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GB COMPLIANCE PROCESSES LEGAL TEXT
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COMPLIANCE PROCESSES
(CP)

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INTRODUCTION

The Compliance Processes ("CP") specifies:

the process (leading to an Energisation Operational Notification) which must be followed by NGET and any GB Code User to demonstrate its compliance with the Grid Code in relation to its Plant and Apparatus (including OTSUA) prior to the relevant Plant and Apparatus (including any OTSUA) being energised.

the process (leading to an Interim Operational Notification and Final Operational Notification) which must be followed by NGET and any Generator or DC Converter Station owner to demonstrate its compliance with the Grid Code in relation to its Plant and Apparatus (including any dynamically controlled OTSUA). This process shall be followed prior to and during the course of the relevant Plant and Apparatus (including OTSUA) being energised and Synchronised.

the process (leading to a Limited Operational Notification) which must be followed by NGET and each Generator and DC Converter Station owner where any of its Plant and/or Apparatus (including any OTSUA) becomes unable to comply with relevant provisions of the Grid Code, and where applicable with Appendices F1 to F5 (and in the case of OTSUA, Appendices OF1 to OF5 of the Bilateral Agreement). This process also includes when changes or Modifications are made to Plant and/or Apparatus (including OTSUA). This process applies to such Plant and/or Apparatus after the Plant and/or Apparatus has become Operational and untilDisconnected from the Total System, (or until, in the case of OTSUA, the OTSUA Transfer Time), when changes or Modifications are made.

As used in this CP references to OTSUA means OTSUA to be connected or connected to the National Electricity Transmission System prior to the OTSUA Transfer Time.

Where the Generator or DC Convertor Station Owner and/or NGET are required to apply for a derogation from the Authority, this is not in respect of the OTSUA

OBJECTIVE

The objective of the CP is to ensure that there is a clear and consistent process for demonstration of compliance by GB Code Users with the Connection Conditions and Bilateral Agreement which are similar for all GB Code Users of an equivalent category and will enable NGET to comply with its statutory and Transmission Licence obligations.

Provisions of the CP which apply in relation to OTSDUW and OTSUA shall (in any particular case) apply up to the OTSUA Transfer Time, whereupon such provisions shall (without prejudice to any prior non-compliance) cease to apply.

In relation to OTSDUW, provisions otherwise to be contained in a Bilateral Agreement may be contained in the Construction Agreement, and accordingly a reference in the CP to a relevant Bilateral Agreement includes the relevant Construction Agreement.

SCOPE

The CP applies to NGET and to GB Code Users, which in the CP means:

(a) GB Generators (other than in relation to Embedded Small Power Stations or Embedded Medium Power Stations not subject to a Bilateral Agreement) including those undertaking OTSDUW.

(b) Network Operators;

(c) Non-Embedded Customers;

(d) DC Converter Station owners (other than those which only have Embedded DC Converter Stations not subject to a Bilateral Agreement).
CP.3.2 The above categories of GB Code User will become bound by the CP prior to them generating, distributing, supplying or consuming, or in the case of OTSUA, transmitting, as the case may be, and references to the various categories should, therefore, be taken as referring to them in that prospective role as well as to Users actually connected.

CP3.3 This CP does not apply to EU Code Users for whom the requirements of the ECP applies.

CP.4 CONNECTION PROCESS

CP.4.1 The CUSC Contract(s) contain certain provisions relating to the procedure for connection to the National Electricity Transmission System or, in the case of Embedded Power Stations or Embedded DC Converter Stations, becoming operational and include provisions to be complied with by GB Code Users prior to and during the course of NGET notifying the User that it has the right to become operational. In addition to such provisions this CP sets out in further detail the processes to be followed to demonstrate compliance. Whilst this CP does not expressly address the processes to be followed in the case of OTSUA connecting to a Network Operator’s User System prior to the OTSUA Transfer Time, the processes to be followed by NGET and the Generator in respect of OTSUA in such circumstances shall be consistent with those set out below by reference OTSUA directly connected to the National Electricity Transmission System.

CP.4.2 The provisions contained in CP.5 to CP.7 detail the process to be followed in order for the GB Code User’s Plant and Apparatus (including OTSUA) to become operational. This process includes EON (energisation) ION (interim synchronising) and FON (final).

CP.4.2.1 The provisions contained in CP.5 relate to the connection and energisation of User’s Plant and Apparatus (including OTSUA) to the National Electricity Transmission System or where Embedded, to a User’s System and is shown diagrammatically at CP.A.1.1.

CP.4.2.2 The provisions contained in CP.6 and CP.7 provide the process for Generators and DC Converter Station owners to demonstrate compliance with the Grid Code and with, where applicable, the CUSC Contract(s) prior to and during the course of such Generator’s or DC Converter Station owner’s Plant and Apparatus (including OTSUA up to the OTSUA Transfer Time) becoming operational and is shown diagrammatically at CP.A.1.2 and CP.A.1.3.

CP.4.2.3 The provisions contained in CP.8 detail the process to be followed when:

(a) a Generator or DC Converter Station owner’s Plant and/or Apparatus (including the OTSUA) is unable to comply with any provisions of the Grid Code and Bilateral Agreement; or,

(b) following any notification by a Generator or a DC Converter Station owner under the PC of any change to its Plant and Apparatus (including any OTSUA); or,

(c) a Modification to a Generator or a DC Converter Station owner’s Plant and/or Apparatus.

The process is shown diagrammatically at Appendix CP.A.1.4 for condition (a) and Appendix CP.A.1.5 for conditions (b) and (c)

CP.4.3 Embedded Medium Power Stations not subject to a Bilateral Agreement and Embedded DC Converter Stations not subject to a Bilateral Agreement

CP.4.3.1 For the avoidance of doubt the process in this CP does not apply to Embedded Medium Power Stations not subject to a Bilateral Agreement and Embedded DC Converter Stations not subject to a Bilateral Agreement.

CP.5 ENERGISATION OPERATIONAL NOTIFICATION

CP.5.1 The following provisions apply in relation to the issue of an Energisation Operational Notification.
CP.5.1.1 Certain provisions relating to the connection and energisation of the GB Code User’s Plant and Apparatus at the Connection Site and OTSUA at the Transmission Interface Point and in certain cases of Embedded Plant and Apparatus are specified in the CUSC and/or CUSC Contract(s). For other Embedded Plant and Apparatus the Distribution Code, the DCUSA and the Embedded Development Agreement for the connection specify equivalent provisions. Further detail on this is set out in CP.5 below.

CP.5.2 The items for submission prior to the issue of an Energisation Operational Notification are set out in CC.5.2

CP.5.3 In the case of a Generator or DC Converter Station owner the items referred to in CC.5.2 shall be submitted using the User Data File Structure.

CP.5.4 Not less than 28 days, or such shorter period as may be acceptable in NGET’s reasonable opinion, prior to the GB Code User wishing to energise its Plant and Apparatus (including passive OTSUA) for the first time the GB Code User will submit to NGET a Certificate of Readiness to Energise High Voltage Equipment which specifies the items of Plant and Apparatus (including OTSUA) ready to be energised in a form acceptable to NGET.

CP.5.5 If the relevant obligations under the provisions of the CUSC and/or CUSC Contract(s) and the conditions of CP.5 have been completed to NGET’s reasonable satisfaction then NGET shall issue an Energisation Operational Notification. Any dynamically controlled reactive compensation OTSUA (including Statcoms or Static Var Compensators) shall not be Energised until the appropriate Interim Operational Notification has been issued in accordance with CP.6.

CP.6 INTERIM OPERATIONAL NOTIFICATION

CP.6.1 The following provisions apply in relation to the issue of an Interim Operational Notification.

CP.6.2 Not less than 28 days, or such shorter period as may be acceptable in NGET’s reasonable opinion, prior to the Generator or DC Converter Station owner wishing to Synchronise its Plant and Apparatus or dynamically controlled OTSUA for the first time the Generator or DC Converter Station owner will:

(i) submit to NGET a Notification of User’s Intention to Synchronise; and

(ii) submit to NGET the items referred to at CP.6.3.

CP.6.3 Items for submission prior to issue of the Interim Operational Notification.

CP.6.3.1 Prior to the issue of an Interim Operational Notification in respect of the GB Code User’s Plant and Apparatus or dynamically controlled OTSUA, the Generator or DC Converter Station owner must submit to NGET to NGET’s satisfaction:

(a) updated Planning Code data (both Standard Planning Data and Detailed Planning Data), with any estimated values assumed for planning purposes confirmed or, where practical, replaced by validated actual values and by updated estimates for the future and by updated forecasts for Forecast Data items such as Demand;

(b) details of any special Power Station, Generating Unit(s), Power Park Module(s) or DC Converter Station(s) protection as applicable. This may include Pole Slipping protection and islanding protection schemes;

(c) any items required by CP.5.2, updated by the GB Code User as necessary;

(d) simulation study provisions of Appendix CP.A.3 and the results demonstrating compliance with Grid Code requirements of:

PC.A.5.4.2
PC.A.5.4.3.2,
CC.6.3.4,
CC.6.3.7(c)(i),
CC.6.3.15,
CC.A.6.2.5.6,
CC.A.7.2.3.1,
as applicable to the Power Station, Generating Unit(s), Power Park Module(s) or DC Converter(s) or dynamically controlled OTSUA unless agreed otherwise by NGET;

(e) a detailed schedule of the tests and the procedures for the tests required to be carried out by the Generator or DC Converter Station owner under CP.7.2 to demonstrate compliance with relevant Grid Code requirements. Such schedule to be consistent with Appendix OC5.A.2 (in the case of Generating Units other than Power Park Modules) or Appendix OC5.A.3 (in the case of Generating Units comprising Power Park Modules) and OTSUA as applicable); and

(f) an interim Compliance Statement and a User Self Certification of Compliance completed by the GB Code User (including any Unresolved Issues) against the relevant Grid Code requirements including details of any requirements that the Generator or DC Converter Station owner has identified that will not or may not be met or demonstrated.

CP.6.3.2 The items referred to in CP.6.3 shall be submitted by the Generator or DC Converter Station owner using the User Data File Structure.

CP.6.4 No Generating Unit, CCGT Module, Power Park Module or DC Converter or dynamically controlled OTSUA shall be Synchronised to the Total System (and for the avoidance of doubt, dynamically controlled OTSUA will not be able to transmit), until the later of:

(a) the date specified by NGET in the Interim Operational Notification issued in respect of the Generating Unit(s), CCGT Module(s), Power Park Module(s) or DC Converter(s) or dynamically controlled OTSUA; and,

(b) if Embedded, the date of receipt of a confirmation from the Network Operator in whose System the Plant and Apparatus is connected that it is acceptable to the Network Operator that the Plant and Apparatus be connected and Synchronised; and,

(c) in the case of Synchronous Generating Unit(s) only after the date of receipt by Generator of written confirmation from NGET that the Generating Unit or CCGT Module as applicable has completed the following tests to demonstrate compliance with the relevant provisions of the Connection Conditions to NGET’s satisfaction:

(i) those tests required to establish the open and short circuit saturation characteristics of the Generating Unit (as detailed in Appendix OC5.A.2.3) to enable assessment of the short circuit ratio in accordance with CC.6.3.2. Such tests may be carried out at a location other than the Power Station site; and

(ii) open circuit step response tests (as detailed in Appendix OC5.A.2.2) to demonstrate compliance with CC.A.6.2.4.1.

CP.6.5 NGET shall assess the schedule of tests submitted by the Generator or DC Converter Station owner with the Notification of User’s Intention to Synchronise under CP.6.1 and shall determine whether such schedule has been completed to NGET’s satisfaction.

CP.6.6 When the requirements of CP.6.2 to CP.6.5 have been met, NGET will notify the Generator or DC Converter Station owner that the:

Generating Unit,
CCGT Module,
Power Park Module,
Dynamically controlled OTSUA or DC Converter,
as applicable may (subject to the Generator or DC Converter Station owner having fulfilled the requirements of CP.6.3 where that applies) be Synchronised to the Total System through the issue of an Interim Operational Notification. Where the Generator is undertaking OTSDUW then the Interim Operational Notification will be in two parts, with the “Interim Operational Notification Part A” applicable to the OTSUA and the “Interim Operational Notification Part B” applicable to the GB Code Users Plant and Apparatus. For the avoidance of doubt, the Interim Operational Notification Part A and the Interim Operational Notification Part B can be issued together or at different times. In respect of an Embedded Power Station or Embedded DC Converter Station (other than a Embedded Medium Power Stations not subject to a Bilateral Agreement and Embedded DC Converter Stations not subject to a Bilateral Agreement), NGET will notify the Network Operator that an Interim Operational Notification has been issued.

CP.6.6.1 The Interim Operational Notification will be time limited, the expiration date being specified at the time of issue. The Interim Operational Notification may be renewed by NGET.

CP.6.6.2 The Generator or DC Converter Station owner must operate the Generating Unit, CCGT Module, Power Park Module, OTSUA or DC Converter in accordance with the terms, arising from the Unresolved Issues, of the Interim Operational Notification. Where practicable, NGET will discuss such terms with the Generator or DC Converter Station owner prior to including them in the Interim Operational Notification.

CP.6.6.3 The Interim Operational Notification will include the following limitations:

(a) In the case of OTSUA, the Interim Operational Notification Part A permits Synchronisation of the dynamically controlled OTSUA to the Total System only for the purposes of active control of voltage and reactive power and not for the purpose of exporting Active Power.

(b) In the case of a Power Park Module the Interim Operational Notification (and where OTSDUW Arrangements apply, this reference will be to the Interim Operational Notification Part B) will limit the proportion of the Power Park Module which can be simultaneously Synchronised to the Total System such that neither of the following figures is exceeded:

(i) 20% of the Registered Capacity of the Power Park Module (or the output of a single Power Park Unit where this exceeds 20% of the Power Station’s Registered Capacity); nor

(ii) 50MW

until the Generator has completed the voltage control tests (detailed in OC5.A.3.2) (including in respect of any dynamically controlled OTSUA) to NGET’s reasonable satisfaction. Following successful completion of this test each additional Power Park Unit should be included in the voltage control scheme as soon as is technically possible (unless NGET agrees otherwise).

(b) In the case of a Power Park Module with a Registered Capacity greater or equal to 100MW, the Interim Operational Notification (and where OTSDUW Arrangements apply, this reference will be to the Interim Operational Notification Part B) will limit the proportion of the Power Park Module which can be simultaneously Synchronised to the Total System to 70% of Registered Capacity until the Generator has completed the Limited Frequency Sensitive Mode control tests with at least 50% of the Registered Capacity of the Power Park Module in service (detailed in OC5.A.3.3) to NGET’s reasonable satisfaction.
(c) In the case of a Synchronous Generating Unit employing a static Excitation System the Interim Operational Notification (and where OTSDUW Arrangements apply, this reference will be to the Interim Operational Notification Part B) may if applicable limit the maximum Active Power output and reactive power output of the Synchronous Generating Unit or CCGT module prior to the successful commissioning of the Power System Stabiliser to NGET’s satisfaction.

CP.6.6.4 When a GB Code User and NGET are acting/operating in accordance with the provisions of a Interim Operational Notification, whilst it is in force, the relevant provisions of the Grid Code to which that Interim Operational Notification relates will not apply to the GB Code User or NGET to the extent and for the period set out in the Interim Operational Notification.

CP.6.7 Other than Unresolved Issues that are subject to tests required under CP.7.2 to be witnessed by NGET, the Generator or DC Converter Station owner must resolve any Unresolved Issues prior to the commencement of the tests, unless NGET agrees to a later resolution. The Generator or DC Converter Station owner must liaise with NGET in respect of such resolution. The tests that may be witnessed by NGET are specified in CP.7.2.

CP.6.8 Not less than 28 days, or such shorter period as may be acceptable in NGET’s reasonable opinion, prior to the Generator or DC Converter Station owner wishing to commence tests required under CP.7 to be witnessed by NGET, the Generator or DC Converter Station owner will notify NGET that the Generating Unit(s), CCGT Module(s), Power Park Module(s) or DC Converter(s) as applicable is ready to commence such tests.

CP.6.9 The items referred to at CP.7.3 shall be submitted by the Generator or the DC Converter Station owner after successful completion of the tests required under CP.7.2.

CP.7. FINAL OPERATIONAL NOTIFICATION

CP.7.1 The following provisions apply in relation to the issue of a Final Operational Notification.

CP.7.2 Tests to be carried out prior to issue of the Final Operational Notification

CP.7.2.1 Prior to the issue of a Final Operational Notification the Generator or DC Converter Station owner must have completed the tests specified in this CP.7.2.2 to NGET’s satisfaction to demonstrate compliance with the relevant Grid Code provisions.

CP.7.2.2 In the case of any Generating Unit, CCGT Module, Power Park Module, OTSUA (if applicable) and DC Converter these tests will comprise one or more of the following:

(a) reactive capability tests to demonstrate that the Generating Unit, CCGT Module, Power Park Module, OTSUA (if applicable) and DC Converter can meet the requirements of CC.6.3.2. These may be witnessed by NGET on site if there is no metering to the NGET Control Centre.

(b) voltage control system tests to demonstrate that the Generating Unit, CCGT Module, Power Park Module, OTSUA (if applicable) and DC Converter can meet the requirements of CC.6.3.6, CC.6.3.8 and, in the case of Power Park Module, OTSUA (if applicable) and DC Converter, the requirements of CC.A.7 and, in the case of the Generating Unit and CCGT Module, the requirements of CC.A.6, and any terms specified in the Bilateral Agreement as applicable. These tests may also be used to validate the Excitation System model (PC.A.5.3) or voltage control system model (PC.A.5.4) as applicable. These tests may be witnessed by NGET.

(c) governor or frequency control system tests to demonstrate that the Generating Unit, CCGT Module, OTSUA (if applicable) and Power Park Module can meet the requirements of CC.6.3.6, CC.6.3.7, where applicable CC.A.3, and BC.3.7. The results will also validate the Mandatory Service Agreement required by CC.8.1. These tests may also be used to validate the Governor model (PC.A.5.3) or frequency control system model (PC.A.5.4) as applicable. These tests may be witnessed by NGET.
(d) fault ride through tests in respect of a **Power Station** with a **Registered Capacity** of 100MW or greater, comprised of one or more **Power Park Modules**, to demonstrate compliance with CC.6.3.15 (a), (b) and (c), CC.A.4.1, CC.A.4.2 and CC.A.4.3. Where test results from a **Manufacturers Data & Performance Report** as defined in CP.10 have been accepted this test will not be required.

(e) any further tests reasonably required by **NGET** and agreed with the **GB Code User** to demonstrate any aspects of compliance with the Grid Code and the **CUSC Contracts**.

**CP.7.2.3** **NGET’s** preferred range of tests to demonstrate compliance with the **CC** are specified in Appendix OC5.A.2 (in the case of **Generating Units** other than **Power Park Modules**) or Appendix OC5.A.3 (in the case of **Generating Units** comprising **Power Park Modules** or **OTSUA** if applicable) or Appendix OC5.A.4 (in the case of **DC Converters**) and are to be carried out by the **GB Code User** with the results of each test provided to **NGET**. The **GB Code User** may carry out an alternative range of tests if this is agreed with **NGET**. **NGET** may agree a reduced set of tests where there is a relevant **Manufacturers Data & Performance Report**.

**CP.7.2.4** In the case of **Offshore Power Park Modules** which do not contribute to **Offshore Transmission Licensee Reactive Power** capability as described in CC.6.3.2(e)(i) or CC.6.3.2(e)(ii) or Voltage Control as described in CC.6.3.8(b)(i) the tests outlined in CP.7.2.2 (a) and CP.7.2.2 (b) are not required. However, the offshore reactive power transfer tests outlined in OC5.A.2.8 shall be completed in their place.

**CP.7.2.5** Following completion of each of the tests specified in this CP.7.2, **NGET** will notify the **Generator** or **DC Converter Station** owner whether, in the opinion of **NGET**, the results demonstrate compliance with the relevant Grid Code conditions.

**CP.7.2.6** The **Generator** or **DC Converter Station** owner is responsible for carrying out the tests and retains the responsibility for safety and personnel during the test.

**CP.7.3** Items for submission prior to issue of the **Final Operational Notification**

**CP.7.3.1** Prior to the issue of a **Final Operational Notification** the **Generator** or **DC Converter Station** owner must submit to **NGET** to **NGET’s** satisfaction:

(a) updated **Planning Code** data (both **Standard Planning Data** and **Detailed Planning Data**), with validated actual values and updated estimates for the future including **Forecast Data** items such as **Demand**;

(b) any items required by CP.5.2 and CP.6.3, updated by the **GB Code User** as necessary;

(c) evidence to **NGET’s** satisfaction that demonstrates that the controller models and/or parameters (as required under PC.A.5.3.2(c) option 2, PC.A.5.3.2(d) option 2, PC.A.5.4.2, and/or PC.A.5.4.3.2) supplied to **NGET** provide a reasonable representation of the behaviour of the **GB Code User’s Plant** and **Apparatus** and **OTSUA** if applicable;

(d) results from the tests required in accordance with CP.7.2 carried out by the **Generator** to demonstrate compliance with relevant Grid Code requirements including the tests witnessed by **NGET**; and

(e) the final **Compliance Statement** and a **User Self Certification of Compliance** signed by the **GB Code User** and a statement of any requirements that the **Generator** or **DC Converter Station** owner has identified that have not been met together with a copy of the derogation in respect of the same from the **Authority**.

**CP.7.3.2** The items in CP.7.3 should be submitted by the **Generator** (including in respect of any **OTSUA** if applicable) or **DC Converter Station** owner using the **User Data File Structure**.
CP.7.4 If the requirements of CP.7.2 and CP.7.3 have been successfully met, NGET will notify the Generator or DC Converter Station owner that compliance with the relevant Grid Code provisions has been demonstrated for the Generating Unit(s), CCGT Module(s), Power Park Module(s), OTSUA, if applicable or DC Converter(s) as applicable through the issue of a Final Operational Notification. In respect of a Embedded Power Station or Embedded DC Converter Station other than a Embedded Medium Power Stations not subject to a Bilateral Agreement and Embedded DC Converter Stations not subject to a Bilateral Agreement, NGET will notify the Network Operator that a Final Operational Notification has been issued.

CP.7.5 If a Final Operational Notification can not be issued because the requirements of CP.7.2 and CP.7.3 have not been successfully met prior to the expiry of an Interim Operational Notification then the Generator or DC Converter Station owner (where licensed in respect of its activities) and/or NGET shall apply to the Authority for a derogation. The provisions of CP.9 shall then apply.

CP.8 LIMITED OPERATIONAL NOTIFICATION

CP.8.1 Following the issue of a Final Operational Notification if:

(i) the Generator or DC Converter Station owner becomes aware, that its Plant and/or Apparatus' (including OTSUA if applicable) capability to meet any provisions of the Grid Code, or where applicable the Bilateral Agreement is not fully available then the Generator or DC Converter Station owner shall follow the process in CP.8.2 to CP.8.11; or,

(ii) a Network Operator becomes aware, that the capability of Plant and/or Apparatus’ belonging to a Embedded Power Station or Embedded DC Converter Station (other than a Embedded Medium Power Stations not subject to a Bilateral Agreement and Embedded DC Converter Stations not subject to a Bilateral Agreement) is failing to meet any provisions of the Grid Code, or where applicable the Bilateral Agreement then the Network Operator shall inform NGET and NGET shall inform the Generator or DC Converter Station owner and then follow the process in CP.8.2 to CP.8.11; or,

(iii) NGET becomes aware through monitoring as described in OC5.4, that a Generator or DC Converter Station owner Plant and/or Apparatus’ (including OTSUA if applicable) capability to meet any provisions of the Grid Code, or where applicable the Bilateral Agreement is not fully available then NGET shall inform the other party. Where NGET and the Generator or DC Converter Station owner cannot agree from the monitoring as described in OC5.4 whether the Plant and/or Apparatus (including OTSUA if applicable) is fully available and/or is compliant with the requirements of the Grid Code and where applicable the Bilateral Agreement, the parties shall first apply the process in OC5.5.1, before applying the process defined in CP.8 (LON) if applicable. Where the testing instructed in accordance with OC5.5.1 indicates that the Plant and/or Apparatus (including OTSUA if applicable) is not fully available and/or is not compliant with the requirements of the Grid Code and/or the Bilateral Agreement, or if the parties so agree, the process in CP.8.2 to CP.8.11 shall be followed.

CP.8.2 Immediately upon a Generator or DC Converter Station owner becoming aware that its Generating Unit, CCGT Module, Power Park Module, OTSUA (if applicable) or DC Converter Station as applicable may be unable to comply with certain provisions of the Grid Code or (where applicable) the Bilateral Agreement, the Generator or DC Converter Station owner shall notify NGET in writing. Additional details of any operating restrictions or changes in applicable data arising from the potential non-compliance and an indication of the date from when the restrictions will be removed and full compliance demonstrated shall be provided as soon as reasonably practical.
CP.8.3 If the nature of any unavailability and/or potential non-compliance described in CP.8.1 causes or can reasonably be expected to cause a material adverse effect on the business or condition of NGET or other Users or the National Electricity Transmission System or any User Systems then NGET may, notwithstanding the provisions of this CP.8 follow the provisions of Paragraph 5.4 of the CUSC.

CP.8.4 Except where the provisions of CP.8.3 apply, where the restriction notified in CP.8.2 is not resolved in 28 days then the Generator or DC Converter Station owner with input from and discussion of conclusions with NGET, and the Network Operator where the Generating Unit, CCGT Module, Power Park Module or Power Station as applicable is Embedded, shall undertake an investigation to attempt to determine the causes of and solution to the non-compliance. Such investigation shall continue for no longer than 56 days. During such investigation the Generator or DC Converter Station owner shall provide to NGET the relevant data which has changed due to the restriction in respect of CP.7.3.1 as notified to the Generator or DC Converter Station owner by NGET as being required to be provided.

CP.8.5 Issue and Effect of LON

CP.8.5.1 Following the issue of a Final Operational Notification, NGET will issue to the Generator or DC Converter Station owner a Limited Operational Notification if:

(a) by the end of the 56 day period referred to at CP.8.4, the investigation has not resolved the non-compliance to NGET's satisfaction; or

(b) NGET is notified by a Generator or DC Converter Station owner of a Modification to its Plant and Apparatus (including OTSUA if applicable); or

(c) NGET receives a submission of data, or a statement from a Generator or DC Converter Station owner indicating a change in Plant or Apparatus (including OTSUA if applicable) or settings (including but not limited to governor and excitation control systems) that may in NGETs reasonable opinion, acting in accordance with Good Industry Practice be expected to result in a material change of performance.

In the case of an Embedded Generator or Embedded DC Converter Station owner, NGET will issue a copy of the Limited Operational Notification to the Network Operator.

CP.8.5.2 The Limited Operational Notification will be time limited to expire no later than 12 months from the start of the non-compliance or restriction or from reconnection following a change. NGET may agree a longer duration in the case of a Limited Operational Notification following a Modification or whilst the Authority is considering the application for a derogation in accordance with CP.9.1.

CP.8.5.3 The Limited Operational Notification will notify the Generator or DC Converter Station owner of any restrictions on the operation of the Generating Unit(s), CCGT Module(s), Power Park Module(s), OTSUA (if applicable) or DC Converter(s) and will specify the Unresolved Issues. The Generator or DC Converter Station owner must operate in accordance with any notified restrictions and must resolve the Unresolved Issues.

CP.8.5.4 When a GB Code User and NGET are acting/operating in accordance with the provisions of a Limited Operational Notification, whilst it is in force, the relevant provisions of the Grid Code to which that Limited Operational Notification relates will not apply to the GB Code User or NGET to the extent and for the period set out in the Limited Operational Notification.

CP.8.5.5 The Unresolved Issues included in a Limited Operational Notification will show the extent that the provisions of CP.7.2 (testing) and CP.7.3 (final data submission) shall apply. In respect of selecting the extent of any tests which may in NGET's view reasonably be needed to demonstrate the restored capability and in agreeing the time period in which the tests will be scheduled, NGET shall, where reasonably practicable, take account of the Generator or DC Converter Station owner's input to contain its costs associated with the testing.
In the case of a change or Modification the Limited Operational Notification may specify that the affected Plant and/or Apparatus (including OTSUA if applicable) or associated Generating Unit(s) or Power Park Unit(s) must not be Synchronised until all of the following items, that in NGET’s reasonable opinion are relevant, have been submitted to NGET to NGET’s satisfaction:

(a) updated Planning Code data (both Standard Planning Data and Detailed Planning Data);

(b) details of any relevant special Power Station, Generating Unit(s), Power Park Module(s), OTSUA (if applicable) or DC Converter Station(s) protection as applicable. This may include Pole Slipping protection and islanding protection schemes; and

(c) simulation study provisions of Appendix CP.A.3 and the results demonstrating compliance with Grid Code requirements relevant to the change or Modification as agreed by NGET; and

(d) a detailed schedule of the tests and the procedures for the tests required to be carried out by the Generator or DC Converter Station to demonstrate compliance with relevant Grid Code requirements as agreed by NGET. The schedule of tests shall be consistent with Appendix OC5.A.2 or Appendix OC5.A.3 as appropriate; and

(e) an interim Compliance Statement and a User Self Certification of Compliance completed by the GB Code User (including any Unresolved Issues) against the relevant Grid Code requirements including details of any requirements that the Generator or DC Converter Station owner has identified that will not or may not be met or demonstrated; and

(f) any other items specified in the LON.

The items referred to in CP.8.5.6 shall be submitted by the Generator (including in respect of any OTSUA if applicable) or DC Converter Station owner using the User Data File Structure.

In the case of Synchronous Generating Unit(s) only, the Unresolved Issues of the LON may require that the Generator must complete the following tests to NGET’s satisfaction to demonstrate compliance with the relevant provisions of the CCs prior to the Generating Unit being Synchronised to the Total System:

(a) those tests required to establish the open and short circuit saturation characteristics of the Generating Unit (as detailed in Appendix OC5.A.2.3) to enable assessment of the short circuit ratio in accordance with CC.6.3.2. Such tests may be carried out at a location other than the Power Station site; and

(b) open circuit step response tests (as detailed in Appendix OC5.A.2.2) to demonstrate compliance with CC.A.6.2.4.1.

In the case of a change or Modification, not less than 28 days, or such shorter period as may be acceptable in NGET’s reasonable opinion, prior to the Generator or DC Converter Station owner wishing to Synchronise its Plant and Apparatus (including OTSUA if applicable) for the first time following the change or Modification, the Generator or DC Converter Station owner will:

(i) submit a Notification of User’s Intention to Synchronise; and

(ii) submit to NGET the items referred to at CP.8.5.6.

Other than Unresolved Issues that are subject to tests to be witnessed by NGET, the Generator or DC Converter Station owner must resolve any Unresolved Issues prior to the commencement of the tests, unless NGET agrees to a later resolution. The Generator or DC Converter Station owner must liaise with NGET in respect of such resolution. The tests that may be witnessed by NGET are specified in CP.7.2.2.
CP.8.8 Not less than 28 days, or such shorter period as may be acceptable in NGET’s reasonable opinion, prior to the Generator or DC Converter Station owner wishing to commence tests listed as Unresolved Issues to be witnessed by NGET, the Generator or DC Converter Station owner will notify NGET that the Generating Unit(s), CCGT Module(s), Power Park Module(s), OTSUA (if applicable) or DC Converter(s) as applicable is ready to commence such tests.

CP.8.9 The items referred to at CP.7.3 and listed as Unresolved Issues shall be submitted by the Generator or the DC Converter Station owner after successful completion of the tests.

CP.8.10 Where the Unresolved Issues have been resolved a Final Operational Notification will be issued to the GB Code User.

CP.8.11 If a Final Operational Notification has not been issued by NGET within the 12 month period referred to at CP.8.5.2 (or where agreed following a Modification by the expiry time of the LON) then the Generator or DC Converter Station owner (where licensed in respect of its activities) and NGET shall apply to the Authority for a derogation.

CP.9 PROCESSES RELATING TO DEROGATIONS

CP.9.1 Whilst the Authority is considering the application for a derogation, the Interim Operational Notification or Limited Operational Notification will be extended to remain in force until the Authority has notified NGET and the Generator or DC Converter Station owner of its decision. Where the Generator or DC Converter Station owner is not licensed NGET may propose any necessary changes to the Bilateral Agreement with such unlicensed Generator or DC Converter Station owner.

CP.9.2 If the Authority:

(a) grants a derogation in respect of the Plant and/or Apparatus, then NGET shall issue Final Operational Notification once all other Unresolved Issues are resolved; or

(b) decides a derogation is not required in respect of the Plant and/or Apparatus then NGET will reconsider the relevant Unresolved Issues and may issue a Final Operational Notification once all other Unresolved Issues are resolved; or

(c) decides not to grant any derogation in respect of the Plant and/or Apparatus, then there will be no Operational Notification in place and NGET and the GB Code User shall consider its rights pursuant to the CUSC.

CP.9.3 Where an Interim Operational Notification or Limited Operational Notification is so conditional upon a derogation and such derogation includes any conditions (including any time limit to such derogation) the Generator or DC Converter Station owner will progress the resolution of any Unresolved Issues and / or progress and / or comply with any conditions upon such derogation and the provisions of CP.6.9 to CP.7.4 shall apply and shall be followed.

CP.10 MANUFACTURER’S DATA & PERFORMANCE REPORT

CP.10.1.1 Data and performance characteristics in respect of certain Grid Code requirements may be registered with NGET by Power Park Unit manufacturers in respect of specific models of Power Park Units by submitting information in the form of a Manufacturer’s Data and Performance Report to NGET.
CP.10.2 A GB Generator planning to construct a Power Station containing the appropriate version of Power Park Units in respect of which a Manufacturer’s Data & Performance Report has been submitted to NGET may reference the Manufacturer’s Data & Performance Report in its submissions to NGET. Any Generator considering referring to a Manufacturer’s Data & Performance Report for any aspect of its Plant and Apparatus may contact NGET to discuss the suitability of the relevant Manufacturer’s Data & Performance Report to its project to determine if, and to what extent, the data included in the Manufacturer’s Data & Performance Report contributes towards demonstrating compliance with those aspects of the Grid Code applicable to the Generator. NGET will inform the Generator if the reference to the Manufacturer’s Data & Performance Report is not appropriate or not sufficient for its project.

CP.10.3 The process to be followed by Power Park Unit manufacturers submitting a Manufacturer’s Data & Performance Report is agreed by NGET. CP.10.2 indicates the specific Grid Code requirement areas in respect of which a Manufacturer’s Data & Performance Report may be submitted.

CP.10.4 NGET will maintain and publish a register of those Manufacturer’s Data & Performance Reports which NGET has received and accepted as being an accurate representation of the performance of the relevant Plant and / or Apparatus. Such register will identify the manufacturer, the model(s) of Power Park Unit(s) to which the report applies and the provisions of the Grid Code in respect of which the report contributes towards the demonstration of compliance. The inclusion of any report in the register does not in any way confirm that any Power Park Modules which utilise any Power Park Unit(s) covered by a report is or will be compliant with the Grid Code.

CP.10.2 A Manufacturer’s Data & Performance Report in respect of Power Park Units may cover one (or part of one) or more of the following provisions of the Grid Code:

(a) Fault Ride Through capability CC.6.3.15

(b) Power Park Module mathematical model PC.A.5.4.2

CP.10.3 Reference to a Manufacturer’s Data & Performance Report in a GB Code User’s submissions does not by itself constitute compliance with the Grid Code.

CP.10.4 A Generator referencing a Manufacturer’s Data & Performance Report should insert the relevant Manufacturer’s Data & Performance Report reference in the appropriate place in the DRC data submission and / or in the User Data File Structure. NGET will consider the suitability of a Manufacturer’s Data & Performance Report:

(a) in place of DRC data submissions a mathematical model suitable for representation of the entire Power Park Module as per CP.A.3.4.4. For the avoidance of doubt only the relevant sections as specified in PC.A.2.5.5.7 apply. Site specific parameters will still need to be submitted by the Generator.

(b) in place of Fault simulation studies as follows;

NGET will not require Fault Ride Through simulation studies to be conducted as per CP.A.3.5.2 provided that;

(i) Adequate and relevant Power Park Unit data is included in respect of Fault Ride Through testing covered in CP.A.14.7.1 in the relevant Manufacturer’s Data & Performance Report, and

(ii) For each type and duration of fault as detailed in CP.A.3.5.1, the expected minimum retained voltage is greater than the corresponding minimum voltage achieved and successfully ridden through in the fault ride through tests covered by the Manufacturer’s Data & Performance Report.

(c) to reduce the scope of compliance site tests as follows;

(i) Where there is a Manufacturer’s Data & Performance Report in respect of a Power Park Unit which covers Fault Ride Through, NGET may agree that no Fault Ride Through testing is required.
CP.10.5 It is the responsibility of the GB Code User to ensure that the correct reference for the Manufacturer's Data & Performance Report is used and the GB Code User by using that reference accepts responsibility for the accuracy of the information. The GB Code User shall ensure that the manufacturer has kept NGET informed of any relevant variations in plant specification since the submission of the relevant Manufacturer's Data & Performance Report which could impact on the validity of the information.

CP.10.6 NGET may contact the Power Park Unit manufacturer directly to verify the relevance of the use of such Manufacturer's Data & Performance Report. If NGET believe the use some or all of such Manufacturer's Data & Performance Report information is incorrect or the referenced data is inappropriate then the reference to the Manufacturer's Data & Performance Report may be declared invalid by NGET. Where, and to the extent possible, the data included in the Manufacturer's Data & Performance Report is appropriate, the compliance assessment process will be continued using the data included in the Manufacturer's Data & Performance Report.
APPENDIX 1 - ILLUSTRATIVE PROCESS DIAGRAMS

CP.A.1.1 Illustrative Compliance Process for Energisation of a User

The process illustrated in CP.A.1.1 applies to all GB Code Users energising passive network Plant and Apparatus including Distribution Network Operators, Non-embedded Customers, Generators and DC Converter Station owners. This process is a subset of the full process for Generators and DC Converter Station owners shown in CP.A.1.2. This diagram illustrates the process in the CP and includes references in brackets to specific Grid Code clauses.
This diagram illustrates the process in the CP and includes references in brackets to specific Grid Code clauses. For the avoidance of doubt this process does not apply to Embedded Medium Power Stations not subject to a Bilateral Agreement and Embedded DC Converter Stations not subject to a Bilateral Agreement.
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APPENDIX 2 - USER SELF CERTIFICATION OF COMPLIANCE

USER SELF CERTIFICATION OF COMPLIANCE (Interim/Final)

<table>
<thead>
<tr>
<th>Power Station/ DC Converter Station:</th>
<th>[Name of Connection Site/site of connection]</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTSUA</td>
<td>[Name of Interface Site]</td>
</tr>
<tr>
<td>GB Code User:</td>
<td>[Full User name]</td>
</tr>
<tr>
<td>Registered Capacity (MW) of Plant:</td>
<td></td>
</tr>
</tbody>
</table>

This User Self Certification of Compliance records the compliance by the GB Code User in respect of [NAME] Power Station/DC Converter Station [and, in the case of OTSDUW Arrangements, OTSUA] with the Grid Code and the requirements of the Bilateral Agreement and Construction Agreement dated [ ] with reference number [ ] . It is completed by the Power Station/DC Converter Station owner in the case of Plant and/or Apparatus (including OTSUA) connected to the National Electricity Transmission System and for Embedded Plant.

We have recorded our compliance against each requirement of the Grid Code which applies to the Power Station/DC Converter Station/OTSUA, together with references to supporting evidence and a commentary where this is appropriate, and have provided this to NGET. A copy of the Compliance Statement is attached.

Supporting evidence, in the form of simulation results, test results, manufacturer’s data and other documentation, is attached in the User Data File Structure.

The GB Code User hereby certifies that, to the best of its knowledge and acting in accordance with Good Industry Practice, [the Power Station is compliant with the Grid Code and the Bilateral Agreement] [the OTSUA is compliant with the Grid Code and the Construction Agreement] in all aspects [with the following Unresolved Issues*] [with the following derogation(s)**]:

<table>
<thead>
<tr>
<th>Connection Condition</th>
<th>Requirement</th>
<th>Ref:</th>
<th>Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Compliance certified by:</th>
<th>Name: [PERSON]</th>
<th>Title: [PERSON DESIGNATION]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Signature: [PERSON]</td>
<td>Of [GB CODE USER DETAILS]</td>
</tr>
<tr>
<td>Date:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Include for Interim User Self Certification of Compliance ahead of Interim Operational Notification.

** Include for final User Self Certification of Compliance ahead of Final Operational Notification where derogation(s) have been granted.
If no derogation(s) required delete wording and Table.
APPENDIX 3 - SIMULATION STUDIES

CP.A.3.1.1 This Appendix sets out the simulation studies required to be submitted to NGET to demonstrate compliance with the Connection Conditions unless otherwise agreed with NGET. This Appendix should be read in conjunction with CP.6 with regard to the submission of the reports to NGET. Where there is any inconsistency in the technical requirements in respect of which compliance is being demonstrated by simulation in this Appendix and CC.6.3 and the Bilateral Agreement, the provisions of the Bilateral Agreement and CC.6.3 prevail. The studies specified in this Appendix will normally be sufficient to demonstrate compliance. However NGET may agree an alternative set of studies proposed by the Generator or DC Converter Station owner provided NGET deem the alternative set of studies sufficient to demonstrate compliance with the Grid Code and the Bilateral Agreement.

CP.A.3.1.2 The Generator or DC Converter Station owner shall submit simulation studies in the form of a report to demonstrate compliance. In all cases the simulation studies must utilise models applicable to the Generating Unit, DC Converter or Power Park Module with proposed or actual parameter settings. Reports should be submitted in English with all diagrams and graphs plotted clearly with legible axes and scaling provided to ensure any variations in plotted values is clear.

CP.A.3.1.3 In the case of an Offshore Power Station where OTSDUW Arrangements apply simulation studies by the Generator should include the action of any relevant OTSUA where applicable to demonstrate compliance with the Grid Code and the Bilateral Agreement at the Interface Point.

CP.A.3.2 Power System Stabiliser Tuning

CP.A.3.2.1 In the case of a Synchronous Generating Unit the Power System Stabiliser tuning simulation study report required by CC.A.6.2.5.6 or required by the Bilateral Agreement shall contain:

(i) the Excitation System model including the Power System Stabiliser with settings as required under the Planning Code (PC.A.5.3.2(c))

(ii) on load time series dynamic simulation studies of the response of the Excitation System with and without the Power System Stabiliser to 2% and 10% steps in the reference voltage and a three phase short circuit fault applied to the higher voltage side of the Generating Unit transformer for 100ms. The simulation studies should be carried out with the Generating Unit operating at full Active Power and maximum leading Reactive Power import with the fault level at the Supergrid HV connection point at minimum or as otherwise agreed with NGET. The results should show Generating Unit field voltage, Generating Unit terminal voltage, Power System Stabiliser output, Generating Unit Active Power and Generating Unit Reactive Power output.

(iii) gain and phase Bode diagrams for the open loop frequency domain response of the Generating Unit Excitation System with and without the Power System Stabiliser. These should be in a suitable format to allow assessment of the phase contribution of the Power System Stabiliser and the gain and phase margin of the Excitation System with and without the Power System Stabiliser in service.

(iv) an eigenvalue plot to demonstrate that all modes remain stable when the Power System Stabiliser gain is increased by at least a factor of 3 from the designed operating value.

(v) gain Bode diagram for the closed loop on load frequency domain response of the Generating Unit Excitation System with and without the Power System Stabiliser. The Generating Unit operating at full load and at unity power factor. These diagrams should be in a suitable format to allow comparison of the Active Power damping across the frequency range specified in CC.A.6.2.6.3 with and without the Power System Stabiliser in service.
In the case of Onshore Non-Synchronous Generating Units, Onshore DC Converters and Onshore Power Park Modules and OTSDUW Plant and Apparatus at the Interface Point the Power System Stabiliser tuning simulation study report required by CC.A.7.2.4.1 or required by the Bilateral Agreement shall contain:

(i) the Voltage Control System model including the Power System Stabiliser with settings as required under the Planning Code (PC.A.5.4) and Bilateral Agreement.

(ii) on load time series dynamic simulation studies of the response of the Voltage Control System with and without the Power System Stabiliser to 2% and 10% steps in the reference voltage and a three phase short circuit fault applied to the Grid Entry Point or the Interface Point in the case of OTSDUW Plant and Apparatus for 100ms. The simulation studies should be carried out operating at full Active Power and maximum leading Reactive Power import condition with the fault level at the Supergrid HV connection point at minimum or as otherwise agreed with NGET. The results should show appropriate signals to demonstrate the expected damping performance of the Power System Stabiliser.

(iii) any other simulation as specified in the Bilateral Agreement or agreed between the Generator or DC Converter Owner or Offshore Transmission Licensee and NGET.

The Generator or DC Converter station owner shall supply simulation studies to demonstrate the capability to meet CC.6.3.4 by submission of a report containing:

(i) a load flow simulation study result to demonstrate the maximum lagging Reactive Power capability of the Synchronous Generating Unit, DC Converter, OTSUA or Power Park Module at Rated MW when the Grid Entry Point or User System Entry Point if Embedded or Interface Point (in case of OTSUA) voltage is at 105% of nominal.

(ii) a load flow simulation study result to demonstrate the maximum leading Reactive Power capability of the Synchronous Generating Unit, DC Converter, OTSUA or Power Park Module at Rated MW when the Grid Entry Point or User System Entry Point if Embedded or Interface Point (in case of OTSUA) voltage is at 95% of nominal.

In the case of a Synchronous Generating Unit the terminal voltage in the simulation should be the nominal voltage for the machine. Where necessary to demonstrate compliance with CC.6.3.4 and subject to compliance with CC.6.3.8 (a) (v), the Generator shall repeat the two simulation studies with the terminal voltage being greater than the nominal voltage and less than or equal to the maximum terminal voltage. The two additional simulations do not need to have the same terminal voltage.

In the case of a Synchronous Generating Unit the Generator shall supply two sets of simulation studies to demonstrate the capability to meet the operational requirements of BC2.A.2.6 and CC.6.1.7 at the minimum and maximum short circuit levels when changing tap position. Each set of simulation studies shall be at the same system conditions. None of the simulation studies shall include the Synchronous Generating Unit operating at the limits of its Reactive Power output.

The simulation results shall include the Reactive Power output of the Synchronous Generating Unit and the voltage at the Grid Entry Point or, if Embedded, the User System Entry Point with the Generating Unit transformer at two adjacent tap positions with the greatest interval between them and the terminal voltage of the Synchronous Generating Unit equal to:
- its nominal value; and
- subject to compliance with CC.6.3.8 (a) (v), its maximum value.
CP.A.3.3.4 In the case of a Power Park Module where the load flow simulation studies show that the individual Power Park Units deviate from nominal voltage to meet the Reactive Power requirements then evidence must be provided from factory (e.g. in a Manufacturer’s Data & Performance Report) or site testing that the Power Park Unit is capable of operating continuously at the operating points determined in the load flow simulation studies.

CP.A.3.4 Voltage Control and Reactive Power Stability

CP.A.3.4.1 In the case of a power station containing Power Park Modules and/or OTSU the Generator shall provide a report to demonstrate the dynamic capability and control stability of the Power Park Module. The report shall contain:

(i) a dynamic time series simulation study result of a sufficiently large negative step in System voltage to cause a change in Reactive Power from zero to the maximum lagging value at Rated MW.

(ii) a dynamic time series simulation study result of a sufficiently large positive step in System voltage to cause a change in Reactive Power from zero to the maximum leading value at Rated MW.

(iii) a dynamic time series simulation study result to demonstrate control stability at the lagging Reactive Power limit by application of a -2% voltage step while operating within 5% of the lagging Reactive Power limit.

(iv) a dynamic time series simulation study result to demonstrate control stability at the leading Reactive Power limit by application of a +2% voltage step while operating within 5% of the leading Reactive Power limit.

CP.A.3.4.2 All the above studies should be completed with a nominal network voltage for zero Reactive Power transfer at the Grid Entry Point or User System Entry Point if Embedded or, in the case of OTSU, Interface Point unless stated otherwise and the fault level at the HV connection point at minimum as agreed with NGET.

CP.A.3.4.3 NGET may permit relaxation from the requirements of CP.A.3.4.1(i) and (ii) for voltage control if the Power Park Modules are comprised of Power Park Units in respect of which the GB Code User has in its submissions to NGET referenced an appropriate Manufacturer’s Data & Performance Report which is acceptable to NGET for voltage control.

CP.A.3.4.4 In addition NGET may permit a further relaxation from the requirements of CP.A.3.4.1(iii) and (iv) if the GB Code User has in its submissions to NGET referenced an appropriate Manufacturer’s Data & Performance Report for a Power Park Module mathematical model for voltage control acceptable to NGET.

CP.A.3.5 Fault Ride Through

CP.A.3.5.1 The Generator, (including where undertaking OTSDUW) or DC Converter Station owner shall supply time series simulation study results to demonstrate the capability of Non-Synchronous Generating Units, DC Converters, Power Park Modules and OTSU to meet CC.6.3.15 by submission of a report containing:

(i) a time series simulation study of a 140ms solid three phase short circuit fault applied on the nearest point of the National Electricity Transmission System operating at Supergrid voltage to the Non-Synchronous Generating Unit, DC Converter, Power Park Module or OTSU.

(ii) time series simulation study of 140ms unbalanced short circuit faults applied on the nearest point of the National Electricity Transmission System operating at Supergrid voltage to the Non-Synchronous Generating Unit, DC Converter, Power Park Module or OTSU. The unbalanced faults to be simulated are:

1. a phase to phase fault
2. a two phase to earth fault
3. a single phase to earth fault.
For a Non-Synchronous Generating Unit, DC Converter, Power Park Module or OTSUA the simulation study should be completed with the Non-Synchronous Generating Unit, DC Converter, Power Park Module or OTSUA operating at full Active Power and maximum leading Reactive Power import and the fault level at the Supergrid HV connection point at minimum or as otherwise agreed with NGET.

(iii) time series simulation studies of balanced Supergrid voltage dips applied on the nearest point of the National Electricity Transmission System operating at Supergrid voltage to the Non-Synchronous Generating Unit, DC Converter, Power Park Module or OTSUA. The simulation studies should include:

1. 30% retained voltage lasting 0.384 seconds
2. 50% retained voltage lasting 0.71 seconds
3. 80% retained voltage lasting 2.5 seconds
4. 85% retained voltage lasting 180 seconds.

For a Non-Synchronous Generating Unit, DC Converter, Power Park Module or OTSUA the simulation study should be completed with the Non-Synchronous Generating Unit, DC Converter, Power Park Module or OTSUA operating at full Active Power and zero Reactive Power output and the fault level at the Supergrid HV connection point at minimum or as otherwise agreed with NGET. Where the Non-Synchronous Generating Unit, DC Converter or Power Park Module is Embedded the minimum Network Operator’s System impedance to the Supergrid HV connection point shall be used which may be calculated from the maximum fault level at the User System Entry Point.

For DC Converters the simulations should include the duration of each voltage dip 1 to 4 above for which the DC Converter will remain connected.

CP.A.3.5.2 In the case of Power Park Modules comprised of Power Park Units in respect of which the GB Code User’s reference to a Manufacturer’s Data & Performance Report has been accepted by NGET for Fault Ride Through, CP.A.3.5.1 will not apply provided:

(i) the Generator or DC Converter Station owner demonstrates by load flow simulation study result that the faults and voltage dips at either side of the Power Park Unit transformer corresponding to the required faults and voltage dips in CP.A.3.5.1 applied at the nearest point of the National Electricity Transmission System operating at Supergrid voltage are less than those included in the Manufacturer’s Data & Performance Report,

or;

(ii) the same or greater percentage faults and voltage dips in CP.A.3.5.1 have been applied at either side of the Power Park Unit transformer in the Manufacturer’s Data & Performance Report.

CP.A.3.5.3 In the case of an Offshore Power Park Module or Offshore DC Converter the studies may instead be completed at the LV Side of the Offshore Platform. For fault simulation studies described in CCA.8.5.1(i) and CCA.8.5.1(ii) a retained voltage of 15% or lower may be applied at the LV Side of the Offshore Platform on the faulted phases. For voltage dip simulation studies described in CP.A.3.5.1(iii) the same voltage levels and durations as normally applied at the National Electricity Transmission System operating at Supergrid Voltage will be applied at the LV Side of the Offshore Platform.

CP.A.3.6 Load Rejection

CP.A.3.6.1 In respect of Generating Units or DC Converters or Power Park Modules with a Completion Date on or after 1 January 2012, the Generator or DC Converter Station owner shall demonstrate the speed control performance of the plant under a part load rejection condition as required by CC.6.3.7(c)(i), through simulation study. In respect of Generating Units or DC Converters or Power Park Modules, including those with a Completion Date before 1 January 2013, the load rejection capability while still supplying load must be stated in accordance with PC.A.5.3.2(f).
CP.A.3.6.2 For Power Park Modules comprised of Power Park Units having a corresponding generically verified and validated model included in the Manufacturer’s Data & Performance Report this study is not required if the correct Manufacturer’s Data & Performance Report reference has been submitted in the appropriate location in the Data Registration Code.

CP.A.3.6.3 The simulation study should comprise of a Generating Unit, DC Converter or Power Park Module connected to the total System with a local load shown as “X” in figure CP.A.3.6.1. The load “X” is in addition to any auxiliary load of the Power Station connected directly to the Generating Unit, DC Converter or Power Park Module and represents a small portion of the System to which the Generating Unit, DC Converter or Power Park Module is attached. The value of “X” should be the minimum for which the Generating Unit, DC Converter or Power Park Module can control the power island frequency to less than 52Hz. Where transient excursions above 52Hz occur the Generator or DC Converter Owner should ensure that the duration above 52Hz is less than any high frequency protection system applied to the Generating Unit, DC Converter or Power Park Module.

CP.A.3.6.4 At the start of the simulation study the Generating Unit, DC Converter or Power Park Module will be operating maximum Active Power output. The Generating Unit, DC Converter or Power Park Module will then be islanded from the Total System but still supplying load “X” by the opening of a breaker, which is not the Generating Unit, DC Converter or Power Park Module connection circuit breaker (the governor should therefore, not receive any signals that the breaker has opened other than the reduction in load and subsequent increase in speed). A schematic arrangement of the simulation study is illustrated by Figure CP.A.3.6.1.

Generator Under Test

[Diagram of Load Rejection Study]

Notes:
1. The simulation begins with the generator connected to the total system.
2. The generator is islanded by onshore system breakers.
3. The frequency may go transiently above 52Hz in responding to the disconnection of demand provided the duration of any excursion beyond 52Hz is less than the high frequency protection trip time for the generator.

Figure CP.A.3.6.1 – Diagram of Load Rejection Study

CP.A.3.6.5 Simulation study shall be performed for both control modes, Frequency Sensitive Mode (FSM) and Limited Frequency Sensitive Mode (LFSM). The simulation study results should indicate Active Power and Frequency in the island system that includes the Generating Unit, DC Converter or Power Park Module.
To allow validation of the model used to simulate load rejection in accordance with CC.6.3.7(c)(i) as described a further simulation study is required to represent the largest positive Frequency injection step or fast ramp (BC1 and BC3 of Figure 2) that will be applied as a test as described in OC5.A.2.8 and OC5.A.3.6.

Voltage and Frequency Controller Model Verification and Validation

For Generating Units, DC Converters or Power Park Modules with a Completion Date after 1 January 2012 or subject to a Modification to a Excitation System, voltage control system, governor control system or Frequency control system after 1 January 2012 the Generator or DC Converter Station owner shall provide simulation studies to verify that the proposed controller models supplied to NGET under the Planning Code are fit for purpose. These simulation study results shall be provided in the timescales stated in the Planning Code. For Power Park Modules comprised of Power Park Units having a corresponding generically verified and validated model in a Manufacturer's Data & Performance Report NGET may permit the simulation studies detailed in CP.A.3.7.2, CP.A.3.7.4 and CP.A.3.7.5 to be replaced by submission of the correct Manufacturer's Data & Performance Report reference in the appropriate location in the Data Registration Code.

To demonstrate the Frequency control or governor/load controller/plant model the Generator or DC Converter Station owner shall submit a simulation study representing the response of the Synchronous Generating Unit, DC Converter or Power Park Module operating at 80% of Registered Capacity. The simulation study event shall be equivalent to:

(i) a ramped reduction in the measured System Frequency of 0.5Hz in 10 seconds followed by

(ii) 20 seconds of steady state with the measured System Frequency depressed by 0.5Hz followed by

(iii) a ramped increase in measured System Frequency of 0.3Hz over 30 seconds followed by

(iv) 60 seconds of steady state with the measured System Frequency depressed by 0.2Hz as illustrated in Figure CP.A.3.7.2 below.

The simulation study shall show Active Power output (MW) and the equivalent of Frequency injected.

To demonstrate the Excitation System model the Generator shall submit simulation studies representing the response of the Synchronous Generating Unit as follows:

(i) operating open circuit at rated terminal voltage and subjected to a 2% step increase in terminal voltage reference.
(ii) operating at Rated MW, nominal terminal voltage and unity power factor subjected to a 2% step increase in the voltage reference. Where a Power System Stabiliser is included within the Excitation System this shall be in service.

The simulation study shall show the terminal voltage, field voltage of the Generating Unit, Active Power, Reactive Power and Power System Stabiliser output signal as appropriate.

CP.A.3.7.4 To demonstrate the Voltage Controller model the Generator or DC Converter Station owner shall submit a simulation study representing the response of the Non-Synchronous Generating Unit, DC Converter or Power Park Module operating at Rated MW and unity power factor at the connection point to a 2% step increase in the voltage reference. The simulation study shall show the terminal voltage, Active Power, Reactive Power and Power System Stabiliser output signal as appropriate.

CP.A.3.7.5 To validate that the excitation and voltage control models submitted under the Planning Code are a reasonable representation of the dynamic behaviour of the Synchronous Generating Unit, DC Converter Station or Power Park Module as built, the Generator or DC Converter Station owner shall repeat the simulation studies outlined above but using the operating conditions of the equivalent tests. The simulation study results shall be displayed overlaid on the actual test results.

CP.A.3.7.7 For Generating Units or DC Converters with a Completion Date after 1 January 2012 or subject to a Modification to the governor system or Frequency control system after 1 January 2013 to validate that the governor/load controller/plant or Frequency control models submitted under the Planning Code is a reasonable representation of the dynamic behaviour of the Synchronous Generating Unit or DC Converter Station as built, the Generator or DC Converter Station owner shall repeat the simulation studies outlined above but using the operating conditions of the equivalent tests. The simulation study results shall be displayed overlaid on the actual test results.
CP.A.3.8  **Sub-synchronous Resonance Control and Power Oscillation Damping Control for DC Converters**

CP.A.3.8.1 To demonstrate the compliance of the sub-synchronous control function with CC.6.3.16(a) and the terms of the **Bilateral Agreement**, the **DC Converter Station** owner or **Generator** undertaking **OTSDUW** shall submit a simulation study report.

CP.A.3.8.2 Where power oscillation damping control function is specified on a **DC Converter** the **DC Converter Station** owner or **Generator** undertaking **OTSDUW** shall submit a simulation study report to demonstrate the compliance with CC.6.3.16(b) and the terms of the **Bilateral Agreement**.

CP.A.3.8.3 The simulation studies should utilise the **DC Converter** control system models including the settings as required under the **Planning Code** (PC.A.5.3.2). The network conditions for the above simulation studies should be discussed with **NGET** prior to commencing any simulation studies.

< END OF COMPLIANCE PROCESSES >