

**OPERATING CODE NO. 5**

TESTING AND MONITORING

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## OPERATING CODE NO. 5

### TESTING AND MONITORING

#### OC5.1 INTRODUCTION

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

- (a) monitoring
  - (i) of **BM Units** against their expected input or output;
  - (ii) of compliance by **Users** with the **CC** 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 Park Modules, DC Converters** and **Generating Units** (excluding **Power Park Units**) to test that they have the capability to comply with the **CC** 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, QPNs, Joint BM Unit Data** and **Dynamic Parameters**.

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Provisions regarding the demonstration of compliance, including testing, with the CCs and BC3 is detailed in CC.4 for **Generators** and **DC Converter Station** owners and in CC.3.3 for **LEEMPS/LEEMDCCS**. Appendix CC.A.13 provides details concerning Compliance Testing for Synchronous Plant and CC.A.14 covers Compliance Testing for **Power Park Modules**.

CC.4.5 details the process to be followed in certain circumstances to demonstrate ongoing compliance. This process includes any testing necessary to demonstrate that compliance with a specific Grid Code requirement has been restored following plant failure and consequential remedial work.

The purpose of testing of generation plant under OC5 is limited to investigations to resolve the position where **NGET** and the **Generator** or **DC Converter Station** owner cannot agree as to whether or not the **Plant** and / or **Apparatus** is compliant with the requirements of the Grid Code. Where a **Limited Operational Notification** has been issued in respect of **Plant** and **Apparatus**, the testing provisions of this OC5 (that is, OC5.5) are not applicable to the matters which are the subject of the **Limited Operational Notification**.

The **OC5** tests include the **Black Start Test** procedure.

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

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

- (y) 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;
- (z) 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:

- (1) where there is a **BM Unit** registered in the **BSC** in respect of **Generating Units** the provisions of **OC5** shall apply as written;
- (2) in all other cases, in respect of each **Generating Unit** 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 **Generating Unit** 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**;
- (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, QPN, Joint BM Unit Data** and **Dynamic Parameters**; and
- (d) whether **Generators, DC Converter Station** 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 **NGET** and to **Users**, which in **OC5** means:

- (a) **Generators**;

- (b) **Network Operators;**
- (c) **Non-Embedded Customers;**
- (d) **Suppliers;** and
- (e) **DC Converter Station** owners.

OC5.4 MONITORING

OC5.4.1 Parameters to be monitored

**NGET** 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**; 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 **NGET's** reasonable view, to follow, in any material respect, its expected input or output or a **User** fails persistently to comply with the **CC** and in the case of response to **Frequency**, **BC3** or to provide the **Ancillary Services** it is required, or has agreed, to provide, **NGET** shall notify the relevant **User** giving details of the failure and of the monitoring that **NGET** has carried out.

OC5.4.2.2 The relevant **User** will, as soon as possible, provide **NGET** 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 **Generating Unit** (excluding a **Power Park Unit**), **CCGT Module**, **Power Park Module** or **DC Converter** to comply with the **CC** 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. Where, in **NGET's** reasonable view, the failure is in relation to compliance with the **CC** and **BC3**, **NGET** shall invoke the process detailed in **CC.4.5**. For **LEEMPS/LEEMDCCS** the process defined in **CC.3.3.6** will apply.

OC5.4.2.3 [Where the process detailed in CC.4.5 is not invoked](#) **NGET** 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 **NGET** to the **User**, **NGET** 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 INVESTIGATIVE TESTING](#)

##### OC5.5.1 [Request For Investigative Testing](#)

OC5.5.1.1 **NGET** 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 **NGET** has reasonable grounds of justification based upon:

- (a) a submission of data, or a statement from a **User** indicating a change in plant or apparatus or settings (including but not limited to governor and excitation control systems) that may reasonably be expected to result in a material change of performance; or
- (b) monitoring carried out in accordance with OC5.4.2; or
- (c) notification from a **User** of completion of an agreed action from

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, QPN, Joint BM Unit Data** 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** or a **DC Converter** meets,

(c) the delivery of the Ancillary Service Agreement values when in **Frequency Sensitive Mode** and compliance with the requirements for operation in **Limited Frequency Sensitive Mode** in accordance with CC.6.3.3, BC3.5.2 and BC3.7.2; or

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

(e) the **Reactive Power** capability registered with **NGET** under **OC2**. 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**.

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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 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 **NGET** 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**.

OC5.5.2 Conduct Of Investigative Test

OC5.5.2.1 The performance of the **BM Unit** in respect of the disputed position to be investigated will be recorded at **Transmission Control Centres** notified by **NGET** with monitoring at site when necessary, from voltage and current signals provided by the **User** for each **BM Unit** under CC.6.6.1.

OC5.5.2.2 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**, 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 Park Module** or **DC Converter** at the point of connection in the relevant **User's Control Room**, in the presence of a reasonable number of representatives appointed and authorised by **NGET**. If **NGET** or the

User requests, monitoring at site will include measurement of parameters: [as set out in CC.A.13 or CC.A.14 as appropriate](#)

- OC5.5.2.3 The test 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, QPN, Joint BM Unit Data 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). The instructions in respect of a **CCGT Unit** within a **CCGT Module** will be in respect of the **CCGT Unit**, as provided in BC2.
- OC5.5.2.4 The **User** is responsible for carrying out the test when requested by **NGET** in accordance with OC5.5.1 and retains the responsibility for the safety of personnel and plant during the test.
- [OC5.5.2.5 Tests to be carried out to demonstrate compliance with the Grid Code are carried out under processes defined in the Connection Conditions, in particular in CC.A.13 for synchronous plant and CC.A.14 for Power Park Modules.](#)

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<#>for Steam Turbines: governor pilot oil pressure, valve position and steam pressure; or¶

¶  
<#>for Gas Turbines: Inlet Guide Vane position, Fuel Valve positions, Fuel Demand signal and Exhaust Gas temperature; or¶

¶  
<#>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.¶

¶  
(e) . . for **Power Park Modules**: appropriate signals related to the voltage/**Reactive Power/Power Factor** control system and the **Frequency** control system as agreed at the time of connection.¶

¶  
(f) . . for **DC Converters**: appropriate signals related to the voltage/**Reactive Power/Power Factor** control system and the **Frequency** control system as agreed at the time of connection.¶

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

Parameter to be Tested	Grid Code Reference	Pass Criteria (to be read in conjunction with the full text under the Grid Code reference)
Voltage Quality	Harmonic Content	Measured harmonic emissions do not exceed the limits specified in the <b>Bilateral Agreement</b> or where no such limits are specified, the relevant planning level specified in G5/4.
	Phase Unbalance	The measured maximum <b>Phase (Voltage) Unbalance</b> on the <b>National Electricity Transmission System</b> should remain, in England and Wales, below 1% and, in Scotland, below 2% and <b>Offshore</b> will be defined in relevant <b>Bilateral Agreement</b> ..
	Phase Unbalance	In England and Wales, measured infrequent short duration peaks in <b>Phase (Voltage) Unbalance</b> should not exceed the maximum value stated in the <b>Bilateral Agreement</b> .
	Voltage Fluctuations	In England and Wales, measured voltage fluctuations at the <b>Point of Common Coupling</b> shall not exceed 1% of the voltage level for step changes. Measured voltage excursions other than step changes may be allowed up to a level of 3%. In Scotland, measured voltage fluctuations at a <b>Point of Common Coupling</b> shall not exceed the limits set out in <b>Engineering Recommendation P28</b> .
	Flicker	Measured voltage fluctuations at a <b>Point of Common Coupling</b> shall not exceed, for voltages above 132kV, <b>Flicker Severity (Short Term)</b> of 0.8 Unit and <b>Flicker Severity (Long Term)</b> of 0.6 Unit, and, for voltages at 132kV and below, shall not exceed <b>Flicker Severity (Short Term)</b> of 1.0 Unit and <b>Flicker Severity (Long Term)</b> of 0.8 Unit, as set out in <b>Engineering Recommendation P28</b> as current at the <b>Transfer Date</b> .

Parameter to be Tested	Grid Code Reference	Pass Criteria (to be read in conjunction with the full text under the Grid Code reference)
Fault Clearance	Voltage Fluctuations	<b>Offshore</b> , measured voltage fluctuations at the <b>Point of Common Coupling</b> shall not exceed the limits set out in the <b>Bilateral Agreement</b> .
	Fault Clearance Times	The fault clearance times shall be in accordance with the <b>Bilateral Agreement</b> .
	<b>Back-Up Protection</b>	The <b>Back-Up Protection</b> system provided by <b>Generators</b> operates in the times specified in CC.6.2.2.2(b). The <b>Back-Up Protection</b> system provided by <b>Network Operators</b> and <b>Non-Embedded Customers</b> operates in the times specified in CC.6.2.3.1.1(b) and with <b>Discrimination</b> as specified in the <b>Bilateral Agreement</b> .
	Circuit Breaker fail <b>Protection</b>	The circuit breaker fail <b>Protection</b> shall initiate tripping so as to interrupt the fault current within 200ms.
Reactive Capability	CC.6.3.2  CC.6.3.4	The <b>Generating Unit</b> , <b>DC Converter</b> or <b>Power Park Module</b> will pass the test <a href="#">for reactive delivery</a> if it is within $\pm 5\%$ of the reactive capability registered with <b>NGET</b> under <b>OC2 Compliance with</b> the requirements <a href="#">of the CC shall be assessed in accordance with CC.A.13 and CC.14</a>

**Deleted:** set out in CC.6.3.2.¶

**Deleted:** 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 **Generating Unit**, **DC Converter** or **Power Park Module** will be maintained by the **Generator** at the voltage specified pursuant to BC2.8 by adjustment of **Reactive Power** on the remaining **Generating Units**, **DC Converters** or **Power Park Modules**, 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** 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  $\pm 5\%$  at 400kV, 275kV and 132kV and lower voltages.

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Parameter to be Tested	Grid Code Reference	Pass Criteria (to be read in conjunction with the full text under the Grid Code reference)
<b>Primary, Secondary and High Frequency Response</b>		The measured response in MW/Hz is within $\pm 5\%$ of the level of response specified in the <b>Ancillary Services Agreement</b> for that <b>Genset</b> .
Stability with Voltage	CC.6.3.4	The measured <b>Active Power</b> output under steady state conditions of any <b>Generating Unit</b> , <b>DC Converter</b> or <b>Power Park Module</b> directly connected to the <b>National Electricity Transmission System</b> should not be affected by voltage changes in the normal operating range.
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<b>Governor</b>	<a href="#">CC.6.3.7</a>	<a href="#">Compliance with the requirements of the CC shall be assessed in</a>
<b>Output at reduced System Frequency</b>	CC.6.3.3 BC3.5.1	For variations in <b>System Frequency</b> exceeding 0.1Hz within a period of less than 10 seconds, the <b>Active Power</b> output is within $\pm 0.2\%$ of the requirements of CC.6.3.3 when monitored at prevailing external air temperatures of up to 25°C.

- Deleted:** BC3.7.2. i.e. the measured rate of change of **Active Power** output must be at least 2% of output per 0.1Hz deviation of **System Frequency** above 50.4Hz.
- Deleted:** Measurements indicate that the Governor/**Frequency** control system parameters are within the criteria set out in the appropriate governor/**Frequency** control system standard (the version of which to apply being determined within CC.6.3.7).¶
- Deleted:** The measured **Generating Unit**, **DC Converter** or **Power Park Module Active Power Output** shall be stable over the entire operating range of the **Generating Unit**.¶
- Deleted:** The measured speed governor overall speed droop should be between 3% and 5%.
- Deleted:** Except for the **Steam Unit** within a **CCGT Module**, the measured speed governor/**Frequency** control system deadband shall be no greater than 0.03Hz (for the avoidance of doubt,  $\pm 0.015\text{Hz}$ ).
- Deleted:** **Target Frequency** settings over at least the range 50  $\pm 0.1$  Hz shall be available.
- Deleted:** The measured frequency response of each **Generating Unit** and/or **CCGT Module** which has a **Completion Date** after 1 January 2001 in England and Wales and after 1 April 2005 in Scotland or **Offshore** shall meet requirement profile contained in **Connection Conditions** Appendix 3. Similarly for **DC Converters** with **Completion Dates** on or after 1 April 2005 and **Power Park Modules** using the **National Electricity Transmission System** on or after 1 January 2006 (irrespective of its ... [1])
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CC.A.3
- Deleted:** BC3.7.2(b)
- Deleted:** Governor Standard
- Deleted:** Governor Stability
- Deleted:** Governor Droop
- Deleted:** Governor Deadband
- Deleted:** **Target Frequency**
- Deleted:** Response Capability
- Deleted:** **Limited High Frequency Response**
- Deleted:** Governor System Compliance

Parameter to be Tested	Grid Code Reference	Pass Criteria (to be read in conjunction with the full text under the Grid Code reference)
<b>Fast Start</b>		The <b>Fast Start Capability</b> requirements of the <b>Ancillary Services Agreement</b> for that <b>Genset</b> are met.
<b>Black Start</b>	OC.5.7.1	The relevant <b>Generating Unit</b> or <b>Power Park Module</b> is <b>Synchronised</b> to the <b>System</b> within two hours of the <b>Auxiliary Gas Turbine(s)</b> or <b>Auxiliary Diesel Engine(s)</b> being required to start.
<b>Excitation System/ Voltage Control</b>	CC.6.3.8(a) (b) & BC2.11.2	<u>Compliance with the requirements of the CC shall be assessed in accordance with <a href="#">CC.A.13</a> and <a href="#">CC.A.14</a>.</u>

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(i) constant terminal voltage control; or¶  
(ii) zero MVA transfer; or,¶  
(iii) voltage control with a **Slope**¶  
of the **Generating Unit, DC Converter** or **Power Park Module** as applicable without instability over the entire operating range of the **Generating Unit, DC Converter** or **Power Park Module**. The measured performance of the automatic excitation or voltage control system should also meet the requirements (including **Power System Stabiliser** performance) specified in the **Bilateral Agreement** or any requirements Specified in an **Embedded Development Agreement**.

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 **NGET's** reasonable satisfaction, the reliability of the suitable recorders, disclosing calibration records to the extent appropriate.

Parameter to be Tested	Grid Code Reference	Pass Criteria
<b>Export and Import Limits, QPN, Joint BM Unit Data and Dynamic Parameters</b>	OC5	<p>The <b>Export and Import Limits, QPN, Joint BM Unit Data</b> and <b>Dynamic Parameters</b> under test are within 2½% of the declared value being tested.</p> <p>The duration of the test will be consistent with and sufficient to measure the relevant expected input or output derived from the <b>Final Physical Notification Data</b> and <b>Bid-Offer Acceptances</b> issued under BC2 which are still in dispute following the procedure in OC5.4.2.</p>
<b>Synchronisation time</b>	BC2.5.2.3	<p><b>Synchronisation</b> takes place within ±5 minutes of the time it should have achieved <b>Synchronisation</b>.</p> <p>The duration of the test will be consistent with and sufficient to measure the relevant expected input or output derived from the <b>Final Physical Notification Data</b> and <b>Bid-Offer Acceptances</b> issued under BC2 which are still in dispute following the procedure in OC5.4.2.</p>
Run-up rates	OC5	<p>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 <b>Synchronisation</b> (or break point, as the case may be), calculated from the run-up rates in its <b>Dynamic Parameters</b>.</p> <p>The duration of the test will be consistent with and sufficient to measure the relevant expected input or output derived from the <b>Final Physical Notification Data</b> and <b>Bid-Offer Acceptances</b> issued under BC2 which are still in dispute following the procedure in OC5.4.2.</p>
Run-down rates	OC5	<p>Achieves the instructed output within ±5 minutes of the time, calculated from the run-down rates in its <b>Dynamic Parameters</b>.</p> <p>The duration of the test will be consistent with and sufficient to measure the relevant expected input or output derived from the <b>Final Physical Notification Data</b> and <b>Bid-Offer Acceptances</b> issued under BC2 which are still in dispute following the procedure in OC5.4.2.</p>

**Dynamic Parameters**

OC5.5.4 Test Failure/Re-test

OC5.5.4.1 If the **BM Unit, CCGT Modules, Power Park Module** or **Generating Unit** (excluding **Power Park Units**) concerned fails to pass the test the **User** must provide **NGET** 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.

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OC5.5.4.2 If in **NGET's** reasonable opinion the failure to pass the test relates to compliance with the **CCs** then **NGET** may invoke the process detailed in **CC.4.5**.

OC5.5.4.3 If a dispute arises relating to the failure, **NGET** 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 **NGET** to carry out 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 **NGET** had issued an instruction at the time of notice from the **User**.

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OC5.5.5 Dispute following Re-test

If the **BM Unit, CCGT Module, Power Park Module** or **Generating Unit** (excluding **Power Park Units**) in **NGET'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, CCGT Module, Power Park Module** or **Generating Unit** (excluding **Power Park Units**) has failed the test or re-test (as applicable), the **User** shall within 14 days, or such longer period as **NGET** may reasonably agree, following such failure, submit in writing to **NGET** 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. **NGET** will not unreasonably withhold or delay its approval of the **User's** proposed date and time submitted. Should **NGET** not approve the **User's** proposed date or time (or any revised proposal), the **User** should amend such proposal having regard to any comments **NGET** 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, QPN, Joint BM Unit Data** and/or **Dynamic Parameters**, or in the case of a **BM Unit** comprising a **Generating Unit, CCGT Module, DC Converter** or **Power Park Module**, the **User** may amend, with **NGET's** approval, the relevant registered parameters of that **Generating Unit, CCGT Module, DC Converter** 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 **NGET** the date and time that the **BM Unit, CCGT Module, Power Park Module** or **Generating Unit** (excluding **Power Park Units**) can achieve the parameters previously registered or submitted, **NGET** 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 OC5.5.2 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**

OC.5.7.1 **General**

- (a) **NGET** may require a **Generator** with a **Black Start Station** to carry out a test (a "**Black Start Test**") on a **Genset** in a **Black Start Station** either while the **Black Start Station** remains connected to an external alternating current electrical supply (a "**BS Unit Test**") or while the **Black Start Station** is disconnected from all external alternating current electrical supplies (a "**BS Station Test**"), in order to demonstrate that a **Black Start Station** has a **Black Start Capability**.
- (b) Where **NGET** requires a **Generator** with a **Black Start Station** to carry out a **BS Unit Test**, **NGET** shall not require the **Black Start Test** 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 **Genset** at the **Black Start Station** to be directly affected by the **BS Unit Test**.
- (c) **NGET** may require a **Generator** with a **Black Start Station** to carry out a **BS Unit Test** at any time (but will not require a **BS 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, and will not require a **BS Station Test** to be carried out more than once in every two 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).
- (d) When **NGET** wishes a **Generator** with a **Black Start Station** to carry out a **Black Start Test**, it shall notify the relevant **Generator** at least 7 days prior to the time of the **Black Start Test** with details of the proposed **Black Start Test**.

OC.5.7.2 **Procedure for a Black Start Test**

The following procedure will, so far as practicable, be carried out in the following sequence for **Black Start Tests**:

OC.5.7.2.1 **BS 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 **NGET** under **BC2**.

#### OC.5.7.2.2 **BS 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 OC.5.7.2.1 (e) and (f) shall thereafter be followed.

OC.5.7.2.3 All **Black Start Tests** shall be carried out at the time specified by **NGET** in the notice given under OC5.7.1(d) and shall be undertaken in the presence of a reasonable number of representatives appointed and authorised by **NGET**, who shall be given access to all information relevant to the **Black Start Test**.

#### OC.5.7.2.4 **Failure of a Black Start Test**

A **Black Start Station** shall fail a **Black Start Test** if the **Black Start Test** shows that it does not have a **Black Start Capability** (i.e. if the relevant **Generating Unit** 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).

OC.5.7.2.5 If a **Black Start Station** fails to pass a **Black Start Test** the **Generator** must provide **NGET** 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. This must be provided within five **Business Days** of the test. If a dispute arises relating to the failure, **NGET** and the relevant **Generator** shall seek to resolve the dispute by discussion, and if they fail to

reach agreement, the **Generator** may require **NGET** to carry out a further **Black Start Test** on 48 hours notice which shall be carried out following the procedure set out in OC.5.7.2.1 or OC.5.7.2.2 as the case may be, as if **NGET** had issued an instruction at the time of notice from the **Generator**.

OC.5.7.2.6 If the **Black Start Station** 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.

OC.5.7.2.7 If following the procedure in OC.5.7.2.5 and OC.5.7.2.6 it is accepted that the **Black Start Station** has failed the **Black Start Test** (or a re-test carried out under OC.5.7.2.5), within 14 days, or such longer period as **NGET** may reasonably agree, following such failure, the relevant **Generator** shall submit to **NGET** in writing for approval, the date and time by which that **Generator** shall have brought that **Black Start Station** to a condition where it has a **Black Start Capability** and would pass the **Black Start Test**, and **NGET** will not unreasonably withhold or delay its approval of the **Generator's** proposed date and time submitted. Should **NGET** not approve the **Generator's** proposed date and time (or any revised proposal) the **Generator** shall revise such proposal having regard to any comments **NGET** may have made and resubmit it for approval.

OC.5.7.2.8 Once the **Generator** has indicated to **NGET** that the **Generating Station** has a **Black Start Capability**, **NGET** shall either accept this information or require the **Generator** to demonstrate that the relevant **Black Start Station** has its **Black Start Capability** restored, by means of a repetition of the **Black Start Test** referred to in OC5.7.1(d) following the same procedure as for the initial **Black Start Test**. The provisions of this OC.5.7.2 will apply to such test.

OC.5.8 PROCEDURES APPLYING TO EMBEDDED MEDIUM POWER STATION NOT SUBJECT TO A BILATERAL AGREEMENT AND EMBEDDED DC CONVERTER STATIONS NOT SUBJECT TO A BILATERAL AGREEMENT

OC5.8.1 Responsibility and scope.  
The responsibility for compliance of new plant is set out in CC3.3.1 to CC3.3.5. Ongoing compliance for LEEMPS/LEEMDCCS is covered in CC3.3.6 and this specifies that irrespective of whether NGET or the Network Operator has had responsibility for assessing compliance of new LEEMPS/LEEMDCCS on its initial commissioning, the ongoing responsibility for monitoring and ensuring compliance of the LEEMPS/LEEMDCCS is with the Network Operator. The purpose of OC5.8 is limited to a process to investigate and resolve differences in views about ongoing compliance.

OC5.8.2 **Network Operator's** Obligations to require Investigative Tests to be undertaken by LEEMPS/LEEMDCCS in the context of Ongoing Compliance.

If:

(a) the LEEMPS/LEEMDCCS considers itself fully compliant and the Network Operator does not agree; or

**Deleted:** Compliance Statement

**Deleted:** Each **Network Operator** shall ensure that each **Embedded Person** provides to the **Network Operator** upon **NGET's** request:¶

¶  
<#>written confirmation that each such **Generating Unit, Power Park Module** or **DC Converter** complies with the requirements of the **CC**; and¶  
¶  
<#>evidence, where requested, reasonably satisfactory to **NGET**, of such compliance. Such a request shall not normally be made by **NGET** more than twice in any calendar year in respect of any **Generator's Generating Unit** or **Power Park Module** 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 **NGET**. ¶  
¶

**Deleted:** ¶  
¶

**Deleted:** Facilitate Tests

**Deleted:** fails to procure the confirmation referred to at OC5.8.1(a);

- (b) the Network Operator considers the LEEMPS/LEEMDCCS fully compliant, yet NGET is not satisfied about such ongoing compliance.

**Deleted:** the evidence of compliance is not to NGET's reasonable satisfaction,

then, NGET shall be entitled to require the Network Operator to undertake investigative testing (in accordance with the following provisions of OC5.8) to establish the complete and accurate position in relation to such Embedded Person.

**Deleted:** procure access upon terms reasonably satisfactory to NGET to enable NGET 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.

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**

NGET 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** 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** 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 Park Module** or **DC Converter** comprising part of the relevant **Embedded Medium Power Station** or **Embedded DC Converter Station** and should only be to demonstrate that:

- (a) the relevant **Generating Unit, Power Park Module** or **DC Converter** meets the requirements of the paragraphs in the **CC** which are applicable to such **Generating Units, Power Park Module** or **DC Converter**;
- (b) the **Reactive Power** capability registered with NGET under **OC2** meets the requirements set out in CC.6.3.2.

The instruction may only be issued where, following consultation with the relevant **Network Operator**, NGET 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 OC5.5.2; and
- (b) received confirmation from the relevant **Network Operator** that the relevant **Generating Unit, Power Park Module** or **DC Converter** 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 NGET 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 OC5.5.4, OC5.5.5 and OC5.6 apply to **Embedded Medium Power Stations** not the subject of a **Bilateral Agreement** or **Embedded DC Converter Stations** 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 OC5.5.4, OC5.5.5 and OC5.6 referred to in OC5.8.4(a) are effective so that **NGET** may require, if it so wishes, the provision to it of any reports or other information equivalent to those or that to which **NGET** would be entitled in relation to test failures, re-tests and disputes as to test failures and re-tests under the provisions of OC5.5.4, OC5.5.5 and OC5.6; and
- (c) the provisions equivalent to OC5.5.4, OC5.5.5 and OC5.6 referred to in OC5.8.4(a) are effective to permit **NGET** 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** or **Embedded DC Converter Stations** 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 OC5.5.4, OC5.5.5 and OC5.6.

<End of OC5>

The measured frequency response of each **Generating Unit** and/or **CCGT Module** which has a **Completion Date** after 1 January 2001 in England and Wales and after 1 April 2005 in Scotland or **Offshore** shall meet requirement profile contained in **Connection Conditions** Appendix 3. Similarly for **DC Converters** with **Completion Dates** on or after 1 April 2005 and **Power Park Modules** using the **National Electricity Transmission System** on or after 1 January 2006 (irrespective of its **Completion Date** excepting those in Scotland with **Completion Date** before 1 April 2005).