that a **Distribution Restoration Zone** is to be established in accordance with the **Distribution Restoration Zone Plan** and to prepare their **Plant** and **Apparatus** so that it is in a state of readiness for establishing the **Distribution Restoration Zone**. The relevant **Restoration Service Provider**(s) will inform the **DNO** the indicative time at when their **Plant** and **Apparatus** will be in a state of readiness to energize, or to ~~s~~**Synchronise** to, the **System**.

DOC9.4.~~7~~8.11~~0~~ Automatic instructions issued by a **Distribution Restoration Zone Control System** will be considered to be, and have the same status as, instructions from the **DNO**

DOC9.4.~~7~~8.1~~0~~21~~1~~ Relevant **Restoration Service Providers** who are not **Anchor Generators** shall not start to ~~s~~**Synchronise** to the **DNO's System** until given a formal instruction by the **DNO** in accordance with DOC9.4.7.~~19~~20. Such instructions would only be given once the **DNO** has established energization of part of its **System** by issuing instructions to **Anchor Generators**, and the **DNO's System** is in a position to expand that portion which is energized and supply more **Demand**.

DOC9.4.~~7~~8.1~~12~~3 The **DNO** shall inform **NGESO** (and relevant Scottish **Transmission Licensee** in the case of a Scottish **Distribution Restoration Zone**) when it has contacted **Anchor Generators** and other relevant **Restoration Service Providers** in accordance with the **Distribution Restoration Zone Plan** and provide an indicative time of when its **System** and associated **Equipment** is in a position to be re-energised and the expected time of when the **Anchor Generator** will be in a position to re-energise the intended section of the **DNO's System**.

DOC9.4.~~7~~8.1~~23~~4 At this point the **DNO** shall start to reconfigure its **System** such that it is in an appropriate state of readiness to enable the **Anchor Generator** to re-energise the intended part of its **System** in accordance with the **Distribution Restoration Zone Plan**. To enable this process to take place, the **DNO** may need to change the topology and status of its **System**. Reconfiguration of the **DNO's System** prior to energisation of the **DNO's System**, may be achieved conventionally or via fully automatic means which could include a **Distribution Restoration Zone Control System**, as required by the **Distribution Restoration Zone Plan**.

DOC9.4.~~7~~8.1~~34~~5 When the **DNO** has reconfigured its **System** it will contact the **Anchor Generator** to confirm and agree a time for the **Anchor Generator** to operate their **Power Generating Module(s)** so as to energise the required section of the **DNO's System**. Where subsequently the **Anchor Generator** or **DNO** needs to change the agreed energisation time as a result of an unforeseen event the **Anchor Generator** and **DNO** will agree a revised energisation time.

DOC9.4.~~7~~8.1~~45~~6 On determining an agreed energisation time , the **DNO** will inform **NGESO** (or the relevant Scottish **Transmission Licensee**) of the time when the **Anchor Generator's Power Generating Module(s)** is scheduled to energise the intended section of the **DNO's System**. Should this scheduled time subsequently change, the **DNO** will inform **NGESO** (or the relevant Scottish **Transmission Licensee**) as necessary and provide an indication of any revised re-energisation time and the reason for the change.

DOC9.4.~~7~~8.1~~56~~7 At the agreed re-energisation time as detailed in DOC9.4.7.1~~4~~5, the **DNO** will contact the **Anchor Generator** and issue an instruction for the **Anchor Generator** to energise a section of the **DNO's System** unless this is being achieved via fully automatic means which could include a **Distribution Restoration Zone Control System**.

DOC9.4.~~7~~8.1~~67~~8 When the **DNO's System** has been energised and is supplying some local **Demand** and/or controllable **Demand** provided by a relevant **Restoration Service Provider**, the **Anchor Generator** will be required to maintain target voltage and **Target Frequency** as instructed by the **DNO**, or via fully automatic means which could include a **Distribution Restoration Zone Control System**. The **DNO**, in liaison with the **Anchor Generator** will ensure the **DNO's System** is operated in a stable manner with additional **Demand** blocks being switched into service when it is appropriate to do so. As part of this process the **DNO** in coordination with the **Anchor Generator** shall ensure there is no risk to the **DNO's System** or the **Anchor**

Power Generating Module through disturbances that could arise in the **Distribution Restoration Zone**. This may be achieved through a series of energisation steps or through a soft energisation between the **Anchor Generator's Power Generating Module(s)** and sections of the **DNO's System**. The requirements of this DOC9.4.~~7~~8.1~~7~~8 may be achieved via manual instructions, remote switching carried out at the **DNO's Control Centre**, a **Distribution Restoration Zone Control System** or a combination of these options.

DOC9.4.~~7~~8.1~~78~~9 If during the **Demand** restoration process any relevant **Restoration Service Provider's Plant** cannot, because of the nature of the **Demand** being supplied, keep within its safe operating parameters, the, relevant **Restoration Service Provider** shall inform the **DNO** who in turn shall inform **NGESO**. In the case of a **Distribution Restoration Zone** in Scotland the **DNO** shall inform the relevant Scottish **Transmission Licensee**.

DOC9.4.~~7~~8.~~19~~208 The **DNO** will, where possible, either instruct **Demand** to be altered or will re-configure the **Distribution Restoration Zone** or will instruct the relevant **Restoration Service Provider** forming part of the **Distribution Restoration Zone** to re-configure its **System** in order to alleviate the problem being experienced by the Relevant **Restoration Service Provider's Equipment**. **NGESO** and the **DNO** (and Relevant **Transmission Licensee** in Scotland) accepts that any decision to keep a Relevant **Restoration Service Provider's Plant** and **Apparatus** from operating, if outside its safe operating parameters, is one for the **Restoration Service Provider** concerned alone and accepts that the relevant **Restoration Service Provider's Plant** and **Apparatus** may change output if the **relevant Restoration Service Provider** believes it is necessary for safety reasons (whether relating to personnel or **Plant** and/or **Apparatus**). If such a change is made without prior notice, then the relevant **Restoration Service Provider** shall inform the **DNO** as soon as reasonably practical. The **DNO** will inform **NGESO** (and the relevant **Transmission Licensee** in the case of Scottish **Distribution Restoration Zones**) of the key stages of establishing each **Distribution Restoration Zone**.

DOC9.4.~~7~~8.~~1~~21 ~~09~~ To stabilise the voltage and **Frequency** of the **DNO's System** and increase the volume of **Demand** fed from within the **Power Island**, the **DNO** will subsequently need to instruct further ~~R~~relevant **Restoration Service Providers** to ~~s~~**Synchronise** to the **Power Island**, either via manual instruction or through the use of a **Distribution Restoration Zone Control System**(s). The control of the **Frequency** and voltage of the **Distribution Restoration Zone** will be the responsibility of the **DNO**. For the avoidance of doubt the control of **System Frequency** and voltage control during the whole **Black Start** phase is the responsibility of **NGESO**, although **NGESO** will require **DNOs** to manage the **Frequency** and voltage levels of **Power Islands** in the case of **Distribution Restoration Zones**.

DOC9.4.~~7~~8.22~~10~~ Once the **Power Island** has been established as described in DOC9.4.7.~~19~~20, the **DNO** shall undertake a step by step process of energising more elements of its **System**. The **DNO** will progressively restore auxiliary supplies to substations, supplies to **Customers** and other relevant **Restoration Service Providers** to stabilise the **DNO's System**. The **DNO** will do this by issuing instructions in the conventional way or via fully automatic means which could include a D**istribution Restoration Zone Control System**. During this phase, the **DNO** will need to ensure that each relevant **Restoration Service Provider's Equipment** is operated within its designed operational limits, that they are contributing to voltage and **Frequency** control and adequate positive and negative headroom is maintained on such **Plant** to enable the management of **Power Island** contingences. During this period, there may be a need to initiate the restoration and operation of relevant **Restoration Service Provider's Equipment** to help balance the **DNO's System**.

DOC9.4.~~7~~8.2~~12~~3 As the **Distribution Restoration Zone** starts to grow and become more clearly established, the **DNO** may need to update protection and control settings to match the needs of the **Power Island**.

DOC9.4.~~7~~8.~~2~~234 With the **Distribution Restoration Zone** now operating in a stable manner, the **DNO** shall ensure that that relevant **Restoration Service Providers Equipment** are operated within safe operating limits and have a sufficient volume of headroom to be able to contribute to voltage and **Frequency** control. This is an essential pre-requisite to enable the **Power ~~I~~Island** to withstand volatility in **Demand** and generation, **DNO** interaction or credible faults and disturbances.

DOC9.4.~~7~~8.25~~43~~ Where circumstances permit, expansion of a **Distribution Restoration Zone** to a ~~T~~transmission busbar and to wider parts of the **Transmission System** will be managed in accordance with the D**istribution Restoration Zone Plan** and DOC9.5.

DOC9.4.~~3.78~~9 **Interconnection of Power Islands**

In accordance with the requirements of the relevant **Transmission Licensee,** the **DNO** may be required to issue instructions to **Users** so as to establish, maintain and expand **Power Islands** and to interconnect **Power Islands** to achieve larger sub-systems and subsequently to form an integrated **System** and re-establishment of the **Total System**. **Users** shall at all times abide by the **DNO's** instructions in relation to interconnection of **Power Islands**.

DOC9.4.~~3.89~~10 **Conclusion of Black Start situation**

The conclusion of the **Black Start** situation and the time of the normal operation of the **Total System** will be determined by the relevant **Transmission Licensee** who shall inform the **DNO.** The **DNO** will inform **Users** of the **DNO's Distribution System** which in the **DNO's** opinion need to be informed that the **Black Start** situation no longer exists and that normal operation of the **Total System** has begun.

DOC9.5 **Re-synchronisation of De-synchronised Islands**

DOC9.5.1 **Resynchronization** of ~~d~~**De-synchronised** islands might be required as a routine contingency, or as part of a **Local Joint Restoration Plan**. **Resynchronization** will also be required as part of a **Distribution Restoration Zone Plan**. The **Distribution Restoration Zone Plan** specific requirements are described in DOC9.5.3.

DOC.9.5.2 **Local Joint Restoration Plan**~~LJRP~~ or routine contingency:

DOC9.5.2.1 Where parts of the **Total System** are out of synchronism with each other, irrespective of whether ~~but~~ there is ~~no~~ a **Total Shutdown** or a **Partial Shutdown**~~,~~ **NGESO** will instruct **Users** to regulate generation or **Demand**, as the case may be, to enable the de-synchronised islands to be re-synchronised.

DOC9.5.2.2 **DNOs** may be involved in re-synchronising by issuing instructions to **Users** in accordance with the requirements of **NGESO. Users** shall at all times abide by the **DNO's** instructions in relation to re-synchronising de-synchronised islands.

DOC9.5.2.3 The re-synchronising of de-synchronised islands are covered by De-synchronised Island Procedures agreed between **NGESO** and the relevant **Transmission Licensee, DNO** and **Generators**.

DOC9.5.3 **Distribution Restoration Zone Plan** Operation

DOC9.5.3.1 Generation in **Distribution Restoration Zone De-synchronised Power ~~I~~Islands** may be dealt with in two different ways, either one of which may be used in relation to any particular incident:

DOC9.5.3.~~1~~ ~~2~~**Indirect loading and generation data management**

(a) The **DNO** and each relevant **Restoration Service Provider** in the **Distribution Restoration Zone** shall exchange information as set out in this DOC9.5.3.~~1~~2 to enable the **DNO** to issue instructions to **Restoration Service Providers** in relation to their **Plant** and **Apparatus** in order for the **Target Frequency** agreed with **NGESO** to be maintained.

(b) The information to the **DNO** from the **Restoration Service Provider** will cover its relevant operational parameters.

(c) The **DNO** will keep **NGESO** informed of the progress of establishing and running the **Distribution Restoration Zone** within the **DNO's System**.

DOC9.5.3.3~~2~~ **Direct loading and generation data management**

(a) Once a **Distribution Restoration Zone** has been established the **DNO** will issue instructions

to the **Anchor Generator** to "float" local **Demand** and maintain **Frequency** at the **Target Frequency**. **Anchor Generators** shall regulate the output of their **Plant** to the **Demand** prevailing in the ~~d~~**De-synchronised Power** ~~i~~**Island** in which it is situated, until ~~r~~**Re-synchronisation** takes place, on the basis that it will (where practicable) seek to maintain the ~~t~~**Target Frequency**.

(b) The **DNO** shall be in contact with the **Anchor Generator** to supply data on **Demand** changes within the de-synchronised island.

(c) If there is ~~-~~more than one **Restoration Service Provider** on the D~~d~~**e-synchronised** ~~i~~**Power Island**, or connected to the ~~d~~**De-synchronised** ~~i~~**Power Island** and available to operate although not **Synchronised**, the **DNO** will need to liaise with **NGESO** to agree which **Restoration Service Providers** will be used to accommodate changes in **Demand** in the D~~d~~**e-synchronised Power Island**. The **DNO** shall then maintain contact with the relevant **Restoration Service Providers**.

(d) The **Anchor Generator** must contact the **DNO** if the level of **Demand** which it has been asked to meet as a result of the ~~i~~instruction to "float", is likely to cause problems for safety reasons (whether relating to personnel or **Plant** and/or **Apparatus**) in the operation of its **Anchor Power Generating Module**, in order that the **DNO** can alter the level of **Demand** which that **Anchor Power Generating Module** needs to meet. Any decision to operate outside any relevant parameters is one entirely for the **Anchor Generator**.

DOC9.5.4 Should the **DNO** establish one or more **Distribution Restoration Zones** within its ~~Network Operator's~~ **System** following agreement with **NGESO** (and a Scottish **Transmission Licensee** where relevant) and confirmation that both **Distribution Restoration Zones** are in a state of readiness, the **DNO** will **Synchronise** the two **Distribution Restoration Zones** by closing appropriate switchgear between the two **Power Islands**. Following the successful **Synchronisation** of two or more **Distribution Restoration Zones** the **DNO** shall inform **NGESO** (and the Scottish **Transmission Licensee** where relevant) of the establishment of the larger **Power Island** in accordance with the requirements of OC7. For the avoidance of doubt, where two **Distribution Restoration Zones** are joined together to form one larger **Power Island**, the subsequent Resynchronisation to the **National Electricity Transmission System** would follow the requirements of OC9.4.8.20 or OC9.4.8.21 in the **Grid Code**.

DOC9.6 **Joint System Incident Procedure**

DOC9.6.1 A **Joint System Incident** is an **Event** (as referred to in **Distribution Operating Code** DOC7) wherever occurring which in the opinion of the **DNO** has or may have a serious and/or widespread effect on, in the case of an incident on a **User's System**, the **DNO's Distribution System** or the **National Electricity Transmission System** or, in the case of an incident on the **DNO's Distribution System** or the **National Electricity Transmission System,** on a **User's,** or **Users'**, **System(s)**. Where an incident on a **User's System** has or may have no effect on the **DNO's Distribution System** or the **National Electricity Transmission System**, then such an incident does not fall within this **Distribution Operating Code** and accordingly DOC9 shall not apply to it.

DOC9.6.2 Each **User** requested by the **DNO** in accordance with the **Distribution Planning and Connection Code**, shall provide in writing to the **DNO** and the **DNO** shall provide in writing to each such **User** a telephone number or numbers at which or through which responsible management representatives, who are fully authorised to take binding decisions on behalf of their appointers, can be contacted day or night when there is a **Joint System Incident**. The lists of telephone numbers shall be provided at the time that a **User** connects to the **DNO's Distribution System** and must be updated (in writing) as often as the information contained in them changes.

DOC9.6.3 On the occurrence of an **Event**, then pursuant to **Distribution Operating Code** DOC7:

(a) If it is on the **System** of a **User**, the **User** shall notify the **DNO** accordingly together with any other **User** who is or may be affected and will inform the **DNO** of which **Users** it has informed.

(b) If it is on the **DNO's Distribution System,** the **DNO** shall notify all **Users** who are or may be affected.

DOC9.6.4 Following notification by a **User** of an **Event**, the **DNO** will if it considers necessary, telephone the **User** on the telephone number referred to in DOC9.6.2 to obtain such additional information as it requires.

DOC9.6.5 Following notification of an **Event** in accordance with DOC9.6.3(a) or (b), and/or the receipt of any additional information requested pursuant to DOC9.6.4, the **DNO** will determine whether or not the **Event** is a **Joint System Incident**, and, if so, the **DNO** may set up a **System Incident Centre** in order to avoid overloading existing operational arrangements of the **DNO**.

DOC9.6.6 The **DNO** shall as soon as possible notify all relevant **Users** that a **System Incident Centre** has been established and the telephone number(s) of the **DNO's System Incident Centre** if different from those already supplied pursuant to DOC9.6.2.

DOC9.6.7 All communications between the responsible management representatives of the relevant parties with regard to the **DNO's** role in the **Joint System Incident** shall be made via the **System Incident Centre**, if it has been established.

DOC9.7 **Civil Emergencies**

DOC9.7.1 Directions under Section 96 of the **Act** place an obligation on the **DNO** to prepare and maintain plans for mitigating the effects of any civil emergency which may occur in accordance with the Electricity Supply Emergency Code. That Code describes the steps which Government might take to deal with an electricity supply emergency envisaged under Section 96(7) of the **Act** or Section 3(i)(b) of the Energy Act 1976 and sets down the actions which Companies in the Electricity Supply Industry should plan to take and which may be needed or required in order to deal with such an emergency.

DOC9.7.2 In an electricity emergency it may become necessary to restrict **Users' Demand** for and consumption of electricity and may be achieved by one or more of the following methods:

(a) Appeals by the Government to the public for voluntary restraint.

(b) The issue of Orders under the Energy Act 1976 requiring restrictions on consumption by industry and commerce.

(c) The issue of directions under the Energy Act 1976 requiring rota disconnections and associated restrictions.

DOC9.7.3 In the event that the **Secretary of State** issues directions to the **DNO** to implement rota disconnections, the **DNO** will establish an Emergency Co-ordinating Centre and as soon as possible establish communications with such relevant **Users** as is necessary to ensure operational liaison. The plans to be implemented will be similar or separate from the schemes outlined in **Distribution Operating Code,** DOC6.

DOC9.7.4 The plans make provision for the need to maintain supply, so far as practicable, to consumers in protected categories. For the purpose of the **Distribution Code** a Nuclear **Power Generating Module** shall be deemed to be a protected category in accordance with the provisions of DOC6.1.4.

Distribution Data Registration Code (ddrc)

DDRC1 INTRODUCTION

DDRC1.1 The various sections of the **Distribution Code** require the **DNO** and **Users** to exchange and update data from time to time. The data which is specified in each section of the **Distribution Code** is summarised in the **Distribution Data Registration Code (DDRC)**.

DDRC1.2 The **Distribution Data Registration Code ("DDRC")** provides a series of schedules summarising all requirements for information of a particular type. Each class of **User** is then referred to the appropriate schedule or group of schedules for a statement of the total data requirements in his case.

DDRC1.3 The **DDRC** specifies procedures and timings for the supply of data and subsequent updating, where the timings are covered by detailed timetables laid down in other sections of the **Distribution Code** they are not necessarily repeated in full in the **DDRC**.

DDRC1.4 In the case of an **Embedded Generator** seeking a connection to the **DNO's Distribution System** then irrespective of its potential involvement in the **Balancing Mechanism,** discussions on connection will be with the **DNO** concerned with the connection arrangements, in addition to any discussions required with **NGESO** under the **Grid Code**. References to "**Embedded Generator**" in the DDRC shall include existing and prospective **Embedded Generators**.

DDRC2 OBJECTIVE

The objective of the **DDRC** is to collate and list in a readily identifiable form all the data to be provided by:

(a) Each category of **User** to the **DNO** under the **Distribution Code**.

(b) The **DNO** to each category of **User** under the **Distribution Code.**

DDRC3 SCOPE

The **DDRC** will apply to the **DNO** and to all **Users** which for the purpose of the **DDRC** are listed below:

(a) **Customers** It is not intended that the **Distribution Code** shall generally apply to small **Customers** individually; their obligations will be dealt with on their behalf by their **Supplier**.

(b) **Embedded Generators**.

(c) **Other Authorised Distributors** connected to the **DNO's Distribution System.**

(d) **Suppliers**

(e) Any other person who is making application for use of or connection to the **DNO's Distribution System**.

DDRC4 DATA CATEGORIES

DDRC4.1 **Categories of Data**

Within the **DDRC** the data required by the **DNO** is allocated to one of the following three categories:

(a) **Standard Planning Data (SPD)**

(b) **Detailed Planning Data (DPD)**

(c) **Operational Data (OD)**

DDRC4.2 **Standard Planning Data (SPD)**

DDRC4.2.1 **Standard Planning Data** is that data listed in the **Distribution Planning and Connection Code** which is required to be supplied by all **Users** when making application for connection to and/or use of

the **DNO's Distribution System** in order that the **DNO** may assess the implications for making the connection.

DDRC4.2.2 **Standard Planning Data** will be provided to the **DNO** in accordance with Section DPC6 and DPC7 of the **Distribution Planning and Connection Code** for **Power Generating Module**s compliant with EREC G59, and in accordance with EREC G99 for **Power Generating Module**s compliant with EREC G99.

DDRC4.2.3 Following an agreement for connection/use of **System**, it is a requirement of the **Distribution Planning and Connection Code** that estimated data supplied by **Users** should be replaced by actual values prior to connection which will be referred to as **Registered Data.**

DDRC4.3 **Detailed Planning Data (DPD)**

DDRC4.3.1 **Detailed Planning Data** is that data listed in the **Distribution Planning and Connection Code** which is required to be supplied by the **Users** specified for connection to and/or use of the **DNO's Distribution System**.

DDRC4.3.2 **Detailed Planning Data** will be provided to the **DNO** in accordance with Section DPC6 and DPC7 of the **Distribution Planning and Connection Code** for **Power Generating Module**s compliant with EREC G59, and in accordance with EREC G99 for **Power Generating Module**s compliant with EREC G99.

DDRC4.3.3 Following an agreement for connection/use of **System**, it is a requirement of the **Distribution Planning and Connection Code** that estimated data supplied by **Users** should be replaced by measured values prior to connection.

DDRC4.4 **Operational Data (OD)**

DDRC4.4.1 **Operational Data** is data, which is required by the **Distribution Operating Codes**.

DDRC4.4.2 **Operational Data** is required to be supplied in accordance with timetables set down in the relevant **Distribution Operating Codes** and is repeated in tabular form in the schedules attached to this **DDRC**.

DDRC5 PROCEDURES AND RESPONSIBILITIES

DDRC5.1 **Responsibility for Submission and Updating of Data**
In accordance with the provisions of the various sections of the **Distribution Code** and unless otherwise agreed or specified by the **DNO,** each **User** is required to submit data as defined in DDRC6 following and the attached schedules.

DDRC5.2 **Methods of Submitting Data**

DDRC5.2.1 Data must be submitted to the **DNO** in writing and where possible in the format specified by the **DNO** and must indicate the name of the person who is submitting those schedules.

DDRC5.2.2 If a **User** wishes to change any data item then this must first be discussed with the **DNO** concerned in order for the implications to be considered and the change if agreed (such agreement not to be unreasonably withheld), should be confirmed by the submission of a revised data scheduler by verbal means with confirmation in writing if short timescales are involved.

DDRC5.2.3 The **DNO** will supply data as requested by **Users** and as agreed by the **DNO** where no obligation of confidentiality exists.

DDRC5.3 **Changes to User's Data**
Whenever a **User** becomes aware of a change to an item of data, which is registered with the **DNO** the **User**, must notify the **DNO** in accordance with the appropriate section of the **Distribution Code**. The method and Distributed ReStart in partnership with

timing of the notification to the **DNO** is set out in the appropriate section of the **Distribution Code**.

DDRC5.4 **Data Accuracy and Data not Supplied**

DDRC5.4.1 The **User** is solely responsible for the accuracy of data (or of changes to data) supplied to the **DNO**.

DDRC5.4.2 Any data which the **User** fails to supply when required by any section of the **Distribution Code** may be estimated by the **DNO** if and when, in the **DNO's** view, it is necessary to do so. Such estimates will be based upon data supplied previously for the same **Plant** or **Apparatus** or upon corresponding data for similar **Plant** or **Apparatus** or upon such other information as the **DNO** deems appropriate.

DDRC5.4.3 The **DNO** will advise a **User** in writing of any estimated data it intends to use pursuant to DDRC5.4.2 relating directly to that **User's Plant** or **Apparatus** in the event of data not being supplied. The **DNO** will not be liable as a result of using that estimated data; the responsibility for the accuracy of that data will rest with the **User** as if the data has been supplied by that **User**.

DDRC5.4.4 It is a requirement of the **Distribution Planning and Connection Code** that Registered Project Planning Data is updated by the **User** annually.

DDRC6 DATA TO BE REGISTERED

DDRC6.1 Schedules 1-4 are not used within the **Distribution Code**.

DDRC6.2 Schedules 5a, 5b and 5c - **Embedded Power Generating Module** Technical Information.

DDRC6.3 Schedule 5e - **Embedded Transmission System**

DDRC6.4 Schedule 5f –**Restoration Service Providers's Information for Distribution Restoration Zones**

DDCR 6.5 Schedule 6 - **Demand** forecasts - as described in DOC1, time varying output/generation forecasts for the **Users** defined in the scope.

DDRC6.56 Schedule 7 - **Operational Planning** - as described in **DOC2**, outage planning information.

DDRC6.67 Schedule 8 - **System** Design Information - comprising **System** technical data.

DDRC6.87 Schedule 9 - Load Characteristics - comprising the forecast data for load points indicating for example, the maximum load, the equipment that comprises the load, and the harmonic content of the load.

DDRC6.89 The schedules applicable to each class of **User** are as follows:-

Schedule Number:-	**Title**	**Applicable to:-**
Error! Reference source not found.	**Power Station Data**	Every **Power Station**
Error! Reference source not found.	**Power Generating Module Data**	All **Embedded Power Generating Modules**

Schedule Number:-	Title	Applicable to:-
Error! Reference source not found.	**Power Generating Module Data**	For specified types of **Power Generating Module** and ancillary **Plant and Apparatus** (i) Synchronous **Power Generating Module** (ii) Fixed speed induction **Power Generating Module** (iii) Doubly fed induction **Power Generating Module** (iv) Series Converter Connected **Power Generating Module** (v) Transformers
Error! Reference source not found.	**DNO** Network Data	**DNO's Distribution System**
Error! Reference source not found.	All **Embedded Transmission System**	All **Embedded Transmission System**
Schedule 5f	Re-**synchronization** times and **Block Loading Capabilities**	All **Restoration Service Providers** for **Distribution Restoration Zones**
Schedule 6	**Demand** Forecasts	All **Embedded Generators** greater than 1MW; Any **Other Authorised Distributor** connected to the host **DNO System**; All **Suppliers**; All **Customers** connected at **HV** whose **Demand** is greater than 5MW
Error! Reference source not found.	**Operational Planning**	All **Embedded Generators** greater than 1MW; Any **Other Authorised Distributor** connected to the host **DNO System**; All **Suppliers**; All **Customers** connected at **HV** whose **Demand** is greater than 5MW
Error! Reference source not found. **Error! Reference source not found.**	**System** Design Information and Load Characteristics	**Embedded Generators**; Any **Other Authorised Distributor** connected to the host **DNO's Distribution System**; All **Suppliers**; All **Customers**

Schedule 5f

DATA REGISTRATION CODE
RE SYNCHRONIZATION TIMES AND BLOCK LOADING CAPABILITIES FROM RESTORATION SERVICE PROVIDERS FOR DISTRIBUTION RESTORATION ZONES

DATA DESCRIPTION 5f Restoration Service Provider Data	UNITS	DATA CATEGORY
RE-SYNCHRONIZATION TIMES		
Assuming all **Restoration Service Providers** were running immediately prior to the **Total Shutdown** or Partial Shutdown and in the event of loss of all external power supplies, provide the following information:		
The estimated time by when each item of relevant **Plant** identified in	Tabular or	**DPD**

DATA DESCRIPTION 5f Restoration Service Provider Data	UNITS	DATA CATEGORY
the **Distribution Restoration Zone Plan** can be **Synchronized** following a **Total Shutdown** or **Partial Shutdown**. (see note 1)	graphical	
Describe any specific issues (ie those that would affect the time at which the **Anchor Power Generating Module** and **Restoration Service Provider's Plant** to be **Synchronised**) that may arise, as time progresses without external supplies being restored.	Text	**DPD**
BLOCK LOADING CAPABILITIES		
The **Block Loading Capability** of the relevant **Plant** shall be provided in either graphical or tabular format showing the estimated **block loading capability** from 0MW to the **Plant's Registered Capacity**. Any particular MW loading points at which the **Anchor Generator's Plant** or **Restoration Service Provider's Plant** should be operated until further changes in output can be accommodated should also be identified. (See note 2)	Tabular or graphical	**DPD**

Note 1 The estimate should include the **Anchor Generator's** and **Restoration Service Provider's** ability to re-synchronise all their **Plant**, assuming all were running immediately prior to the Total Shutdown or **Partial Shutdown**

Note 2 The data of each **Anchor Power Generating Module** and **Restoration Service Provider's Plant** forming part of a **Distribution Restoration Zone** should be provided for the condition of an **Anchor Power Generating Module** or **Restoration Service Provider's Plant** (which are considered as both 'hot' units (running prior to **Shutdown**) and cold units (not run for 48 hours or more prior to the shutdown) that were **Synchronised** immediately prior to the **Total Shutdown** or **Partial Shutdown**. The **Block Loading Capability** assessment should be done against a frequency variation of 49.5Hz – 50.5Hz.

Engineering Recommendation G99

Requirements for the connection of generation equipment in parallel with public distribution networks on or after 27 April 2019

2 Scope and Structure

2.1 This EREC provides the technical requirements for the connection of **Type A**, **Type B**, **Type C** and **Type D Power Generating Module**s to the **Distribution Network**s of licensed **DNO**s in **Great Britain**. For the purposes of this EREC, a **Power Generating Module** is any source of electrical energy, irrespective of the generating technology and **Power Generating Module** type. This EREC applies to all **Power Generating Module**s which are not in the scope of EREC G98, Requirements for the connection of **Fully Type Tested** Micro-generators (up to and including 16 A per phase) in parallel with public **Low Voltage Distribution Network**s on or after 27 April 2019, or are not compliant with EREC G98 requirements.

The requirements set out in this EREC G99 shall not apply to the following **Generator**s who should refer to EREC G59:

(a) **Generator**s whose **Power Generating Module**(s) was already connected to the **DNO**'s **Distribution Network** before 27 April 2019[1] or

(b) **Generator**s who had concluded a final and binding contract for the purchase of main generating plant before 17 May 2018. The **Generator** shall have notified the **DNO** of the conclusion of this final and binding contract by 17 November 2018; or

(c) **Generator**s who have been granted a relevant derogation by the **Authority**.

The requirements set out in this **EREC G99** shall apply to **Generator**s owning any **Power Generating Module** which has been substantially modified on or after 27 April 2019. Such a modification will generally require the **Generator's Connection Agreement** to be substantially revised or replaced for example a change to a technical appendix in a **Connection Agreement**. Section 20.3 contains further details and Annex A.6 provides guidance on what modifications are considered substantial.

2.2 This EREC does not provide advice for the design, specification, protection or operation of **Power Generating Module**s themselves. These matters are for the **Generator** to determine.

2.3 Specific separate requirements apply to **Power Generating Facilities** connected at **LV** comprising **Fully Type Tested, Type A**, **Power Generating Module**s 16 A/phase or less (micro-generators) and these are covered in EREC G98. All **Power Generating Module**s 16 A/phase or less connecting to the **DNO**'s

[1] **Power Generating Modules** that fully comply with this EREC G99 can be commissioned in advance of 27 April 2019 as they also comply with the pre-existing EREC G59 requirements.

Distribution Network shall be **Fully Type Tested**.[2]

2.4 The connection of mobile generation operated by the **DNO**, EREC G98 compliant **Power Generating Module**s, Offshore **Power Generating Module**s or offshore **Transmission System**s containing generation are outside the scope of this Engineering Recommendation.

2.5 This document applies to systems where the **Power Generating Module**(s) can be paralleled with a **Distribution Network**. Where the **Power Generating Module**(s) can only be used as an alternative source of energy to supply the same electrical load within the **Customer Installation** the requirements of Section 7.4 of this EREC G99 apply.

2.6 The generic requirements for all types of **Power Generating Facilities** within the scope of this document relate to the connection design requirements, connection application and notification process including confirmation of commissioning. The document does not attempt to describe in detail the overall process of connection from application, through agreement, construction and commissioning. It is recommended that the ENA publication entitled – "*Distributed Generation Connection Guide*" is consulted for more general guidance.

2.7 Any **Power Generating Module** which participates in the balancing mechanism in addition to the general requirements of this EREC will have to comply with the relevant parts of the **Grid Code**. If the aggregated capacity of all the **Power Generating Module**s in the **Power Generating Facility** reaches the threshold for large as defined in the **Grid Code** (ie 10 MW in the north of Scotland; 30 MW in the south of Scotland, 100 MW in England and Wales), then the **Generator** will have to ensure compliance with the relevant parts of the **Grid Code**.

2.8 If the **Registered Capacity** of a **Power Generating Facility** in England and Wales is 50 MW or more, the **Generator** will have to comply with the requirements for an **Embedded Medium Power Station** as detailed in paragraphs 6.4.4 and 13.8.

2.9 This EREC is written principally from the point of view of the requirements in **Great Britain**. There are some differences in the requirements in **Great Britain** and Northern Ireland, which are reflected in the separate **Grid Code**s for **Great Britain** and Northern Ireland, and the separate **Distribution Code** and Engineering Recommendations for Northern Ireland. These documents should be consulted as necessary, noting that the numbering of sections within these documents is not necessarily the same as in the **Distribution Code** for **Great Britain** and the **Grid Code** for **Great Britain**.

2.10 The separate synchronous network operating in the Shetland Isles has specific technical challenges which are different to those of the **Great Britain** synchronous network. This EREC is not in itself sufficient to deal with these issues.

2.11 **Type B, Type C and Type D** pumped-storage **Power Generating Module**s shall fulfil all the relevant requirements of this EREC G99 in both generating and pumping operation mode. Synchronous compensation operation of pumped-storage **Power Generating Module**s shall not be limited in time by the technical design of **Power Generating Module**s. Pumped-storage variable speed **Power Generating Module**s shall fulfil the requirements applicable to **Synchronous Power Generating Module**s as well as those set out in Section 12.3 or Section 13.4.

2.12 Except for **Limited Frequency Sensitive Mode – Overfrequency** and the requirements relating to output power with falling frequency or where otherwise stated, requirements of this EREC G99 relating to the capability to maintain constant **Active Power** output or to modulate **Active Power** output shall not apply to **Power Generating Module**s of facilities for combined heat and power production embedded in the networks

[2] This EREC G99 contains an **Integrated Micro Generation and Storage** procedure, details of which are given in **Error! Reference source not found.**.

of industrial sites, where all of the following criteria are met:

(a) the primary purpose of those facilities is to produce heat for production processes of the industrial site concerned;

(b) heat and power generating is inextricably interlinked, that is to say any change of heat generation results inadvertently in a change of **Active Power** output and vice versa;

Combined heat and power generating facilities shall be assessed on the basis of their electrical **Registered Capacity**.

2.13 **Power Generating Modules** which by agreement between the **Generator** and the **DNO** will have the capability to run in island mode, as described in section 9.6.3 and including **Black Start Station**s, will need to comply with the general requirements of this EREG G99, although the specific technical requirements, particularly in relation to the earthing requirements of Section 8, the design requirements of Section 9 and protection requirements of Section 10 shall be modified in accordance with any site-specific requirements that are specified in the agreement with the **DNO** and in any contract covering **Black Start** services.

…

4 Terms and definitions

4.1 For the purposes of this document, the following terms and definitions apply.

Active Power (P)
The product of voltage and the in-phase component of alternating current measured in units of watts, normally measured in kilowatts (kW) or megawatts (MW).

Active Power Frequency Response
An automatic response of **Active Power** output, from a **Power Generating Module,** to a change in system frequency from the nominal system frequency.

Authority
The Gas and Electricity Markets Authority established under Section 1 of the Utilities Act 2000 The Gas and Electricity Markets Authority established under Section 1 of the Utilities Act 2000.

Automatic Voltage Regulator or AVR
The continuously acting automatic equipment controlling the terminal voltage of a synchronous **Generating Unit** by comparing the actual terminal voltage with a reference value and controlling by appropriate means the output of an **Exciter**, depending on the deviations.

Black Start

The procedure necessary for a recovery from a situation where all electricity supplies have been interrupted and all generation has ceased in that part of the Distribution Network. In these cases, there is no immediate prospect of external electricity supply being available to that part of the Distribution Network from the Transmission System

or any other source, and therefore electrical supplies cannot be restored without recourse to the Black Start Capability of a Black Start Station.

Black Start Capability
An ability in respect of a **Black Start Station**, for at least one of its **Generating Unit**s to ~~Start-Up~~start-up from ~~S~~shutdown and to energise a part of the **Distribution Network** and be synchronised to the **Distribution Network** upon instruction from the **NETSO**, or instruction or signal from the **DNO,** within ~~two hours~~a time period defined in the **Black Start** contract, without an external electrical power supply.

Black Start Station
A **Power Generating Facility** which is registered with the **NETSO** or **DNO,** as having a **Black Start Capability**.

Combined Cycle Gas Turbine Module or CCGT Module
A collection of **Generating Unit**s comprising one or more Gas Turbine Units (or other gas based engine units) and one or more Steam Units where, in normal operation, the waste heat from the Gas Turbines is passed to the water/steam system of the associated Steam Unit(s) or Steam Units and where the component units within the **CCGT Module** are directly connected by steam or hot gas lines which enable those units to contribute to the efficiency of the combined cycle operation of the **CCGT Module**.

….

5 Legal Aspects

5.1 The operation and design of the electricity system in **Great Britain** is defined principally by Directive 2009/72/EC, the **Electricity Act**, the **Electricity Safety Quality and Continuity Regulations (ESQCR)** 2002, as well as general considerations under the Health and Safety at Work Act (HASWA) 1974 and the Electricity at Work Regulations (EaWR) 1989. A brief summary of the main statutory obligations on **DNO**s, **Generator**s and **Customer**s is included as Annex D.4.

5.2 Directive 2009/72/EC gives rise to a number of pieces of other EU law, the most relevant of which is Commission Regulation (EU) 2016/631, the Network Code Requirements for all Generators (RfG). This code supersedes UK law, although it is not a complete set of requirements. This EREC has been written to comply fully with the requirements of the RfG, and to include other requirements required for connection to the **GB** power system.

5.3 Under Section 21 of the **Electricity Act**, **Generator**s may be required to enter into a bespoke **Connection Agreement** with the **DNO**. Such a **Connection Agreement** will specify the terms and conditions including technical, operating, safety and other requirements under which **Power Generating Module**s are entitled to remain connected to the **Distribution Network**. It is usual to include site specific commercial issues, including recovery of costs associated with the connection, GDUoS (Generator Distribution Use of System) charges and the applicable energy loss adjustment factors, in **Connection Agreement**s. It is also common practice by some **DNO**s to collect the technical issues into a subordinate "Technical and Operating Agreement" which is given contractual force by the **Connection Agreement**.

5.4 **DNO**s are required by their licences to have in force and comply with the **Distribution Code**. **Generators** will be bound by their **Connection Agreement**s and licences if applicable, to comply with the **Distribution Code**.

5.5 In accordance with DPC5.4 of the **Distribution Code**, when details of the interface between a **Power Generating Facility** and the **Distribution Network** have been agreed a site responsibility schedule detailing ownership, maintenance, safety and control responsibilities will be drafted. The site responsibility schedule

and operation drawing shall be displayed at the point of interconnection between the **DNO**'s **Distribution Network** and **Generator's Installation**, or as otherwise agreed.

5.6 The **DNO**s have statutory and licence obligations within which they have to offer the most economic, technically feasible option for connecting **Power Generating Facilities** to their **Distribution Network**s. The main general design obligations imposed on the **DNO**s are to:

(a) maintain supplies to their **Customer**s within defined statutory voltage and frequency limits;

~~(b)(a) ensure that the **Distribution Network**s at all voltage levels are adequately earthed;~~

~~(c)~~(b) comply with the "Security of Supply" criteria defined in EREC P2;

~~(d)~~(c) meet improving standards of supply in terms of customer minutes lost (CMLs) and the number of customer interruptions (CIs);

(d) ensure that the **Distribution Network**s at all voltage levels are adequately earthed;

(e) facilitate competition in the connection, generation and supply of electricity.

5.7 Under conditions of Black Start it is recognized that DNOs may relax some or all of the requirements (a) to (c) of 5.6 for the duration of the Black Start event for the purpose of re-establishing a stable network.

5.8 Failure to meet any of the above obligations will incur legal or regulatory penalties. The first two criteria, amongst others, define the actions needed to allow islanded operation of the **Power Generating Facility** or to ensure that the **Power Generating Facility** is rapidly disconnected from the **Distribution Network** under islanded conditions. The next two criteria influence the type of connection that may be offered without jeopardising regulated standards.

5.~~8~~9 General conditions of supply to **Customer**s are also covered by Regulation 23 of the **ESQCR** 2002. Under Regulation 26 of the **ESQCR** 2002 no **DNO** is compelled to commence or continue a supply if the **Customer's Installation** may be dangerous or cause undue interference with the **Distribution Network** or the supply to other **Customer**s. The same regulation empowers the **DNO** to disconnect any part of the **Customer's Installation** which does not comply with the requirements of Regulation 26. It should also be noted that each installation has to satisfy the requirements of the HASWA 1974 and the EaWR 1989.

5.~~9~~10 The **DNO** shall refuse to allow the connection of a **Power Generating Module** which does not comply with the requirements and connection process set out in this EREC G99 and which is not covered by a derogation granted by the **Authority** or a **LON** as described in Section 19.6.

5.1~~0~~ Regulations 21 and 22 of the **ESQCR** 2002 require installations that have alternative sources of energy to satisfy Regulation 21 in relation to switched alternative supplies, and Regulation 22 in the case of sources of energy running in parallel with the **Distribution Network**.

5.1~~1~~2 Under Regulation 22 of the **ESQCR** 2002, no person may operate **Power Generating Module**s in parallel with a public **Distribution Network** without the agreement of the **DNO**.

5.1~~2~~3 All **Generator**s have to comply with the appropriate parts of the **ESQCR**.

5.1~~3~~4 Any collection of **Power Generating Module**s under the control of one **Generator** in one installation is classed in the industry codes as a **Power Generating Facility**.

5.1~~4~~5 **Power Generating Facilities** that are to be connected to a **Distribution Network** and contain **Power Generating Module**s that trade in the wholesale market as Balancing Mechanism Units or have for other reasons become a party to the Balancing and Settlement Code and/or National Grid's Connection and Use of System Code, will then have to comply with the applicable **Grid Code** requirements for **Power Generating Module**s.

5.1~~5~~6 Information, which should assist **Generator**s wishing to connect to the **Distribution Network** at **High Voltage** (**HV**), will be published by the **DNO** in accordance with condition 25 of the Distribution Licence. This is known as the **Long Term Development Statement (LTDS)**. The general form and content of this statement is specified by Ofgem and covers the existing **Distribution Network** as well as authorised changes in future years on a rolling basis.

5.1~~6~~7 Under the terms of the **Electricity Act**, generation of electricity is a licensed activity, although the Secretary of State, may by order[3] grant exemptions. Broadly, generating stations of less than 50 MW are automatically exempt from the need to hold a licence, and those between 50 MW and 100 MW may apply to the Department for Business, Energy and Industrial Strategy for an exemption if they wish.

5.1~~7~~8 **Generator**s will need appropriate contracts in place for the purchase of any energy that is exported from the **Generator**s' **Power Generating Facilities**, and for any energy imported. For this purpose the **Generator** will need contracts with one or more **Supplier**s, and where the **Supplier** does not provide it, a meter operator agreement with the appropriate provider.

5.1~~8~~9 **Generator**s wishing to trade ancillary services for National Grid purposes will need appropriate contracts in place with National Grid in its role as Great Britain System Operator.

5.20~~19~~ In **GB** law, **Electricity Storage** is treated just as generation. Accordingly, this EREC G99 includes **Electricity Storage** in the definition of a **Generating Unit** and Annex A.4 details certain requirements which do not apply to **Electricity Storage** devices.

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9 Network Connection Design and Operation

9.1 General Criteria

9.1.1 As outlined in Section 5, **DNO**s have to meet certain statutory and **Distribution Licence** obligations when designing and operating their **Distribution Network**s. These obligations will influence the options for connecting **Power Generating Module**s.

9.1.2 The technical and design criteria to be applied in the design of the **Distribution Network** and **Power Generating Module** connection are detailed in this document and DPC 4 of the **Distribution Code**. The criteria are based upon the performance requirements of the **Distribution Network** necessary to meet the above obligations.

9.1.3 The **Distribution Network**, and any **Power Generating Module** connection to that network, shall be designed:

a) to comply with the obligations (to include security, frequency and voltage; voltage disturbances and harmonic distortion; auto reclosing and single phase protection operation).

b) according to design principles in relation to **Distribution Network**'s plant and equipment, earthing, voltage regulation and control, and protection as outlined in DPC4, subject to any **Modification** to which the **DNO** may reasonably consent.

9.1.4 **Power Generating Module**s should meet a set of technical requirements in relation to its performance with respect to frequency and voltage, control capabilities, protection coordination requirements, **Phase (Voltage) Unbalance** requirements, neutral earthing provisions, islanding and **Black Start Capability** as applicable. The technical connection requirements in this chapter are common to all **Power Generating**

[3] see http://www.opsi.gov.uk/si/si2001/20013270.htm

Modules.

9.1.5 In addition requirements for **Type A Power Generating Module**s are detailed in Section 11. Requirements for **Type B Power Generating Module**s are detailed in Section 12. Requirements for **Type C and Type D Power Generating Module**s are detailed in Section 13.

9.1.6 The **Reactive Power** and voltage control requirements are given in Section 11, Section 12 and Section 13 for **Type A Power Generating Module**s, **Type B Power Generating Module**s, and **Type C** and **Type D Power Generating Module**s respectively. They are summarised in Table D.4 for information.

9.1.7 Every **Power Generating Module** and any associated equipment must be designed and operated appropriately to comply with cyber security requirements. As a minimum the recommendations in "ENA and Department for Business, Energy and Industrial Strategy (BEIS) Distributed Energy Resources (DER) – Cyber Security Connection Guidance" (where applicable) and the relevant principles for cybersecurity from PAS 1879 "Energy smart appliances – Demand side response operation – Code of practice" should be implemented.

9.1.8 As explained in 2.13 **DNOs** may relax certain aspects of section 9 for island operation, and section 5.7 during **Black Start**.

…

9.6 Island Mode

9.6.1 There are two specific instances of island mode to be considered:

(a) where the **Generator** wishes to deliberately move from the long-term parallel mode of operation to the situation where the **Generator**'s **Power Generating Module**(s) is arranged to supply just the load presented by the **Customer's Installation**, with the **Customer's Installation** disconnected from the **DNO**'s **Distribution Network**; or

(b) where one or more **Power Generating Module**s, belonging to one or more **Generator**s, support an isolated part of the **DNO**'s **Distribution Network**, maintaining supplies to other **Customer**s of the **DNO**.

9.6.2 Customer's Installation Island

9.6.2.1 Wherever a **Generator**'s **Power Generating Module** runs in parallel with the **DNO**'s **Distribution Network** for more than 5 minutes per month, the design of the **Power Generating Module** and the **Customer's Installation** must meet the requirements for long-term parallel operation and comply with all the appropriate requirements of this EREC G99.

2.1.1.2 Where a **Generator** intends to operate the **Power Generating Module** so that it supplies just the **Customer's Installation**, it is the **Generator**'s responsibility to ensure the safety of the **Customer's Installation** in respect of electrical and general safety.

2.1.1.3 The arrangements of Figures 8.6 (HV) and 8.9 (LV) will generally be appropriate for earthing and switching arrangements. Exact designs of **Customer's Installation**s will vary, but the functional requirements of these figures should be implemented.

2.1.1.4 It is the **Generator**'s responsibility to ensure appropriate and safe synchronisation to, and disconnection from, the **DNO**'s **Distribution Network**, respecting the requirements of EREC P28 on voltage disturbances on the **DNO**'s **Distribution Network**.

9.6.3 DNO Distribution Network Island

9.6.3.1 The provisions of this section 9.6.3 apply to situations where island mode operation is envisaged both for the mutual benefit of **DNOs** and relevant **Generators**. For **Black Start Stations**, additional or conflicting

technical requirements may be imposed, again by mutual agreement, and recorded in the **Black Start** services contract.

~~9.6.3.1~~9.6.3.2 A fault or planned outage, which results in the disconnection of a **Power Generating Module**, together with an associated section of **Distribution Network**, from the remainder of the **Total System**, creates the potential for island mode operation. It will be necessary for the **DNO** to decide, dependent on local network conditions, if it is desirable for the **Generator**s to continue to generate onto the islanded **DNO**'s **Distribution Network**. The key potential advantage of operating in island mode is to maintain continuity of supply to the portion of the **Distribution Network** containing the **Power Generating Module**. The principles discussed in this section generally also apply where **Power Generating Module**s on a **Generator**'s site is designed to maintain supplies to that site in the event of a failure of the **DNO** supply.

…

10 Protection

10 General

10.1.1 The main function of the protection systems and settings described in this document is to prevent the **Power Generating Module** supporting an islanded section of the **Distribution Network** when it would or could pose a hazard to the **Distribution Network** or **Customer**s connected to it. The settings recognize the need to avoid nuisance tripping and therefore require a two stage approach where practicable, ie to have a long time delay for smaller excursions that may be experienced during normal **Distribution Network** operation, to avoid nuisance tripping, but with a faster trip, where possible, for greater excursions.

10.1.2 In accordance with established practice it is for the **Generator** to install, own and maintain this protection. The **Generator** can therefore determine the approach, ie per **Power Generating Module** or per installation, and where in the installation the protection is sited.

10.1.3 Where a common protection system is used to provide the protection function for multiple **Power Generating Module**s the complete installation cannot be considered to comprise **Fully Type Tested Power Generating Module**s if the protection and connections are made up on site and so cannot be factory tested or **Type Tested**. If the units or **Power Generating Module**s are specifically designed to be interconnected on site via plugs and sockets, then provided the assembly passes the function tests required in Form A2-4 (Annex A.2), the **Power Generating Module**s can retain **Type Tested** status.

10.1.4 **Type Tested Interface Protection** shall have protection settings set during manufacture. An **Interface Protection** device or relay can only be considered **Type Tested** if:

(a) The frequency and LoM protection settings are factory set in firmware by the **Manufacturer** to those in Table 10.1 and cannot be changed outside the factory (except as provided by (e) below).

(b) The voltage protection settings are factory set to those in Table 10.1 and can be changed by agreement with the **DNO** and by personnel specifically instructed by the **Generator** to make this change.

(c) The access by the personnel specifically instructed shall be controlled by a password, pin or a physical switch that has the facility to be sealed.

(d) Any **Interface Protection** device functionality other than the voltage protection settings (eg such as any auto reclosing functionality) can only be changed by personnel specifically empowered to do so by the **Generator**.

(e) Any changes to device firmware etc, where **Type Tested** status is to be retained, outside of the original factory environment shall be undertaken by personnel specifically empowered and equipped for that task by the **Manufacturer**.

10.1.5 Once the **Power Generating Module**s has been installed and commissioned the protection settings shall only be altered following written agreement between the **DNO** and the **Generator**. Paragraphs 10.6.14 and 10.6.15 detail the protection setting calculation for non-standard **LV** connections and the display requirements respectively.

10.1.6 In exceptional circumstances additional protection may be required by the **DNO** to protect the **Distribution Network** and its **Customer**s from the **Power Generating Module**.

10.1.7 Note that where the **Generator** installs an export limitation scheme in accordance with EREC G100 the installation will also need to comply with the requirements of that EREC.

10.1.8 Where a **Generator** has entered into an agreement with the DNO for island mode operation or has entered into a **Black Start** services contract, the **DNO** and the **Generator** shall agree variations to the standard arrangements described in this Section 10 to the extent necessary to facilitate the island mode and/or **Black Start** services.

Engineering Recommendation G59

Recommendations for the Connection of Generating Plant to the Distribution Systems of Licensed Distribution Network Operators

2 Scope

2.1 This EREC provides guidance on the technical requirements for the connection of **Generating Plant** to the **Distribution System**s of licensed **DNO**s. For the purposes of this EREC, a **Generating Plant** is any source of electrical energy, irrespective of the prime mover and **Generating Unit** type. This EREC applies to all **Generating Plant** which is not in the scope of EREC G83 or is not compliant with EREC G83 requirements.[4] EREC G59 describes a simplified connection procedure for connection of a **Type Tested single Generating Unit** of less than 17kW per phase or 50kW three phase, or the connection of multiple **Type Tested Generating Units** with a maximum aggregate capacity of less than 17kW per phase or 50kW three phase, per **Customer** installation, provided that any existing connected **Generating Units** are also **Type Tested.** This EREC G59/3-7 is effective from 1 September 2019.

2.2 This EREC does not provide advice for the design, specification, protection or operation of **Generating Plant** itself. These matters are for the owners of plant to determine.

2.3 Specific separate requirements apply to **Generating Plant** comprising **Generating Unit**s less than or equal to 16A per phase and these are covered in EREC G83. However, **Generating Unit**s ≤16A per phase that have not been **Type Tested** in accordance with EREC G83 or whose technology type is not covered by one of the EREC G83 annexes should comply with the requirements set in this document. Section 6 of this document provides more guidance on how to apply this document to **Generating Unit**s that are below the 16A threshold but do not meet the requirements of EREC G83.

2.4 The connection of mobile generation owned by the **DNO**, EREC G83 compliant **Generating Unit**s or offshore **Transmission System**s containing generation are outside the scope of this Engineering Recommendation.

[4] Engineering Recommendation EREC G83 – Recommendations for the connection of small-scale embedded generators (up to and including 16 A per phase) in parallel with public low-voltage distribution networks. This Engineering Recommendation provides guidance on the technical requirements for the connection of **Generating Units** rated up to and including 16 A per phase, single or multi-phase, 230/400 Volts AC. The recommendations cover the connection of **Generating Units**, either single or multi-phase within a single Customer's installation up to the limit of 16A per phase, and multiple **Generating Unit**s in a close geographic region with a limit of 16A per phase in each customer installation, under a planned programme of work.

2.5 This document applies to systems where the **Generating Plant** can be paralleled with a **Distribution System** or where either the **Generating Plant** or a **Distribution System** with **Generating Plant** connected can be used as an alternative source of energy to supply the same electrical load.

2.6 The generic requirements for all types of **Generating Plant** within the scope of this document relate to the connection design requirements, connection application and notification process including confirmation of commissioning. The document does not attempt to describe in detail the overall process of connection from application, through agreement, construction and commissioning. It is recommended that the ENA publications entitled – "*Distributed Generation Connection Guides*" are consulted for more general guidance.

2.7 **Medium and Large Power Station**s are, in addition to the general requirements of this EREC, bound by the requirements of the **Grid Code**. In the case of **Large Power Station**s, the **Grid Code** will generally apply in full. For **Medium Power Station**s, only a subset of the **Grid Code** applies directly, and the relevant clauses are listed in DPC7 of the **Distribution Code**.

2.8 This EREC is written principally from the point of view of the requirements in Great Britain. There are some differences in the requirements in Great Britain and Northern Ireland, which are reflected in the separate Grid Codes for Great Britain and Northern Ireland, and the separate Distribution Code for Northern Ireland. These documents should be consulted where necessary, noting that the numbering of sections within these documents is not necessarily the same as in the **Distribution Code** for Great Britain and the **Grid Code** for Great Britain.

2.9 The separate synchronous network operating in the Shetland Isles has specific technical challenges which are different to those of the Great Britain synchronous network. This EREC is not in itself sufficient to deal with these issues

2.10 EREC G59/3-7 (ie this version of G59) has been updated to require Generators to apply a RoCoF setting of 1Hzs^{-1} , 500 ms delay, and remove vector shift as an allowable loss of mains (LoM) for all future generation and to retrospectively apply this RoCoF setting and retrospectively remove vector shift as an allowed loss of mains for all existing generation that is not Type Tested

2.11 Generation commissioned on after 27 April 2019 must comply with EREC G99. EREC G59 is not applicable to generation commissioned on or after that date.

2.12 **Generating Units** which by agreement between the **Generator** and the **DNO** will have the capability to run in island mode, as described in section 9.8 and including those providi9ng black start services to the **NETSO**, will need to comply with the general requirements of this EREG G59, although the specific technical requirements, particularly in relation to the earthing requirements of Section 8, the design requirements of Section 9 and the protection requirements of Section 10 shall be modified in accordance with any site-specific requirements that are specified in the agreement with the **DNO** and in any contract covering black start services.

…

5 Legal Aspects

5.1 The operation and design of the electricity system in Great Britain is defined principally by the Electricity Act (1989 as amended), the Electricity Safety Quality and Continuity Regulations (ESQCR) 2002, as well as general considerations under the Health and Safety at Work Act (HASWA) 1974 and the Electricity at Work Regulations (EaWR) 1989. A brief summary of the main statutory obligations on **DNO**s, **Generator**s and Users is included as Appendix 13.9.

5.2 Under section 21 of the Electricity Act, **Generator**s may be required to enter into a bespoke **Connection Agreement** with the **DNO**. Such a **Connection Agreement** will specify the terms and conditions including technical, operating, safety and other requirements under which **Generating Plant** is entitled to remain connected to the **Distribution System**. It is usual to include site specific commercial issues, including recovery of costs associated with the connection, GDUoS (**Generator** Distribution Use of System) charges and the applicable energy loss adjustment factors, in **Connection Agreement**s. It is also common practice by some **DNO**s to collect the technical issues into a subordinate "Technical and Operating Agreement" which is given contractual force by the **Connection Agreement**.

5.3 **DNO**s are required by their licences to have in force and comply with the **Distribution Code**. **Generators** will be bound by their licences or by their **Connection Agreements**, or both, to comply with the **Distribution Code**.

5.4 In accordance with DPC5.4 of the **Distribution Code**, when details of the interface between a **Generating Plant** and the **Distribution System** have been agreed a site responsibility schedule detailing ownership, maintenance, safety and control responsibilities will be drafted. The site responsibility schedule and operation drawing shall be displayed at the point of interconnection between the **DNO's** and **Generator's** systems, or as otherwise agreed.

5.5 The **DNO**s have statutory and licence obligations within which they have to offer the most economic, technically feasible option for connecting **Generating Plant** to their **Distribution System**s. The main general design obligations imposed on the **DNO**s are to:

a. maintain supplies to their **Customers** within defined statutory voltage and frequency limits;

~~b.~~a. ~~ensure that the **Distribution Systems** at all voltage levels are adequately earthed;~~

~~c.~~b. comply with the "Security of Supply" criteria defined in EREC P2;

~~d.~~c. meet improving standards of supply in terms of customer minutes lost (CMLs) and the number of customer interruptions (CIs);

d. ensure that the **Distribution Systems** at all voltage levels are adequately earthed;

e. facilitate competition in the connection, generation and supply of electricity.

5.6 Under conditions of Black Start it is recognized that DNOs may relax some or all of the requirements (a) to (c) of 5.6 for the duration of the Black Start event for the purpose of re-establishing a stable network.

5.7 Failure to meet any of the above obligations will incur legal or regulatory penalties. The first two criteria, amongst others, define the actions needed to allow islanded operation of the **Generating Plant** or to ensure that the **Generating Plant** is rapidly disconnected from the **Distribution System** under islanded conditions. The next two criteria influence the type of connection that may be offered without jeopardising regulated standards.

5.8~~7~~ General conditions of supply to **Customer**s are also covered by Regulation 23 of the ESQCR 2002. Under Regulation 26 of the ESQCR 2002 no **DNO** is compelled to commence or continue a supply if the **Customer's Installation** may be dangerous or cause undue interference with the **Distribution System** or the supply to other **Customer**s. The same regulation empowers the **DNO** to disconnect any part of the **Customer**'s **Installation** which does not comply with the requirements of Regulation 26. It should also be noted that each installation has to satisfy the requirements of the HASWA 1974 and the EaWR 1989.

5.9~~8~~ Regulations 21 and 22 of the ESQCR 2002 require installations that have alternative sources of energy to satisfy Regulation 21 in relation to switched alternative supplies, and Regulation 22 in the case of sources of energy running in parallel with the **Distribution System**.

5.10~~9~~ Under Regulation 22 of the ESQCR 2002, no person may operate **Generating Plant** in parallel with a public **Distribution System** without the agreement of the **DNO**.

5.110 All **Generator**s have to comply with the appropriate parts of the ESQCR.

5.121 The general requirements for **Generator**s wishing to connect their **Generating Plant** to a **Distribution System** are contained in the **Distribution Code.**

5.132 It is important to note that both the **Distribution Code** and **Grid Code** use the terms **Large, Medium and Small** in relation to **Power Station**s. These terms are defined in the Codes and various parts of the Codes apply to different size **Power Station**s, with generally no **Grid Code** requirements applying to **Small Power Station**s. Any collection of **Generating Plant** under the control of one owner or operator in one installation is classed in the Codes as a **Power Station**.

5.143 **Generators** with **Medium Power Station**s will have to comply with a few specific **Grid Code** clauses. The requirement for these clauses is contained in DPC7 of the **Distribution Code**.

5.154 **Power Stations** that are to be connected to a **Distribution System** and contain **Generating Unit**s that trade in the wholesale market as Balancing Mechanism Units or have for other reasons become a party to the Balancing and Settlement Code and/or National Grid's Connection and Use of System Code, will then have to comply with the **Grid Code** requirements for **Generating Plant**.

5.165 Information, which should assist **Generator**s wishing to connect to the **Distribution System** at **High Voltage (HV)**, will be published by the **DNO** in accordance with condition 25 of the **Distribution Licence**. This is known as the Long Term Development Statement (LTDS). The general form and content of this statement is specified by Ofgem and covers the existing **Distribution System** as well as authorised changes in future years on a rolling basis.

5.176 Under the terms of the Electricity Act 1989 (as amended), generation of electricity is a licensed activity, although the Secretary of State, may by order[5] grant exemptions. Broadly, generating stations of less than 50MW are automatically exempt from the need to hold a licence, and those between 50MW and 100MW may apply to the Department for Business, Energy and Industrial Strategy for an exemption if they wish.

5.187 **Generator**s who are licensed will be required to become parties to the Balancing and Settlement Code and to the Connection and Use of System Code. They will also be bound in their licences to comply with the **Grid Code** and the **Distribution Code**.

5.198 **Generator**s will need appropriate contracts in place for the purchase of any energy that is exported from the **Generator**s' **Power Station**s, and for any energy imported. For this purpose the **Generator** will need contracts with one or more **Supplier**s**,** and where the **Supplier** does not provide it, a meter operator agreement with the appropriate provider.

5.2019 **Generator**s wishing to trade ancillary services for National Grid purposes will need appropriate contracts in place with the National Grid Electricity Transmission in its role as Great Britain System Operator.

...

9 Network Connection Design and Operation

9.1 General Criteria

9.1.1 As outlined in Section 5, **DNO**s have to meet certain statutory and **Distribution Licence** obligations when designing and operating their **Distribution System**s. These obligations will influence the options for connecting **Generating Plant**.

[5] see http://www.opsi.gov.uk/si/si2001/20013270.htm

9.1.2 The technical and design criteria to be applied in the design of the **Distribution System** and **Generating Plant** connection are detailed within the Distribution Planning and Connection Code (DPC) and the standards listed in Annex 1 of the **Distribution Code**. The criteria are based upon the performance requirements of the **Distribution System** necessary to meet the above obligations.

9.1.3 The **Distribution System**, and any **Generating Plant** connection to that System, shall be designed,

a. to comply with the obligations (to include security, frequency and voltage; voltage disturbances and harmonic distortion; auto reclosing and single phase protection operation).

b. according to design principles in relation to **Distribution System**'s plant and equipment, earthing, voltage regulation and control, and protection as outlined in DPC4, subject to any modification to which the **DNO** may reasonably consent.

9.1.4 **Generating Plant** should meet a set of technical requirements in relation to its performance with respect to frequency and voltage, control capabilities, protection coordination requirements, phase voltage unbalance requirements, neutral earthing provisions, islanding and black start capability. These requirements are listed in DPC7.4 of the **Distribution Code**.

9.1.5 There are additional performance requirements that are specified in the **Grid Code** for all embedded **Medium and Large Power Station**s. The requirements for **Medium Power Station**s are referenced in DPC7.5 of the **Distribution Code**, and are all listed in CC3.3 to CC3.5 of the **Grid Code**.

9.1.6 As explained in 2.12 **DNOs** shall relax certain aspects of section 9 for island operation, and section 5.7 during a black start.

9.8 Island Mode

9.8.1 The provisions of this section 9.6.3 apply to situations where island mode operation is envisaged both for the mutual benefit of **DNOs** and relevant **Generators**. For **Generators** providing black start services, additional or conflicting technical requirements may be imposed, again by mutual agreement, and recorded in the black start services contract.

9.8.2 A fault or planned outage, which results in the disconnection of a **Generating Unit**, together with an associated section of **Distribution System**, from the remainder of the **Total System**, creates the potential for island mode operation. The key potential advantage of operating in Island Mode is to maintain continuity of supply to the portion of the **Distribution System** containing the **Generating Unit**. The principles discussed in this section generally also apply where **Generation Plant** on a **Customer**'s site is designed to maintain supplies to that site in the event of a failure of the **DNO** supply.

…

10 Protection

10.1 General

10.1.1 The main function of the protection systems and settings described in this document is to prevent the **Generating Plant** supporting an islanded section of the **Distribution System** when it would or could pose a hazard to the **Distribution System** or **Customers** connected to it. The settings recognize the need to avoid nuisance tripping and therefore require a two stage approach where practicable, ie to have a long time delay for smaller excursions that may be experienced during normal **Distribution System** operation, to avoid nuisance tripping, but with a faster trip for greater excursions.

10.1.2 In accordance with established practice it is for the **Generator** to install, own and maintain this protection. The **Generator** can therefore determine the approach, ie per **Generating Unit** or per installation, and where in the installation the protection is sited.

Where a common protection system is used to provide the protection function for multiple **Generation Unit**s the complete installation cannot be considered to comprise **Type Tested Generating Unit**s as the protection and connections are made up on site and so cannot be factory tested or **Type Tested**.

10.1.3 In exceptional circumstance additional protection may be required by the **DNO** to protect the **Distribution System** from the **Generating Plant**.

10.1.4 Where a **Generator** has entered into an agreement with the **DNO** for island mode operation or has entered into a black start services contract, the **DNO** and the **Generator** shall agree variations to the standard arrangements described in this Section 10 to the extent necessary to facilitate the island mode and/or black start services.

System Operator – Transmission Owner (STC) Code, specifically STC Procedure 06-1

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 recovery of 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 formed through Local Joint Restoration Plans (LJRPs) and any Power Islands created under them, and/or Distribution Restoration Zone Plans (DRZPs) and associated Power Islands created under them. These arrangements onlyonly include sites from within a single Transmission Area. No offshore networks currently include a nominated Black Start station.

1.1.3 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.

1.1.4 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.

1.1.5 This document covers the restoration of the Total System following a Partial Shutdown or Total Shutdown in accordance with the Local Joint Restoration Plans and/or Distribution Restoration Zone Plans. The restoration process may include an onshore TO carrying out the processes set out in Local Joint Restoration Plans and/or Distribution Restoration Zone Plans.

1.1.6 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.

1.1.7 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.

3 Procedure

3.1 Responsibilities

3.1.1 NGESO shall establish the overall Black Start for the TOs' Transmission Systems. This shall require Black Start Stations and other Power Stations to be party to Local Joint Restoration Plans or Anchor Plant and Restoration Service Providers to be party to Distributed Restoration Zone Plans (DRZP). Where an offshore network connects within an onshore network ~~:-~~

- and the offshore Transmission network is covered by a Local Joint Restoration Plan (LJRP) then 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 3.54.11 or ~~,~~ 3.54.12 ~~or 3.4.14~~ and NGESO have taken control of co-ordination of the interconnection of both systems;~~-~~or,~~-~~
- the embedded offshore Transmission network is covered by a Distribution Restoration Zone Plan (DRZP) then the offshore TO shall not be party to the Distribution Restoration Zone Plan and the offshore TO network will not be connected to the Distribution network until the DRZP has been terminated as outlined in sections 3.5.11 or 3.5.12 and NGESO have re-established control of the offshore Transmission network.

3.1.2. NGESO shall establish Local Joint Restoration Plans and Distribution Restoration Zone Plans (as described in this document) and associated Ancillary Service Agreements.

3.1.3 Local Joint Restoration Plans and Distribution Restoration Zone Plans shall be agreed by NGESO, the relevant onshore TO, ~~and~~ any relevant Users and Restoration Service Providers.

3.1.4 NGESO shall provide the onshore TO with a signed copy of each Local Joint Restoration Plan and/or Distribution Restoration Zone Plan relevant to that TO's Transmission System. Where an offshore network connects within an onshore network covered by a Local Joint Restoration Plan (LJRP) or Distribution Restoration Zone Plan, the offshore TO shall receive a copy of the agreed LJRP and/or DRZP 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 and Distribution Restoration Zone 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 or Distribution Restoration Zone Plan.

3.1.7 NGESO shall regularly review, update and re-issue ~~the~~ Local Joint Restoration Plans and/or Distribution Restoration Zone Plans as necessary.

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

3.1.9 In Scotland, the relevant onshore TO shall implement the Local Joint Restoration Plans and/or 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 the Black Start through:

- agreeing the implementation of the Local Joint Restoration Plans and/or Distribution Restoration Zone 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, Restoration Service Providers and offshore TOs shall abide with the Local Joint Restoration Plans and/or Distribution Restoration Zone Plans.

3.1.13 NGESO shall periodically carry out Black Start and remote synchronisation tests and Anchor Plant tests in accordance with the requirements of OC5.7 of the Grid Code. In either case ~~and~~ NGESO will advise the onshore TO of these. The relevant TO shall co-operate with NGESO in facilitating these tests including the provision of additional staff and resources when identified as needed by NGESO. NGESO shall procure that relevant Users, Restoration Service Providers and offshore TOs co-operate in facilitating such tests.

3.2 Local Joint Restoration Plans

3.2.1 Description of 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 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.

3.2.1.2 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.

3.2.1.3 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.

3.2.1.4 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) that shall energise parts of the Transmission System, and meet complementary demand, so as to form a Power Island.

3.2.1.5 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.

3.2.1.6 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 other than those at Black Start Stations.

3.2.1.7 A Local Joint Restoration Plan shall include the agreed methods and procedures that an 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 shall be available to energise the National Electricity Transmission System and meet demand blocks;
- Generating Units, other than those at Black Start Stations, 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 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.

3.2.1.8 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, 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.

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
3.2.2.4 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 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.

3.2.3 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, which NGESO reasonably require, 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 Generators, including those for Power Stations other than the Black Start Stations, which NGESO reasonably require, 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 0 shall apply to discussions held under 0 and 0 and to any consequent changes.

3.2.3.4 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.

3.2.4 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 Plant Owners and Restoration Service Providers. This may require the relevant onshore TO to issue instructions to Network Operators to initiate a Distribution Restoration Zone who as part of this process will instruct Anchor Plant Owners and Restoration Service Providers that are party to the relevant Distribution Restoration Zone Plan and to liaise with any embedded offshore TO connecting within the network covered by the DRZP to the extent required to disconnect the offshore network from the onshore Network Operator's System prior to DRZP implementation.

3.3.1.2 Distribution Restoration Zone Plans and any Power Islands created under them shall only include sites from within a single onshore Transmission Area (unless an Annex to the DRZP exists for a defined restoration route and is signed, and agreed, by all affected TOs, User's and Restoration Service Providers). Where an embedded offshore transmission network connects within an onshore

Distribution Network Operators System covered by a Distribution Restoration Zone Plan (DRZP) the offshore TO will not participate in the Distribution Restoration Zone Plan apart from facilitating disconnection from the Network Operator's system.

3.3.1.3 The Distribution Restoration Zone Plan shall include a record of which TO, which DNO, which onshore TO sites and which DNO 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.

3.3.1.4 The Distribution Restoration Zone Plan shall include the provision for the creation of Power Islands within onshore Distribution Networks and may also provide for, TO Transmission areas and may require the despatch of Restoration Service Providers other than Anchor Plant.

3.3.1.5 A Distribution Restoration Zone Plan shall include the agreed methods and procedures that a Network Operator shall use to restore that Distribution Network Operators 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;
- Restoration Service Providers 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 any other Restoration Service Providers 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.

3.3.1.6 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 Distribution Network Operator identifies a requirement for a new Distribution Restoration Zone Plan, the relevant Distribution Network Operator shall discuss and agree such a plan with NGESO, the relevant onshore TO and relevant Restoration Service Providers.

3.3.2.2 Each Distribution Restoration Zone Plan shall be prepared by the relevant Distribution Network Operator to reflect the above discussions and agreement. NGESO and onshore TO shall support the relevant Distribution Network Operator in developing the Distribution Restoration Zone Plans, including the provision of relevant information, data and resources, where necessary.

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 Distribution Network Operator shall also send the prepared DRZP to Restoration Service Providers (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. NGESO and the relevant Distribution Network Operator shall procure that those parties involved (including Anchor Plant Owners and relevant Restoration Service Providers also sign to confirm agreement

Once signed by the relevant parties, the Distribution Restoration Zone Plan shall apply between the

relevant Distribution Network Operator, NGESO and the relevant TO as if it were part of this STCP.

3.3.2.5 NGESO (upon receipt of the Distribution Restoration Zone Plan) shall distribute a signed copy of the new Distribution Restoration Zone Plan to each relevant onshore TO and Restoration Service Provider (including Anchor Plant Owners) indicating the date of implementation. Where an embedded offshore network connects within a Distribution network covered by a Distribution Restoration Zone (DRZP) the offshore TO will also be provided with a copy of the DRZP by NGESO for information.

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 NGESO and NGESO shall then initiate such discussions with the TO, Distribution Network Operator and other affected parties to seek agreement for that change. NGESO in coordination with the relevant Distribution Network Operator shall procure 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. Where an embedded offshore network is covered by a DRZP, even though the offshore network will not form an active part of the DRZP, the offshore TO may be invited to participate in the discussions initiated by NGESO.

3.3.3.2 The principles applied in section 0 shall apply to discussions held under 0 and to any consequent changes.

3.3.3.3 When changes to a Distribution Restoration Zone Plan are agreed, NGESO shall update and reissue that Distribution Restoration Zone Plan to the relevant onshore TO, those parties who are signatories to the Plan and other affected parties indicating the issue number and the date that any change takes effect.

3.3.4 Failure to Agree

3.3.4.1 If NGESO or the relevant onshore TO do not agree on a Distribution Restoration Zone Plan, NGESO shall develop and agree its own restoration plan.

~~3.3~~3.4 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 Network Operators, relevant Restoration Service Providers (including Anchor Plant Owners), 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 Black Start Procedure

~~3.4.1~~3.5.1In the event of a Total Shutdown or Partial Shutdown, NGESO shall, as soon as reasonably practicable, notify the relevant onshore TO, Users and other affected parties (including relevant Restoration Service Providers) that a Total Shutdown or a Partial Shutdown exists and that Local Joint Restoration Plan and/or a Distribution Restoration Zone Plan shall be implemented.

~~3.4.2~~3.5.2 Where voice communication between NGESO and the relevant onshore TO and/or Users and/or relevant Restoration Service Providers is not available and prevents NGESO from invoking Black Start, the provisions of section 3.6~~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 party to the Local Joint Restoration Plan 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 Distribution Network Operator undertaking an assessment of the Distribution Network to ensure the network is in a position to establish a Distribution Restoration Zone and that Anchor Plant Owners and relevant Restoration Service Providers 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.

~~3.4.3.2~~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. In the case of an embedded offshore network ~~connectinembedded in to~~ a Distribution Network, the onshore TO shall, as necessary, liaise with the offshore TO and Distribution Network Operator 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 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. Where the availability and capability of the onshore TO's Transmission System and Network Operators' Systems, and the availability of~~-~~ Anchor Plant and Restoration Service Provider'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 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 or DZRP, it shall execute and progress the appropriate Local Joint Restoration Plan or DZRP in accordance with its obligations under th~~at LJRP~~ose plans.~~ Equally, When the relevant onshore TO has been given the authority to implement the~~

~~3.4.3.6~~3.5.3.6 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. Where an embedded offshore Transmission network ~~connects to~~is connected to~~embedded in~~ a Distribution Network Operator's System covered by a Distribution Restoration Zone Plan (DRZP) the onshore TO shall liaise with the relevant Network Operator and offshore TO to confirm the intention to implement the DRZP and the ~~disconnection~~de-energization of the offshore network until the DRZP is terminated and operational control is transferred back to NGESO

~~3.4.3.7~~3.5.3.7 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 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 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 undertaken an assessment of the Distribution Network to ensure the network is in a position to establish a Distribution Restoration Zone and that Anchor Plant Owners and relevant Restoration Service Providers 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. Where an embedded offshore transmission network connects to a Distribution Network Operators System covered by a Distribution Restoration Zone Plan (DRZP) NGESO shall as necessary, liaise with the offshore TO and Distribution Network Operator to confirm the status of the connection between the Distribution Network and offshore transmission network.

~~3.4.4.4~~3.5.4.4 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. Where an embedded offshore transmission network is connected to a Distribution Network Operator's System covered by a Distribution Restoration Zone Plan (DRZP) NGESO shall liaise with the relevant Network Operator and offshore TO to confirm the intention to implement the DRZP and the de-energization of the embeddd offshore network until the DRZP is terminated and operational control is transferred back to NGESO.

3.5.4.5 W~~w~~hen implementing a Local Joint Restoration Plan, NGESO shall carry out operational liaison, with Black Start Stations and Generators party to the Local Joint Restoration Plan in accordance with the provisions of the Local Joint Restoration Plan. 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 the following frequency and voltage criteria unless abnormal conditions prevail:

- the frequency on the ~~Transmission~~ Total 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%.
-

~~3.4.6~~3.5.6During 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~~3.5.7At any time during the implementation of the Local Joint Restoration Plan or Distribution Restoration Zone Plan, the onshore TO shall advise NGESO 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~~3.5.8At 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, NGESO (upon advice from a 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. NGESO shall notify the relevant Network Operator, relevant onshore TO and any other affected parties of the termination of the Distribution Restoration Zone Plan

~~3.4.9~~3.5.9At 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 received advice from 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~~3.5.10The 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 becomes available, such that additional Power Islands can be established in accordance with the relevant Local Joint Restoration Plan or relevant 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 onshore 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 or 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. 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 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 Black 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 Distribution 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 through a prescribed Distribution Restoration Zone Plan Annex

~~3.4.12~~3.5.12 Completion of Black Start

~~3.4.12.1~~3.5.12.1 When the Black Start is complete NGESO shall formally notify the TOs and Users (including Distribution Network Operators who have invoked a Distribution Restoration Zone) that the 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 Black Start conditions, the onshore TO where possible, may choose to invoke the LJRP(s) or~~d~~ DRZP(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) and Distribution Restoration Zones.

~~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 Black 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 Black Start condition. The TO shall make

available appropriately skilled personnel to complete the prescribed Black Start training.

~~3.7~~3.8 Black Start Testing

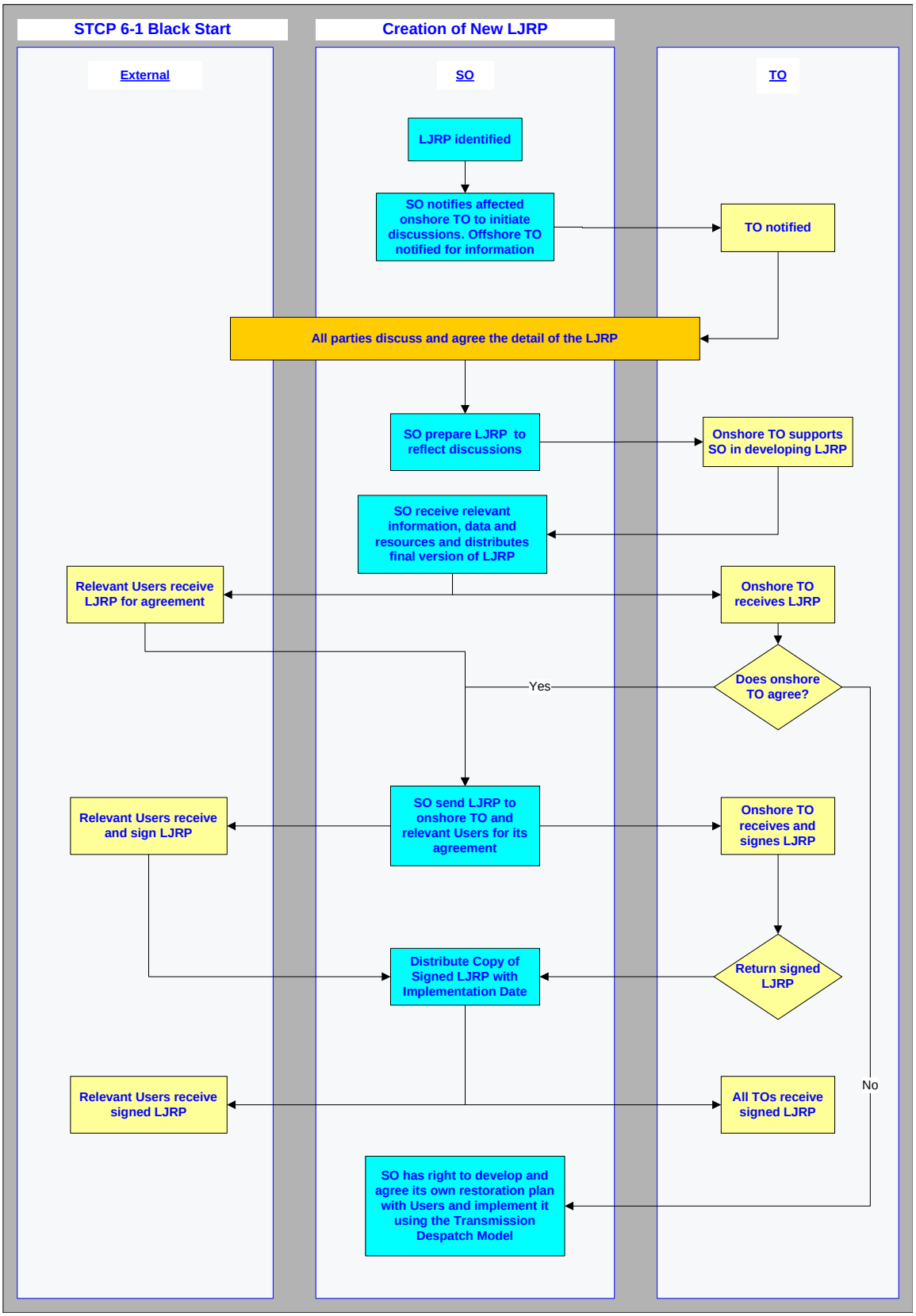
~~3.7.1~~3.8.1 NGESO shall carry out Black Start and other related Tests on a routine basis. All Black Start or related Tests shall be carried out in accordance with the provision of STCP 08-3 Operational Tests and System Tests.

~~3.8~~3.9 Black Start Test Bookings

~~3.8.1~~3.9.1 Black 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.

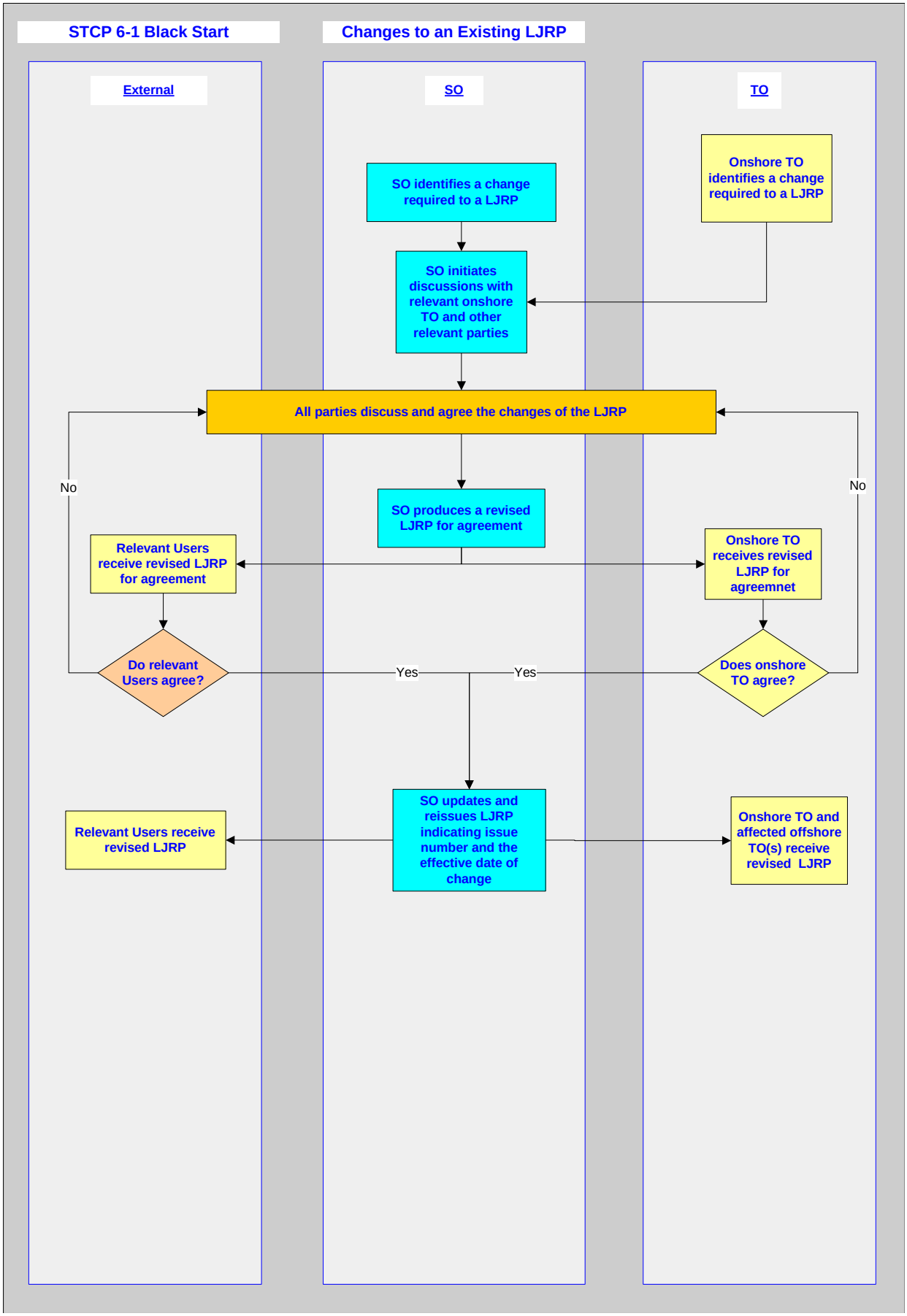


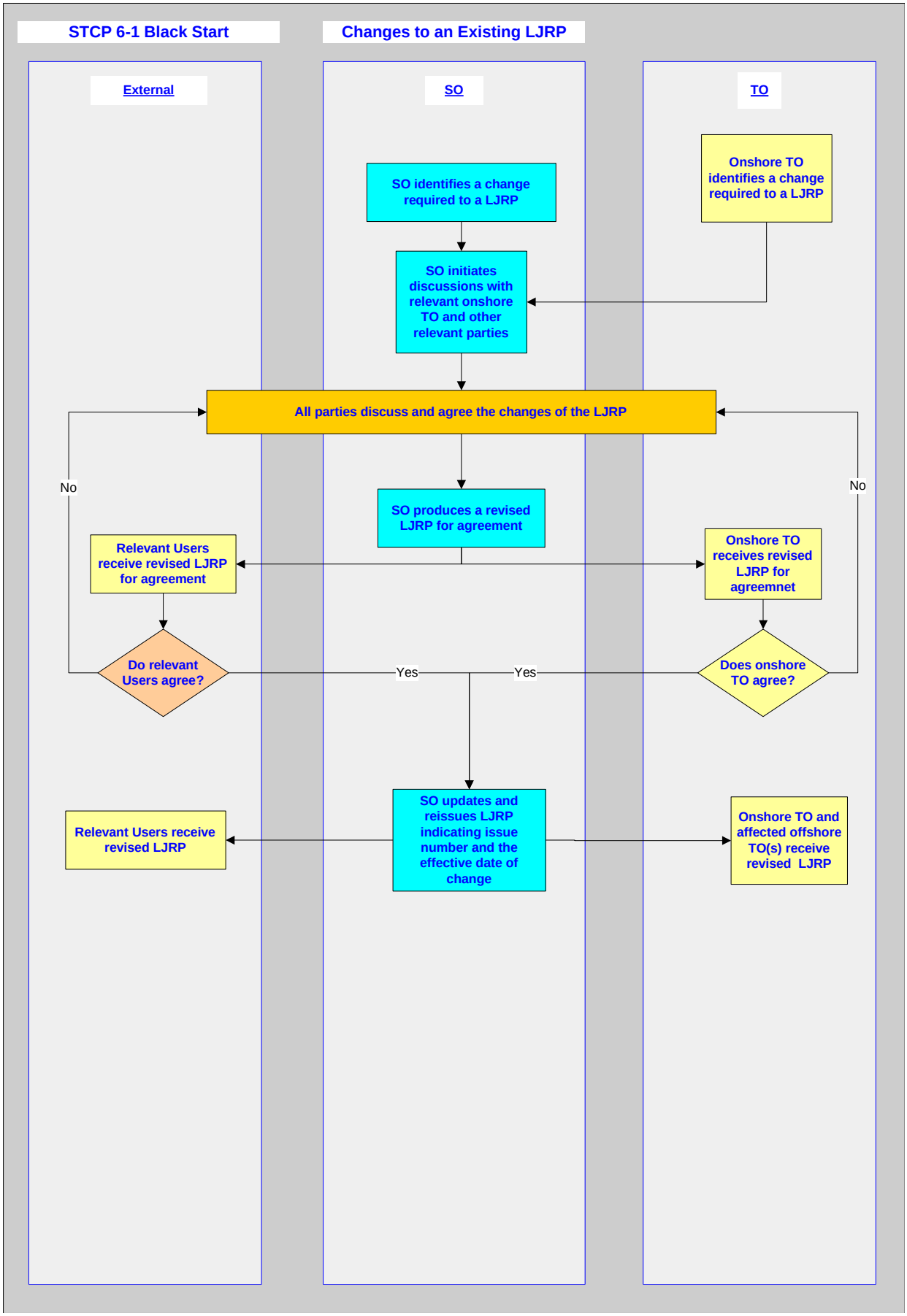
Distributed ReStart in partnership with

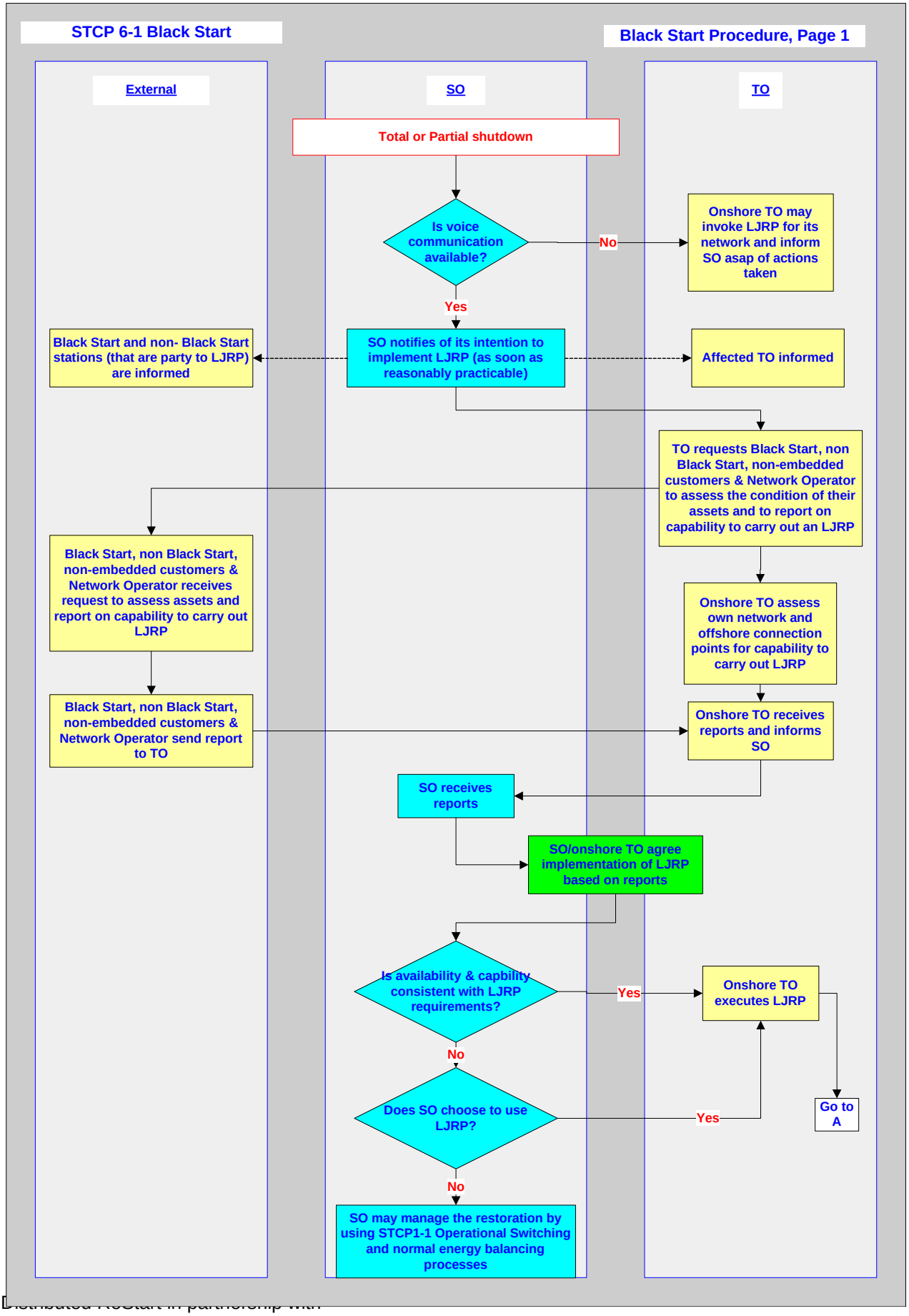
tnei

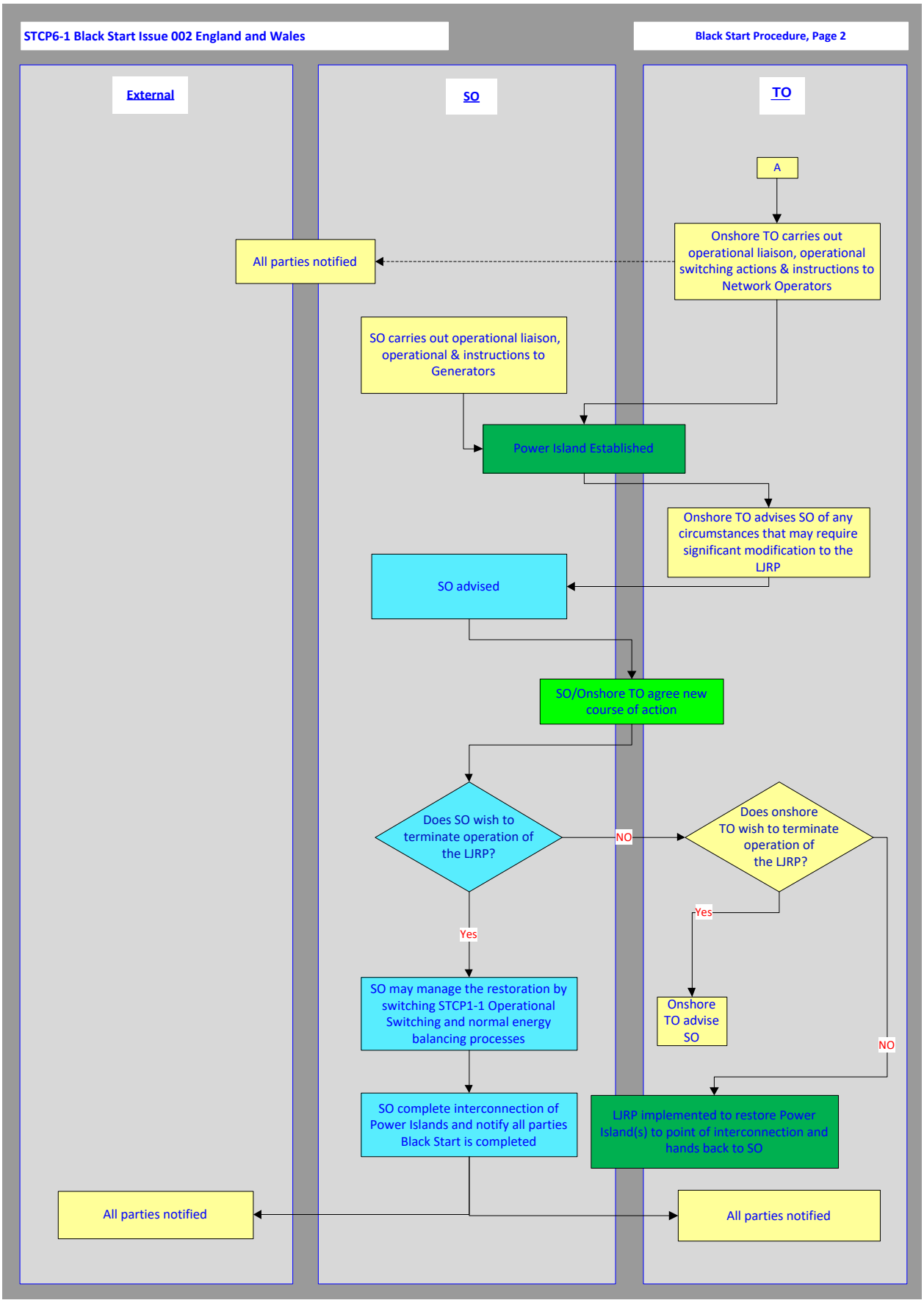
SP ENERGY NETWORKS

nationalgridESO


STCP 6-1 Black Start
Changes to an Existing LJRP
External
SO
TO
SO identifies a change required to a LJRP
Onshore TO identifies a change required to a LJRP
SO initiates discussions with relevant onshore 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
Onshore TO receives revised LJRP for agreemnet
Do relevant Users agree?
Yes
Yes
Does onshore TO agree?
SO updates and reissues LJRP indicating issue number and the effective date of change
Relevant Users receive revised LJRP
Onshore TO and affected offshore TO(s) receive revised LJRP


STCP 6-1 Black Start
Changes to an Existing LJRP
External
SO
TO
SO identifies a change required to a LJRP
Onshore TO identifies a change required to a LJRP
SO initiates discussions with relevant onshore 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
Onshore TO receives revised LJRP for agreemnet
Do relevant Users agree?
Yes
Yes
Does onshore TO agree?
SO updates and reissues LJRP indicating issue number and the effective date of change
Relevant Users receive revised LJRP
Onshore TO and affected offshore TO(s) receive revised LJRP


STCP 6-1 Black Start
Black Start Procedure, Page 1
External
SO
TO
Total or Partial shutdown
Is voice communication available?
No
Onshore TO may invoke LJRP for its network and inform SO asap of actions taken
Yes
Black Start and non- Black Start stations (that are party to LJRP) are informed
SO notifies of its intention to implement LJRP (as soon as reasonably practicable)
Affected TO informed
TO requests Black Start, non Black Start, non-embedded customers & Network Operator to assess the condition of their assets and to report on capability to carry out an LJRP
Black Start, non Black Start, non-embedded customers & Network Operator receives request to assess assets and report on capability to carry out LJRP
Onshore TO assess own network and offshore connection points for capability to carry out LJRP
Black Start, non Black Start, non-embedded customers & Network Operator send report to TO
Onshore TO receives reports and informs SO
SO receives reports
SO/onshore TO agree implementation of LJRP based on reports
Is availability & capbility consistent with LJRP requirements?
Yes
Onshore TO executes LJRP
No
Does SO choose to use LJRP?
Yes
Go to A
No
SO may manage the restoration by using STCP1-1 Operational Switching and normal energy balancing processes


STCP6-1 Black Start Issue 002 England and Wales
Black Start Procedure, Page 2
External
SO
TO
A
Onshore TO carries out operational liaison, operational switching actions & instructions to Network Operators
All parties notified
SO carries out operational liaison, operational & instructions to Generators
Power Island Established
Onshore TO advises SO of any circumstances that may require significant modification to the LJRP
SO advised
SO/Onshore TO agree new course of action
Does SO wish to terminate operation of the LJRP?
NO
Does onshore TO wish to terminate operation of the LJRP?
Yes
Yes
SO may manage the restoration by switching STCP1-1 Operational Switching and normal energy balancing processes
Onshore TO advise SO
NO
SO complete interconnection of Power Islands and notify all parties Black Start is completed
LJRP 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 2022**.

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

Distribution Connection and Use of System Agreement (DCUSA)

Cornwall Insight supported the review of the DCUSA and highlighted the potential areas for change.

Areas of possible change identified

Cornwall Insight identified the following areas of the DCUSA which could potentially require changes based on the designs of the Distributed ReStart project, which are discussed in the main part of the P&C report:

- **1A Preliminary** – potential need for new defined terms as a result of the other changes.
- **2A Distributor to Supplier/Generator Relationships** – May have to change if Distributed Restart participation changes the terms of the generator relationship with the distributor.
- **2B Distributor to Distributor/OTSO Relationships –** If Distributed Restart generators are located on IDNO networks, or utilising Distributed Restart capability may affect DNO and IDNO networks, there may be clauses in IDNOs' BCAs that are affected.
- **Schedule 4 Billing and Payment Disputes –** If changes are made to sections 2A and/or 2B then consequential updates will be required to Schedule 4 to reflect these changes.
- **Schedules 15, 16, 17 and 18 (charging methodologies) –** These methodologies may need to be amended if Distributed Restart costs will be recovered through DUoS.
- **Schedule 9 Accession Agreement and Schedule 11 Party Details** – The DCUSA has very limited links between DNOs and non-CVA distributed generators, and currently SVA generators are not DCUSA parties. If the Distributed Restart providers are SVA registered but need to be DCUSA parties/ covered by DCUSA arrangements, this will require changes to implement.

Detailed DCUSA changes required based on final designs

Cost recovery:

- As the operational/ utilisation costs of Distribution Restoration will be recovered through BSUoS there is no need to change the DCUSA charging methodologies for operational cost recovery.
- Investment/ shared use asset costs will be captured via the RIIO-ED price controls and recovered via DUoS as other price control costs are.
- Depending on how the investment costs are covered under the price control, this may require changes to the DCUSA. We understand that it will be for individual DNOs to decide how best to factor costs into their business plans. However, for information we note the two main ways there could be an explicit price control "cost line":
    1. In the Price Control Financial Model as part of the build up of TOTEX feeding into base revenue
        - No DCUSA changes will be necessary as the charging methodology takes base revenue as an input
    2. As a separate pass-through line
        - A DCUSA change will be needed as the charging methodology takes each pass-through line as an input, so will effectively need a new input for Distribution Restoration costs. This would be a minor change to Schedule 15
- In our opinion option 1 would be more straightforward, and given the expected level of costs experienced by the DNOs, likely more suitable
- Option 2 could improve the transparency of Distribution Restoration costs by individually breaking them out. However, this would need to be balanced against the complexity of the TOTEX calculations and the need to reflect the updated pass-through lines in both the charging models and revenue forecasts

1. The change modification would need to be raised following the confirmation of the treatment of Distribution Restoration costs under RIIO and not before. We expect this would be undertaken by the DNOs.
2. Similar changes have been progressed effectively as housekeeping changes to keep DCUSA and licence aligned so should be straightforward to progress

Generator actions during market suspension:

- Where a Distribution Restoration generator takes actions to re-energise the system it will face costs for doing so, including costs associated with the DCUSA.
    - This could include Distribution Use of System (DUoS) costs if in a zone with Generator DUoS (GDUoS) charges in future depending on the exact future arrangements and potentially exceeded capacity charges (for example if a Behind the Meter generator exports at full volume to support re-energisation when normally its exports would be limited by on-site demand).
- Given the intended role of Distribution Restoration to support re-energising the system, we have assumed that it would not be desirable for generators to face network costs as a result of actions taken under their contract.
- There are two potential ways in which we consider these costs could be treated:
    - Contractually mitigated – the generator party would incur the costs as standard and then would have any incurred costs reimbursed to them under their Distribution Restoration contract to ensure they do not face a cost to supporting system restart. Generators would have to price these expected costs into their bids for Distribution Restoration contracts.
    - Mitigated in DCUSA – modifications could be made such that, in the event of a system shutdown and Black Start event, distribution charges are not levied on parties acting under Distribution Restoraiton contracts. Alternatively, the specific charging sections could be modified to set out the specific circumstances in which each charge should not apply in relation to Distribution Restoration.
- Cornwall Insight considered that as with other issues, resolving this via the contractual arrangements would be the preferred option.
    - Costs could be recovered through BSUoS as per other Distribution Restoration operational costs and paid to the generator.
    - Resolving via DCUSA would require complex DCUSA changes specifying the circumstances in which charges would not apply.
    - Those DCUSA changes would likely then drive a need for distributors to undertake potentially costly upgrades to their billing systems (and likewise supplier validation systems) to correctly “dis-apply” charges following a Restart event.
    - Contractual arrangements would also allow future proofing against future charging changes via a broader clause to make generators “whole” for distribution charges as opposed to specific drafting required for the Code.
- However, if the Distributed ReStart project does wish to resolve this issue via DCUSA we would recommend a new section similar to Section G “Contingencies” in the BSC arrangements would be preferable to modifying individual sections.
    - This would minimise the level of code redrafting required, improve understanding by collecting all the arrangements in a single clause and align with the BSC approach.

Code members, party types and new terms:

- Distribution Restoration contracts and arrangements will be handled outside of the DCUSA wherever possible.
    - This route was chosen to remove/ minimise the need to change DCUSA drafting and to avoid the need to introduce new party types/ relationships.
- This combined with the lack of required changes identified for the other areas as set out in the report means that Cornwall Insight did not consider there to be changes needed to these areas.

The final decisions on changes required to DCUSA are captured within Section 13 of the latest P&C report: Distribution Restoration future commercial structure and industry codes recommendations.