

Our Ref:

Your Ref:

Date: March 2009

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Dear Sir/Madam

THE SERVICED GRID CODE – ISSUE 3 REVISION 33

Revision 33 of Issue 3 of the Grid Code has been approved by the Authority for implementation on **16th March 2009**.

I have enclosed the replacement pages that incorporate the agreed changes necessary to update the Grid Code Issue 3 to Revision 33 standard.

The enclosed note provides a brief summary of the changes made to the text.

Yours faithfully

Richard Dunn
Electricity Codes



INVESTOR IN PEOPLE

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England and Wales
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THE GRID CODE

Issue 3

Revision 33
16th March 2009

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THE GRID CODE – ISSUE 3 REVISION 33

INCLUSION OF REVISED PAGES

Title Page

Glossary and Definitions GD - **Pages 41- 42**

Connection Conditions CC - **Contents Pages, Pages 25 to 40**

Revisions - **Page 29**

NOTE: See Page 1 of the Revisions section of the Grid Code for details of how the revisions are indicated on the pages.

NATIONAL GRID ELECTRICITY TRANSMISSION PLC

THE GRID CODE – ISSUE 3 REVISION 33

SUMMARY OF CHANGES

The changes arise from the implementation of modifications proposed in the following Consultation Paper:

- **F/08** – Grid Code Requirements for System to Generator Operational Intertripping Scheme

Summary of Proposals

Codification of the generic information which will be specified in a Bilateral Agreement regarding the System to Generator Operational Intertripping Scheme; including information regarding the functional specification and performance of the scheme.

The categories of Users affected by this revision to the Grid Code are:

- Network Operators
- Generators

<u>System</u>	Any User System and/or the GB Transmission System , as the case may be.
<u>System Ancillary Services</u>	Collectively Part 1 System Ancillary Services and Part 2 System Ancillary Services .
<u>System Constraint</u>	A limitation on the use of a System due to lack of transmission capacity or other System conditions.
<u>System Constrained Capacity</u>	That portion of Registered Capacity or Registered Import Capacity not available due to a System Constraint .
<u>System Constraint Group</u>	A part of the GB Transmission System which, because of System Constraints , is subject to limits of Active Power which can flow into or out of (as the case may be) that part.
<u>System Fault Dependability Index or Dp</u>	<p>A measure of the ability of Protection to initiate successful tripping of circuit-breakers which are associated with a faulty item of Apparatus. It is calculated using the formula:</p> $Dp = 1 - F_1/A$ <p>Where:</p> <p>A = Total number of System faults</p> <p>F₁ = Number of System faults where there was a failure to trip a circuit-breaker.</p>
<u>System Margin</u>	<p>The margin in any period between</p> <p>(a) the sum of Maximum Export Limits and</p> <p>(b) forecast Demand and the Operating Margin,</p> <p>for that period.</p>
<u>System Negative Reserve Active Power Margin or System NRAPM</u>	That margin of Active Power sufficient to allow the largest loss of Load at any time.
<u>System Operator - Transmission Owner Code or STC</u>	Has the meaning set out in NGET's Transmission Licence

<u>System Telephony</u>	An alternative method by which a User's Responsible Engineer/Operator and NGET Control Engineer(s) speak to one and another for the purposes of control of the Total System in both normal operating conditions and where practicable, emergency operating conditions.
<u>System Tests</u>	Tests which involve simulating conditions, or the controlled application of irregular, unusual or extreme conditions, on the Total System , or any part of the Total System , but which do not include commissioning or recommissioning tests or any other tests of a minor nature.
<u>System to Demand Intertrip Scheme</u>	An intertrip scheme which disconnects Demand when a System fault has arisen to prevent abnormal conditions occurring on the System .
<u>System to Generator Operational Intertripping</u>	A Balancing Service involving the initiation by a System to Generator Operational Intertripping Scheme of automatic tripping of the User's circuit breaker(s) resulting in the tripping of BM Unit(s) or (where relevant) Generating Unit(s) comprised in a BM Unit to prevent abnormal system conditions occurring, such as over voltage, overload, System instability, etc, after the tripping of other circuit-breakers following power System fault(s).
<u>System to Generator Operational Intertripping Scheme</u>	A System to Generating Unit or System to CCGT Module or System to Power Park Modules intertripping scheme forming a condition of connection and specified in Appendix F3 of the relevant Bilateral Agreement , being either a Category 1 Intertripping Scheme , Category 2 Intertripping Scheme , Category 3 Intertripping Scheme or Category 4 Intertripping Scheme .
<u>System Zone</u>	A region of the GB Transmission System within a described boundary or the whole of the GB Transmission System , as further provided for in OC2.2.4, and the term " Zonal " will be construed accordingly.
<u>Target Frequency</u>	That Frequency determined by NGET , in its reasonable opinion, as the desired operating Frequency of the Total System . This will normally be 50.00Hz plus or minus 0.05Hz, except in exceptional circumstances as determined by NGET , in its reasonable opinion when this may be 49.90 or 50.10Hz. An example of exceptional circumstances may be difficulties caused in operating the System during disputes affecting fuel supplies.
<u>Technical Specification</u>	In relation to Plant and/or Apparatus , <ul style="list-style-type: none"> a) the relevant European Specification; or b) if there is no relevant European Specification, other relevant standards which are in common use in the European Community.
<u>Test Co-ordinator</u>	A person who co-ordinates System Tests .

CONNECTION CONDITIONS

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transient rating limits of the **Generating Unit** or **Power Park Module** and any constituent **Power Park Unit**; and,

- (iii) restore **Active Power** output, following **Supergrid Voltage** dips as described in Figure 5, within 1 second of restoration of the voltage at the **Grid Entry Point** to the minimum levels specified in CC.6.1.4 (or within 1 second of restoration of the voltage at the **User System Entry Point** to 90% of nominal or greater if **Embedded**), to at least 90% of the level available immediately before the occurrence of the dip except in the case of a **Non-Synchronous Generating Unit** or **Power Park Module** where there has been a reduction in the **Intermittent Power Source** in the time range in Figure 5 that restricts the **Active Power** output below this level. Once the **Active Power** output has been restored to the required level, **Active Power** oscillations shall be acceptable provided that:
 - the total **Active Energy** delivered during the period of the oscillations is at least that which would have been delivered if the **Active Power** was constant
 - the oscillations are adequately damped.

For the avoidance of doubt a balanced **Supergrid Voltage** meets the requirements of CC.6.1.5 (b) and CC.6.1.6.

(c) Other Requirements

- (i) In the case of a **Power Park Module** (comprising of wind-turbine generator units), the requirements in CC.6.3.15(a) and CC.6.3.15(b) do not apply when the **Power Park Module** is operating at less than 5% of its **Rated MW** or during very high wind speed conditions when more than 50% of the wind turbine generator units in a **Power Park Module** have been shut down or disconnected under an emergency shutdown sequence to protect **User's Plant** and **Apparatus**.
- (ii) In addition to meeting the conditions specified in CC.6.1.5(b) and CC.6.1.6, each **Non-Synchronous Generating Unit** or **Power Park Module** with a **Completion Date** after 1 April 2005 and any constituent **Power Park Unit** thereof will be required to withstand, without tripping, the negative phase sequence loading incurred by clearance of a close-up phase-to-phase fault, by **System Back-Up Protection** on the **GB Transmission System** operating at **Supergrid Voltage**.
- (iii) In the case of a **Power Park Module** in Scotland with a **Completion Date** before 1 January 2004 and a **Registered Capacity** less than 30MW the requirements in CC.6.3.15 (a) do not apply. In the case of a **Power Park Module** in Scotland with a **Completion Date** on or after 1 January 2004 and before 1 July 2005 and a **Registered Capacity** less than 30MW the requirements in CC.6.3.15 (a) are relaxed from the minimum **Supergrid Voltage** of zero to a minimum **Supergrid Voltage** of 15% of nominal. In the case of a **Power Park Module** in Scotland with a **Completion Date** before 1 January 2004 and a **Registered Capacity** of 30MW and above the requirements in CC.6.3.15 (a) are relaxed from the minimum **Supergrid Voltage** of zero to a minimum **Supergrid Voltage** of 15% of nominal.

(iv) To avoid unwanted island operation, **Non-Synchronous Generating Units** in Scotland or **Power Park Modules** in Scotland shall be tripped for the following conditions:-

- (1) Frequency above 52Hz for more than 2 seconds
- (2) Frequency below 47Hz for more than 2 seconds
- (3) Voltage as measured at the **Connection Point** or **User System Entry Point** below 80% for more than 2 seconds
- (4) Voltage as measured at the **Connection Point** or **User System Entry Point** above 120% (115% for 275kV) for more than 1 second.

The times in sections (1) and (2) are maximum trip times. Shorter times may be used to protect the **Non-Synchronous Generating Units** or **Power Park Modules**.

Additional Damping Control Facilities for DC Converters

- CC.6.3.16
- (a) **DC Converter** owners or **Network Operators** in the case of an **Embedded DC Converter Station** not subject to a **Bilateral Agreement** must ensure that any of their **DC Converters** will not cause a sub-synchronous resonance problem on the **Total System**. Each **DC Converter** is required to be provided with sub-synchronous resonance damping control facilities.
 - (b) Where specified in the **Bilateral Agreement**, each **DC Converter** is required to be provided with power oscillation damping or any other identified additional control facilities.

System to Generator Operational Intertripping Scheme

- CC.6.3.17
- NGET** may require that a **System to Generator Operational Intertripping Scheme** be installed as part of a condition of the connection of the **Generator**. Scheme specific details shall be included in the relevant **Bilateral Agreement** and shall, in respect of **Bilateral Agreements** entered into on or after 16th March 2009, include the following information:
1. the relevant category(ies) of the scheme (referred to as **Category 1 Intertripping Scheme, Category 2 Intertripping Scheme, Category 3 Intertripping Scheme** and **Category 4 Intertripping Scheme**);
 2. the **Generating Unit(s)** or **CCGT Module(s)** or **Power Park Module(s)** to be either permanently armed or that can be instructed to be armed in accordance with BC2.8;
 3. the time within which the **Generating Unit(s)** or **CCGT Module(s)** or **Power Park Module(s)** circuit breaker(s) are to be automatically tripped;
 4. the location to which the trip signal will be provided by **NGET**. Such location will be provided by **NGET** prior to the commissioning of the **Generating Unit(s)** or **CCGT Module(s)** or **Power Park Module(s)**.

Where applicable, the **Bilateral Agreement** shall include the conditions on the **GB Transmission System** during which **NGET** may instruct the **System to Generator Operational Intertripping Scheme** to be armed and the conditions that would initiate a trip signal.

CC.6.3.18 The time within which the **Generating Unit(s)** or **CCGT Module(s)** or **Power Park Module(s)** circuit breaker(s) need to be automatically tripped is determined by the specific conditions local to the **Generator**. This 'time to trip' (defined as time from provision of the trip signal by **NGET** to the specified location, to circuit breaker main contact opening) can typically range from 100ms to 10sec. A longer time to trip may allow the initiation of an automatic reduction in the **Generating Unit(s)** or **CCGT Module(s)** or **Power Park Module(s)** output prior to the automatic tripping of the **Generating Unit(s)** or **CCGT Module(s)** or **Power Park Module(s)** circuit breaker. Where applicable **NGET** may provide separate trip signals to allow for either a longer or shorter 'time to trip' to be initiated.

CC.6.4 GENERAL NETWORK OPERATOR AND NON-EMBEDDED CUSTOMER REQUIREMENTS

CC.6.4.1 This part of the **Grid Code** describes the technical and design criteria and performance requirements for **Network Operators** and **Non-Embedded Customers**.

Neutral Earthing

CC.6.4.2 At nominal **System** voltages of 132kV and above the higher voltage windings of three phase transformers and transformer banks connected to the **GB Transmission System** must be star connected with the star point suitable for connection to earth. The earthing and lower voltage winding arrangement shall be such as to ensure that the **Earth Fault Factor** requirement of paragraph CC.6.2.1.1 (b) will be met on the **GB Transmission System** at nominal **System** voltages of 132kV and above.

Frequency Sensitive Relays

CC.6.4.3 As explained under **OC6**, each **Network Operator**, will make arrangements that will facilitate automatic low **Frequency Disconnection of Demand** (based on **Annual ACS Conditions**). CC.A.5.5. of Appendix 5 includes specifications of the local percentage **Demand** that shall be disconnected at specific frequencies. The manner in which **Demand** subject to low **Frequency** disconnection will be split into discrete MW blocks is specified in OC6.6. Technical requirements relating to **Low Frequency Relays** are also listed in Appendix 5.

Operational Metering

CC.6.4.4 Where **NGET** can reasonably demonstrate that an **Embedded Medium Power Station** or **Embedded DC Converter Station** has a significant effect on the **GB Transmission System**, it may require the **Network Operator** within whose **System** the **Embedded Medium Power Station** or **Embedded DC Converter Station** is situated to ensure that the operational metering equipment described in CC.6.5.6 is installed such that **NGET** can receive the data referred to in CC.6.5.6. In the case of an **Embedded Medium Power Station** subject to, or proposed to be subject to a **Bilateral Agreement** **NGET** shall notify such **Network Operator** of the details of such installation in writing within 3 months of being notified of the application to connect under **CUSC** and in the case of an **Embedded Medium Power Station** not subject to, or not proposed to be subject to a **Bilateral Agreement** in writing as a **Site Specific Requirement** in accordance with the timescales in CUSC 6.5.5. In either case the **Network Operator** shall ensure that the data referred to in CC.6.5.6 is provided to **NGET**.

CC.6.5 COMMUNICATIONS PLANT

CC.6.5.1 In order to ensure control of the **GB Transmission System**, telecommunications between **Users** and **NGET** must, if required by **NGET**, be established in accordance with the requirements set down below.

CC.6.5.2 **Control Telephony and System Telephony**

CC.6.5.2.1 **Control Telephony** is the principle method by which a **User's Responsible Engineer/Operator** and **NGET Control Engineers** speak to one another for the purposes of control of the **Total System** in both normal and emergency operating conditions. **Control Telephony** provides secure point to point telephony for routine **Control Calls**, priority **Control Calls** and emergency **Control Calls**.

CC.6.5.2.2 **System Telephony** is an alternate method by which a **User's Responsible Engineer/Operator** and **NGET Control Engineers** speak to one another for the purposes of control of the **Total System** in both normal operating conditions and where practicable, emergency operating conditions. **System Telephony** uses the Public Switched Telephony Network to provide telephony for **Control Calls**, inclusive of emergency **Control Calls**.

CC.6.5.2.3 Calls made and received over **Control Telephony** and **System Telephony** may be recorded and subsequently replayed for commercial and operational reasons.

CC.6.5.3 Supervisory Tones

CC.6.5.3.1 **Control Telephony** supervisory tones indicate to the calling and receiving parties dial, engaged, ringing, secondary engaged (signifying that priority may be exercised) and priority disconnect tones.

CC.6.5.3.2 **System Telephony** supervisory tones indicate to the calling and receiving parties dial, engaged and ringing tones.

CC.6.5.4 Obligations in respect of **Control Telephony** and **System Telephony**

CC.6.5.4.1 Where **NGET** requires **Control Telephony**, **Users** are required to use the **Control Telephony** with **NGET** in respect of all **Connection Points** with the **GB Transmission System** and in respect of all **Embedded Large Power Stations** and **Embedded DC Converter Stations**. **NGET** will install **Control Telephony** at the **User's Control Point** where the **User's** telephony equipment is not capable of providing the required facilities or is otherwise incompatible with the **Transmission Control Telephony**. Details of and relating to the **Control Telephony** required are contained in the **Bilateral Agreement**.

CC.6.5.4.2 Where in **NGET's** sole opinion the installation of **Control Telephony** is not practicable at a **User's Control Point(s)**, **NGET** shall specify in the **Bilateral Agreement** whether **System Telephony** is required. Where **System Telephony** is required by **NGET**, the **User** shall ensure that **System Telephony** is installed.

CC.6.5.4.3 Where **System Telephony** is installed, **Users** are required to use the **System Telephony** with **NGET** in respect of those **Control Point(s)** for which it has been installed. Details of and relating to the **System Telephony** required are contained in the **Bilateral Agreement**.

CC.6.5.4.4 Where **Control Telephony** or **System Telephony** is installed, routine testing of such facilities may be required by **NGET** (not normally more than once in any calendar month). The **User** and **NGET** shall use reasonable endeavours to agree a

test programme and where **NGET** requests the assistance of the **User** in performing the agreed test programme the **User** shall provide such assistance.

CC.6.5.4.5 **Control Telephony** and **System Telephony** shall only be used for the purposes of operational voice communication between **NGET** and the relevant **User**.

CC.6.5.4.6 **Control Telephony** contains emergency calling functionality to be used for urgent operational communication only. Such functionality enables **NGET** and **Users** to utilise a priority call in the event of an emergency. **NGET** and **Users** shall only use such priority call functionality for urgent operational communications.

CC.6.5.5 Technical Requirements for **Control Telephony** and **System Telephony**

CC.6.5.5.1 Detailed information on the technical interfaces and support requirements for **Control Telephony** applicable in **NGET's Transmission Area** is provided in the **Control Telephony Electrical Standard** identified in the Annex to the **General Conditions**. Where additional information, or information in relation to **Control Telephony** applicable in Scotland, is requested by **Users**, this will be provided, where possible, by **NGET**.

CC.6.5.5.2 **System Telephony** shall consist of a dedicated Public Switched Telephone Network telephone line that shall be installed and configured by the relevant **User**. **NGET** shall provide a dedicated free phone number (UK only), for the purposes of receiving incoming calls to **NGET**, which **Users** shall utilise for **System Telephony**. **System Telephony** shall only be utilised by the **NGET Control Engineer** and the **User's Responsible Engineer/Operator** for the purposes of operational communications.

Operational Metering

CC.6.5.6 (a) **NGET** shall provide system control and data acquisition (SCADA) outstation interface equipment. The **User** shall provide such voltage, current, **Frequency, Active Power** and **Reactive Power** measurement outputs and plant status indications and alarms to the **Transmission SCADA** outstation interface equipment as required by **NGET** in accordance with the terms of the **Bilateral Agreement**.

(b) For the avoidance of doubt, for **Active Power** and **Reactive Power** measurements, circuit breaker and disconnect status indications from:

(i) **CCGT Modules** at **Large Power Stations**, the outputs and status indications must each be provided to **NGET** on an individual **CCGT Unit** basis. In addition, where identified in the **Bilateral Agreement, Active Power** and **Reactive Power** measurements from **Unit Transformers** and/or **Station Transformers** must be provided.

(ii) **DC Converters** at **DC Converter Stations**, the outputs and status indications must each be provided to **NGET** on an individual **DC Converter** basis. In addition, where identified in the **Bilateral Agreement, Active Power** and **Reactive Power** measurements from converter and/or station transformers must be provided.

(iii) **Power Park Modules** at **Embedded Large Power Stations** and at directly connected **Power Stations**, the outputs and status indications must each be provided to **NGET** on an individual **Power Park Module** basis. In addition, where identified in the **Bilateral Agreement, Active**

Power and Reactive Power measurements from station transformers must be provided.

- (c) For the avoidance of doubt, the requirements of CC.6.5.6(a) in the case of a **Cascade Hydro Scheme** will be provided for each **Generating Unit** forming part of that **Cascade Hydro Scheme**. In the case of **Embedded Generating Units** forming part of a **Cascade Hydro Scheme** the data may be provided by means other than a **NGET** SCADA outstation located at the **Power Station**, such as, with the agreement of the **Network Operator** in whose system such **Embedded Generating Unit** is located, from the **Network Operator's** SCADA system to **NGET**. Details of such arrangements will be contained in the relevant **Bilateral Agreements** between **NGET** and the **Generator** and the **Network Operator**.
- (d) In the case of a **Power Park Module** an additional energy input signal (e.g. wind speed) may be specified in the **Bilateral Agreement**. The signal may be used to establish the level of energy input from the **Intermittent Power Source** for monitoring pursuant to CC.6.6.1 and **Ancillary Services** and will, in the case of a wind farm, be used to provide **NGET** with advanced warning of excess wind speed shutdown.

Instructor Facilities

CC.6.5.7 The **User** shall accommodate **Instructor Facilities** provided by **NGET** for the receipt of operational messages relating to **System** conditions.

Electronic Data Communication Facilities

- CC.6.5.8 (a) All **BM Participants** must ensure that appropriate electronic data communication facilities are in place to permit the submission of data, as required by the **Grid Code**, to **NGET**.
- (b) In addition, any **User** that wishes to participate in the **Balancing Mechanism** must ensure that appropriate automatic logging devices are installed at the **Control Points** of its **BM Units** to submit data to and to receive instructions from **NGET**, as required by the **Grid Code**. For the avoidance of doubt, in the case of an **Interconnector User** the **Control Point** will be at the **Control Centre** of the appropriate **Externally Interconnected System Operator**.
- (c) Detailed specifications of these required electronic facilities will be provided by **NGET** on request and they are listed as **Electrical Standards** in the Annex to the **General Conditions**.

Facsimile Machines

CC.6.5.9 Each **User** and **NGET** shall provide a facsimile machine or machines:-

- (a) in the case of **Generators**, at the **Control Point** of each **Power Station** and at its **Trading Point**;
- (b) in the case of **NGET** and **Network Operators**, at the **Control Centre(s)**; and
- (c) in the case of **Non-Embedded Customers** and **DC Converter Station** owners at the **Control Point**.

Each **User** shall notify, prior to connection to the **System** of the **User's Plant and Apparatus**, **NGET** of its or their telephone number or numbers, and will notify **NGET** of any changes. Prior to connection to the **System** of the **User's Plant and Apparatus** **NGET** shall notify each **User** of the telephone number or numbers of its facsimile machine or machines and will notify any changes.

CC.6.5.10 Busbar Voltage

NGET shall, subject as provided below, provide each **Generator** or **DC Converter Station** owner at each **Grid Entry Point** where one of its **Power Stations** or **DC Converter Stations** is connected with appropriate voltage signals to enable the **Generator** or **DC Converter Station** owner to obtain the necessary information to permit its **Gensets** or **DC Converters** to be **Synchronised** to the **GB Transmission System**. The term "voltage signal" shall mean in this context, a point of connection on (or wire or wires from) a relevant part of **Transmission Plant** and/or **Apparatus** at the **Grid Entry Point**, to which the **Generator** or **DC Converter Station** owner, with **NGET's** agreement (not to be unreasonably withheld) in relation to the **Plant** and/or **Apparatus** to be attached, will be able to attach its **Plant** and/or **Apparatus** (normally a wire or wires) in order to obtain measurement outputs in relation to the busbar.

CC.6.5.11 Bilingual Message Facilities

- (a) A Bilingual Message Facility is the method by which the **User's Responsible Engineer/Operator**, the **Externally Interconnected System Operator** and **NGET Control Engineers** communicate clear and unambiguous information in two languages for the purposes of control of the **Total System** in both normal and emergency operating conditions.
- (b) A Bilingual Message Facility, where required, will provide up to two hundred pre-defined messages with up to five hundred and sixty characters each. A maximum of one minute is allowed for the transmission to, and display of, the selected message at any destination. The standard messages must be capable of being displayed at any combination of locations and can originate from any of these locations. Messages displayed in the UK will be displayed in the English language.
- (c) Detailed information on a Bilingual Message Facility and suitable equipment required for individual **User** applications will be provided by **NGET** upon request.

CC.6.6 **SYSTEM MONITORING**

CC.6.6.1 Monitoring equipment is provided on the **GB Transmission System** to enable **NGET** to monitor its power system dynamic performance conditions. Where this monitoring equipment requires voltage and current signals on the **Generating Unit** (other than **Power Park Unit**), **DC Converter** or **Power Park Module** circuit from the **User**, **NGET** will inform the **User** and they will be provided by the **User** with both the timing of the installation of the equipment for receiving such signals and its exact position being agreed (the **User's** agreement not to be unreasonably withheld) and the costs being dealt with, pursuant to the terms of the **Bilateral Agreement**.

CC.7 SITE RELATED CONDITIONS

CC.7.1 Not used.

CC.7.2 RESPONSIBILITIES FOR SAFETY

CC.7.2.1 In England and Wales, any **User** entering and working on its **Plant** and/or **Apparatus** on a **Transmission Site** will work to the **Safety Rules** of **NGET**.

In Scotland, any **User** entering and working on its **Plant** and/or **Apparatus** on a **Transmission Site** will work to the **Safety Rules** of the **Relevant Transmission Licensee**, as advised by **NGET**.

CC.7.2.2 **NGET** entering and working on **Transmission Plant** and/or **Apparatus** on a **User Site** will work to the **User's Safety Rules**. For **User Sites** in Scotland, **NGET** shall procure that the **Relevant Transmission Licensee** entering and working on **Transmission Plant** and/or **Apparatus** on a **User Site** will work to the **User's Safety Rules**.

CC.7.2.3 A **User** may, with a minimum of six weeks notice, apply to **NGET** for permission to work according to that **Users** own **Safety Rules** when working on its **Plant** and/or **Apparatus** on a **Transmission Site** rather than those set out in CC.7.2.1. If **NGET** is of the opinion that the **User's Safety Rules** provide for a level of safety commensurate with those set out in CC.7.2.1, **NGET** will notify the **User**, in writing, that, with effect from the date requested by the **User**, the **User** may use its own **Safety Rules** when working on its **Plant** and/or **Apparatus** on the **Transmission Site**. For a **Transmission Site** in Scotland, in forming its opinion, **NGET** will seek the opinion of the **Relevant Transmission Licensee**. Until receipt of such written approval from **NGET**, the **User** will continue to use the **Safety Rules** as set out in CC.7.2.1.

CC.7.2.4 In the case of a **User Site** in England and Wales, **NGET** may, with a minimum of six weeks notice, apply to a **User** for permission to work according to **NGET's Safety Rules** when working on **Transmission Plant** and/or **Apparatus** on that **User Site**, rather than the **User's Safety Rules**. If the **User** is of the opinion that **NGET's Safety Rules** provide for a level of safety commensurate with that of that **User's Safety Rules**, it will notify **NGET**, in writing, that, with the effect from the date requested by **NGET**, **NGET** may use its own **Safety Rules** when working on its **Transmission Plant** and/or **Apparatus** on that **User Site**. Until receipt of such written approval from the **User**, **NGET** shall continue to use the **User's Safety Rules**.

In the case of a **User Site** in Scotland, **NGET** may, with a minimum of six weeks notice, apply to a **User** for permission for the **Relevant Transmission Licensee** to work according to the **Relevant Transmission Licensee's Safety Rules** when working on **Transmission Plant** and/or **Apparatus** on that **User Site**, rather than the **User's Safety Rules**. If the **User** is of the opinion that the **Relevant Transmission Licensee's Safety Rules**, provide for a level of safety commensurate with that of that **User's Safety Rules**, it will notify **NGET**, in writing, that, with effect from the date requested by **NGET**, that the **Relevant Transmission Licensee** may use its own **Safety Rules** when working on its **Transmission Plant** and/or **Apparatus** on that **User's Site**. Until receipt of such written approval from the **User**, **NGET** shall procure that the **Relevant Transmission Licensee** shall continue to use the **User's Safety Rules**.

CC.7.2.5 For a **Transmission Site** in England and Wales, if **NGET** gives its approval for the **User's Safety Rules** to apply to the **User** when working on its **Plant** and/or

Apparatus, that does not imply that the **User's Safety Rules** will apply to entering the **Transmission Site** and access to the **User's Plant** and/or **Apparatus** on that **Transmission Site**. Bearing in mind **NGET's** responsibility for the whole **Transmission Site**, entry and access will always be in accordance with **NGET's** site access procedures. For a **User Site** in England and Wales, if the **User** gives its approval for **NGET's Safety Rules** to apply to **NGET** when working on its **Plant** and **Apparatus**, that does not imply that **NGET's Safety Rules** will apply to entering the **User Site**, and access to the **Transmission Plant** and **Apparatus** on that **User Site**. Bearing in mind the **User's** responsibility for the whole **User Site**, entry and access will always be in accordance with the **User's** site access procedures.

For a **Transmission Site** in Scotland, if **NGET** gives its approval for the **User's Safety Rules** to apply to the **User** when working on its **Plant** and/or **Apparatus**, that does not imply that the **User's Safety Rules** will apply to entering the **Transmission Site** and access to the **User's Plant** and/or **Apparatus** on that **Transmission Site**. Bearing in mind the **Relevant Transmission Licensee's** responsibility for the whole **Transmission Site**, entry and access will always be in accordance with the **Relevant Transmission Licensee's** site access procedures. For a **User Site** in Scotland, if the **User** gives its approval for **Relevant Transmission Licensee Safety Rules** to apply to the **Relevant Transmission Licensee** when working on its **Plant** and **Apparatus**, that does not imply that the **Relevant Transmission Licensee's Safety Rules** will apply to entering the **User Site**, and access to the **Transmission Plant** and **Apparatus** on that **User Site**. Bearing in mind the **User's** responsibility for the whole **User Site**, entry and access will always be in accordance with the **User's** site access procedures.

CC.7.2.6 For **User Sites** in England and Wales, **Users** shall notify **NGET** of any **Safety Rules** that apply to **NGET's** staff working on **User Sites**. For **Transmission Sites** in England and Wales, **NGET** shall notify **Users** of any **Safety Rules** that apply to the **User's** staff working on the **Transmission Site**.

For **User Sites** in Scotland, **Users** shall notify **NGET** of any **Safety Rules** that apply to the **Relevant Transmission Licensee's** staff working on **User Sites**. For **Transmission Sites** in Scotland **NGET** shall procure that the **Relevant Transmission Licensee** shall notify **Users** of any **Safety Rules** that apply to the **User's** staff working on the **Transmission Site**.

CC.7.2.7 Each **Site Responsibility Schedule** must have recorded on it the **Safety Rules** which apply to each item of **Plant** and/or **Apparatus**.

CC.7.3 **SITE RESPONSIBILITY SCHEDULES**

CC.7.3.1 In order to inform site operational staff and **NGET Control Engineers** of agreed responsibilities for **Plant** and/or **Apparatus** at the operational interface, a **Site Responsibility Schedule** shall be produced for **Connection Sites** in England and Wales for **NGET** and **Users** with whom they interface, and for **Connection Sites** in Scotland for **NGET**, the **Relevant Transmission Licensee** and **Users** with whom they interface.

CC.7.3.2 The format, principles and basic procedure to be used in the preparation of **Site Responsibility Schedules** are set down in Appendix 1.

CC.7.4 OPERATION AND GAS ZONE DIAGRAMS

Operation Diagrams

CC.7.4.1 An **Operation Diagram** shall be prepared for each **Connection Site** at which a **Connection Point** exists using, where appropriate, the graphical symbols shown in Part 1A of Appendix 2. **Users** should also note that the provisions of **OC11** apply in certain circumstances.

CC.7.4.2 The **Operation Diagram** shall include all **HV Apparatus** and the connections to all external circuits and incorporate numbering, nomenclature and labelling, as set out in **OC11**. At those **Connection Sites** where gas-insulated metal enclosed switchgear and/or other gas-insulated **HV Apparatus** is installed, those items must be depicted within an area delineated by a chain dotted line which intersects gas-zone boundaries. The nomenclature used shall conform with that used on the relevant **Connection Site** and circuit. The **Operation Diagram** (and the list of technical details) is intended to provide an accurate record of the layout and circuit interconnections, ratings and numbering and nomenclature of **HV Apparatus** and related **Plant**.

CC.7.4.3 A non-exhaustive guide to the types of **HV Apparatus** to be shown in the **Operation Diagram** is shown in Part 2 of Appendix 2, together with certain basic principles to be followed unless equivalent principles are approved by **NGET**.

Gas Zone Diagrams

CC.7.4.4 A **Gas Zone Diagram** shall be prepared for each **Connection Site** at which a **Connection Point** exists where gas-insulated switchgear and/or other gas-insulated **HV Apparatus** is utilised. They shall use, where appropriate, the graphical symbols shown in Part 1B of Appendix 2.

CC.7.4.5 The nomenclature used shall conform with that used in the relevant **Connection Site** and circuit.

CC.7.4.6 The basic principles set out in Part 2 of Appendix 2 shall be followed in the preparation of **Gas Zone Diagrams** unless equivalent principles are approved by **NGET**.

Preparation of Operation and Gas Zone Diagrams for Users' Sites

CC.7.4.7 In the case of a **User Site**, the **User** shall prepare and submit to **NGET**, an **Operation Diagram** for all **HV Apparatus** on the **User** side of the **Connection Point** and **NGET** shall provide the **User** with an **Operation Diagram** for all **HV Apparatus** on the **Transmission** side of the **Connection Point**, in accordance with the timing requirements of the **Bilateral Agreement** and/or **Construction Agreement** prior to the **Completion Date** under the **Bilateral Agreement** and/or **Construction Agreement**.

CC.7.4.8 The **User** will then prepare, produce and distribute, using the information submitted on the **User's Operation Diagram** and **NGET Operation Diagram**, a composite **Operation Diagram** for the complete **Connection Site**, also in accordance with the timing requirements of the **Bilateral Agreement** and/or **Construction Agreement**.

CC.7.4.9 The provisions of CC7.4.7 and CC.7.4.8 shall apply in relation to **Gas Zone Diagrams** where gas-insulated switchgear and/or other gas-insulated **HV Apparatus** is utilised.

Preparation of **Operation** and **Gas Zone Diagrams** for **Transmission Sites**

- CC.7.4.10 In the case of an **Transmission Site**, the **User** shall prepare and submit to **NGET** an **Operation Diagram** for all **HV Apparatus** on the **User** side of the **Connection Point**, in accordance with the timing requirements of the **Bilateral Agreement** and/or **Construction Agreement**.
- CC.7.4.11 **NGET** will then prepare, produce and distribute, using the information submitted on the **User's Operation Diagram**, a composite **Operation Diagram** for the complete **Connection Site**, also in accordance with the timing requirements of the **Bilateral Agreement** and/or **Construction Agreement** .
- CC.7.4.12 The provisions of CC7.4.10 and CC.7.4.11 shall apply in relation to **Gas Zone Diagrams** where gas-insulated switchgear and/or other gas-insulated **HV Apparatus** is utilised.
- CC.7.4.13 Changes to **Operation** and **Gas Zone Diagrams**
- CC.7.4.13.1 When **NGET** has decided that it wishes to install new **HV Apparatus** or it wishes to change the existing numbering or nomenclature of **Transmission HV Apparatus** at a **Transmission Site**, **NGET** will (unless it gives rise to a **Modification** under the **CUSC**, in which case the provisions of the **CUSC** as to the timing apply) one month prior to the installation or change, send to each such **User** a revised **Operation Diagram** of that **Transmission Site**, incorporating the new **Transmission HV Apparatus** to be installed and its numbering and nomenclature or the changes, as the case may be. **OC11** is also relevant to certain **Apparatus**.
- CC.7.4.13.2 When a **User** has decided that it wishes to install new **HV Apparatus**, or it wishes to change the existing numbering or nomenclature of its **HV Apparatus** at its **User Site**, the **User** will (unless it gives rise to a **Modification** under the **CUSC**, in which case the provisions of the **CUSC** as to the timing apply) one month prior to the installation or change, send to **NGET** a revised **Operation Diagram** of that **User Site** incorporating the new **User HV Apparatus** to be installed and its numbering and nomenclature or the changes as the case may be. **OC11** is also relevant to certain **Apparatus**.
- CC.7.4.13.3 The provisions of CC7.4.13.1 and CC.7.4.13.2 shall apply in relation to **Gas Zone Diagrams** where gas-insulated switchgear and/or other gas-insulated **HV Apparatus** is installed.

Validity

- CC.7.4.14 (a) The composite **Operation Diagram** prepared by **NGET** or the **User**, as the case may be, will be the definitive **Operation Diagram** for all operational and planning activities associated with the **Connection Site**. If a dispute arises as to the accuracy of the composite **Operation Diagram**, a meeting shall be held at the **Connection Site**, as soon as reasonably practicable, between **NGET** and the **User**, to endeavour to resolve the matters in dispute.
- (b) An equivalent rule shall apply for **Gas Zone Diagrams** where they exist for a **Connection Site**.

CC.7.5 **SITE COMMON DRAWINGS**

CC.7.5.1 **Site Common Drawings** will be prepared for each **Connection Site** and will include **Connection Site** layout drawings, electrical layout drawings, common **Protection/control** drawings and common services drawings.

Preparation of Site Common Drawings for a User Site

CC.7.5.2 In the case of a **User Site**, **NGET** shall prepare and submit to the **User**, **Site Common Drawings** for the **Transmission** side of the **Connection Point** in accordance with the timing requirements of the **Bilateral Agreement** and/or **Construction Agreement**.

CC.7.5.3 The **User** will then prepare, produce and distribute, using the information submitted on the **Transmission Site Common Drawings**, **Site Common Drawings** for the complete **Connection Site** in accordance with the timing requirements of the **Bilateral Agreement** and/or **Construction Agreement** .

Preparation of Site Common Drawings for a Transmission Site

CC.7.5.4 In the case of a **Transmission Site**, the **User** will prepare and submit to **NGET Site Common Drawings** for the **User** side of the **Connection Point** in accordance with the timing requirements of the **Bilateral Agreement** and/or **Construction Agreement**.

CC.7.5.5 **NGET** will then prepare, produce and distribute, using the information submitted in the **User's Site Common Drawings**, **Site Common Drawings** for the complete **Connection Site** in accordance with the timing requirements of the **Bilateral Agreement** and/or **Construction Agreement**.

CC.7.5.6 When a **User** becomes aware that it is necessary to change any aspect of the **Site Common Drawings** at a **Connection Site** it will:

- (a) if it is a **User Site**, as soon as reasonably practicable, prepare, produce and distribute revised **Site Common Drawings** for the complete **Connection Site**; and
- (b) if it is a **Transmission Site**, as soon as reasonably practicable, prepare and submit to **NGET** revised **Site Common Drawings** for the **User** side of the **Connection Point** and **NGET** will then, as soon as reasonably practicable, prepare, produce and distribute, using the information submitted in the **User's Site Common Drawings**, revised **Site Common Drawings** for the complete **Connection Site**.

In either case, if in the **User's** reasonable opinion the change can be dealt with by it notifying **NGET** in writing of the change and for each party to amend its copy of the **Site Common Drawings** (or where there is only one set, for the party holding that set to amend it), then it shall so notify and each party shall so amend. If the change gives rise to a **Modification** under the **CUSC**, the provisions of the **CUSC** as to timing will apply.

CC.7.5.7 When **NGET** becomes aware that it is necessary to change any aspect of the **Site Common Drawings** at a **Connection Site** it will:

- (a) if it is a **Transmission Site**, as soon as reasonably practicable, prepare, produce and distribute revised **Site Common Drawings** for the complete **Connection Site**; and

- (b) if it is a **User Site**, as soon as reasonably practicable, prepare and submit to the **User** revised **Site Common Drawings** for the **Transmission** side of the **Connection Point** and the **User** will then, as soon as reasonably practicable, prepare, produce and distribute, using the information submitted in the **Transmission Site Common Drawings**, revised **Site Common Drawings** for the complete **Connection Site**.

In either case, if in **NGET's** reasonable opinion the change can be dealt with by it notifying the **User** in writing of the change and for each party to amend its copy of the **Site Common Drawings** (or where there is only one set, for the party holding that set to amend it), then it shall so notify and each party shall so amend. If the change gives rise to a **Modification** under the **CUSC**, the provisions of the **CUSC** as to timing will apply.

Validity

CC.7.5.8 The **Site Common Drawings** for the complete **Connection Site** prepared by the **User** or **NGET**, as the case may be, will be the definitive **Site Common Drawings** for all operational and planning activities associated with the **Connection Site**. If a dispute arises as to the accuracy of the **Site Common Drawings**, a meeting shall be held at the **Site**, as soon as reasonably practicable, between **NGET** and the **User**, to endeavour to resolve the matters in dispute.

CC.7.6 ACCESS

CC.7.6.1 The provisions relating to access to **Transmission Sites** by **Users**, and to **Users' Sites** by **Transmission Licensees**, are set out in each **Interface Agreement** with, for **Transmission Sites** in England and Wales, **NGET** and each **User**, and for **Transmission Sites** in Scotland, the **Relevant Transmission Licensee** and each **User**.

CC.7.6.2 In addition to those provisions, where a **Transmission Site** in England and Wales contains exposed **HV** conductors, unaccompanied access will only be granted to individuals holding an **Authority for Access** issued by **NGET** and where a **Transmission Site** in Scotland contains exposed **HV** conductors, unaccompanied access will only be granted to individuals holding an **Authority for Access** issued by the **Relevant Transmission Licensee**.

CC.7.6.3 The procedure for applying for an **Authority for Access** is contained in the **Interface Agreement**.

CC.7.7 MAINTENANCE STANDARDS

CC.7.7.1 It is a requirement that all **User's Plant** and **Apparatus** on **Transmission Sites** is maintained adequately for the purpose for which it is intended and to ensure that it does not pose a threat to the safety of any **Transmission Plant, Apparatus** or personnel on the **Transmission Site**. **NGET** will have the right to inspect the test results and maintenance records relating to such **Plant** and **Apparatus** at any time. In Scotland, it is the **User's** responsibility to ensure that all the **User's Plant** and **Apparatus**, including protection systems, are tested and maintained and remain rated for the duty required. An annual update of system fault levels is available as part of the **Seven Year Statement**.

CC.7.7.2 It is a requirement that all **Transmission Plant** and **Apparatus** on **User's Sites** is maintained adequately for the purposes for which it is intended and to ensure that it does not pose a threat to the safety of any of the **User's Plant, Apparatus** or

personnel on the **User Site**. **Users** will have the right to inspect the test results and maintenance records relating to such **Plant** and **Apparatus**, at any time.

CC.7.8 SITE OPERATIONAL PROCEDURES

CC.7.8.1 **NGET** and **Users** with an interface with **NGET**, must make available staff to take necessary **Safety Precautions** and carry out operational duties as may be required to enable work/testing to be carried out and for the operation of **Plant** and **Apparatus** connected to the **Total System**.

CC.7.9 **Generators** and **DC Converter Station** owners shall provide a **Control Point** in respect of each **Power Station** directly connected to the **GB Transmission System** and **Embedded Large Power Station** or **DC Converter Station** to receive and act upon instructions pursuant to OC7 and BC2 at all times that **Generating Units** or **Power Park Modules** at the **Power Station** are generating or available to generate or **DC Converters** at the **DC Converter Station** are importing or exporting or available to do so. The **Control Point** shall be continuously manned except where the **Bilateral Agreement** in respect of such **Embedded Power Station** specifies that compliance with BC2 is not required, where the **Control Point** shall be manned between the hours of 0800 and 1800 each day.

CC.8 ANCILLARY SERVICES

CC.8.1 System Ancillary Services

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

- (a) **Generators** in respect of **Large Power Stations** are obliged to provide (except **Generators** in respect of **Large Power Stations** which have a **Registered Capacity** of less than 50MW and comprise **Power Park Modules**); and,
- (b) **Generators** in respect of **Large Power Stations** which a **Registered Capacity** of less than 50MW and comprise **Power Park Modules** are obliged to provide in respect of **Reactive Power** only; and,
- (c) **DC Converter Station** owners are obliged to have the capability to supply; and
- (d) **Generators** in respect of **Medium Power Stations** (except **Embedded Medium Power Stations**) are obliged to provide in respect of **Reactive Power** only:

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

Part 1

- (a) **Reactive Power** supplied (in accordance with CC.6.3.2) otherwise than by means of synchronous or static compensators (except in the case of a

Power Park Module where synchronous or static compensators within the **Power Park Module** may be used to provide **Reactive Power**)

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

Part 2

- (c) **Frequency** Control by means of **Fast Start** - CC.6.3.14
- (d) **Black Start Capability** - CC.6.3.5
- (e) **System to Generator Operational Intertripping**

CC.8.2

Commercial Ancillary Services

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

CONNECTION CONDITIONS

APPENDIX 1

FORMAT, PRINCIPLES AND BASIC PROCEDURE TO BE USED IN THE PREPARATION OF SITE RESPONSIBILITY SCHEDULES

CC.A.1.1 PRINCIPLES

Types of Schedules

CC.A.1.1.1 At all **Complexes** the following **Site Responsibility Schedules** shall be drawn up using the relevant proforma attached or with such variations as may be agreed between **NGET** and **Users**, but in the absence of agreement the relevant proforma attached will be used:

- (a) Schedule of **HV Apparatus**
- (b) Schedule of **Plant, LV/MV Apparatus**, services and supplies;
- (c) Schedule of telecommunications and measurements **Apparatus**.

Other than at **Generating Unit, DC Converter, Power Park Module** and **Power Station** locations, the schedules referred to in (b) and (c) may be combined.

New Connection Sites

CC.A.1.1.2 In the case of a new **Connection Site** each **Site Responsibility Schedule** for a **Connection Site** shall be prepared by **NGET** in consultation with relevant **Users** at least 2 weeks prior to the **Completion Date** under the **Bilateral Agreement** and/or **Construction Agreement** for that **Connection Site** (which may form part of a **Complex**). Each **User** shall, in accordance with the timing requirements of the **Bilateral Agreement** and/or **Construction Agreement**, provide information to **NGET** to enable it to prepare the **Site Responsibility Schedule**.

Sub-division

CC.A.1.1.3 Each **Site Responsibility Schedule** will be subdivided to take account of any separate **Connection Sites** on that **Complex**.

Scope

CC.A.1.1.4 Each **Site Responsibility Schedule** shall detail for each item of **Plant** and **Apparatus**:-

- (a) **Plant/Apparatus** ownership;
- (b) Site Manager (Controller) (except in the case of **Plant/Apparatus** located in **SPT's Transmission Area**);
- (c) Safety issues comprising applicable **Safety Rules** and **Control Person** or other responsible person (**Safety Co-ordinator**), or such other person who is responsible for safety;

CODE	PAGE	CLAUSE
	44	Schedule 10, page 2: Table page 2 amended
	45	Schedule 11: Clause on page 1 added
	48	Schedule 12: Clause on page 2 added
	49	Schedule 13: Table page 1 amended
	50-52	Schedule 14: Table pages 1-3 amended
	56	Schedule 15: Clause on page 3 added
	57	Schedule 16: Clause on page 1 added
	58	Schedule 17: Clause on page 1 added

Revision 32

Effective Date: 8 December 2008

CODE	PAGE	CLAUSE
G&D	11	Definition of Droop amended.
PC	48	PC.A.5.3.2 (c) Option 2 Clause amended.
	50	PC.A.5.3.2 (d) (i) Option 2 Clause amended.
	53	PC.A.5.4.2 (a) Clause amended
CC	66-67	CC.A.6.2.5.3 Clause amended.
	67	CC.A.6.2.5.4 Clause amended.
	67	CC.A.6.2.5.7 Clause added.
	67	CC.A.6.2.5.8 Clause added.
BC3	6	BC3.7.1 Clause amended.

Revision 33

Effective Date: 16 March 2009

CODE	PAGE	CLAUSE
G&D	42	Definition of System to Generator Operational Intertipping Scheme amended.
CC	26	CC.6.3.17 Clause amended.
	27	CC.6.3.18 Clause added.