**Our Ref:**

**Your Ref:**

**Date:** September 2006

To: All Recipients of the Serviced Grid Code

**Commercial**
**Electricity Balancing and Codes**

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**National Grid House**
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Dear Sir/Madam

**THE SERVICED GRID CODE – ISSUE 3 REVISION 17**

Revision 17 of Issue 3 of the Grid Code has been approved by the Authority for implementation on **1st September 2006**.

I have enclosed the replacement pages that incorporate the agreed changes necessary to update the Grid Code Issue 3 to Revision 17 standard.

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

Yours faithfully

L Macleod
Electricity Codes

INVESTOR IN PEOPLE

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Registered in
England and Wales
No 2366977

**THE GRID CODE – ISSUE 3 REVISION 17**

**INCLUSION OF REVISED PAGES**

| | | | |
|---|---|---|---|
| Title Page | | | |
| Glossary and Definitions | **G&D** | **-** | **Pages 21 to 47** |
| Connection Conditions | **CC** | **-** | **Content Page, Pages 17 to 20 and Pages 35 to 61** |
| Balancing Code 1 | **BC1** | **-** | **Content Page and Pages 3 to 12** |
| Balancing Code 2 | **BC2** | **-** | **Pages 7 to 8** |
| Balancing Code 3 | **BC3** | **-** | **Content Page and Pages 1 to 8** |
| Revisions | | - | **Pages 19 and 20** |

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 17**

**SUMMARY OF CHANGES**

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

- **B/06** – Regional Differences

# THE GRID CODE

## Issue 3

## Revision 17
## 1st September 2006

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**THIS DOCUMENT IS ISSUED BY:-**

**NATIONAL GRID ELECTRICITY TRANSMISSION plc**
**COMMERCIAL, ELECTRICITY CODES**
**NATIONAL GRID HOUSE**
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**GALLOWS HILL**
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**REGISTERED OFFICE:** **1-3 Strand**
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| | |
|---|---|
| **Interconnection Agreement** | An agreement made between **NGET** and an **Externally Interconnected System Operator** and/or an **Interconnector User** and/or other relevant persons for the **External Interconnection** relating to an **External Interconnection** and/or an agreement under which an **Interconnector User** can use an **External Interconnection**. |
| **Interconnector User** | Has the meaning set out in the **BSC**. |
| **Interface Agreement** | Has the meaning set out in the **CUSC**. |
| **Intermittent Power Source** | The primary source of power for a **Generating Unit** that can not be considered as controllable, e.g. wind, wave or solar. |
| **Intertripping** | (a) The tripping of circuit-breaker(s) by commands initiated from **Protection** at a remote location independent of the state of the local **Protection**; or<br><br>(b) **Operational Intertripping**. |
| **Intertrip Apparatus** | **Apparatus** which performs **Intertripping**. |
| **IP Turbine Power Fraction** | Ratio of steady state mechanical power delivered by the IP turbine to the total steady state mechanical power delivered by the total steam turbine at **Registered Capacity**. |
| **Isolating Device** | A device for achieving **Isolation**. |

**Isolation**

The disconnection of **HV Apparatus** (as defined in OC8A.1.6.2 and OC8B.1.7.2) from the remainder of the **System** in which that **HV Apparatus** is situated by either of the following:

(a) an **Isolating Device** maintained in an isolating position. The isolating position must either be:

(i) maintained by immobilising and **Locking** the **Isolating Device** in the isolating position and affixing a **Caution Notice** to it. Where the **Isolating Device** is **Locked** with a **Safety Key**, the **Safety Key** must be secured in a **Key Safe** and the **Key Safe Key** must be, where reasonably practicable, given to the authorised site representative of the **Requesting Safety Co-Ordinator** and is to be retained in safe custody. Where not reasonably practicable the **Key Safe Key** must be retained by the authorised site representative of the **Implementing Safety Co-Ordinator** in safe custody; or

(ii) maintained and/or secured by such other method which must be in accordance with the **Local Safety Instructions** of **NGET** or the **Safety Rules** of the **Relevant Transmission Licensee** or that **User**, as the case may be; or

(b) an adequate physical separation which must be in accordance with and maintained by the method set out in the **Local Safety Instructions** of **NGET** or the **Safety Rules** of the **Relevant Transmission Licensee** or that **User**, as the case may be.

**Joint BM Unit Data**

Has the meaning set out in the **BSC**.

**Joint System Incident**

An **Event** wherever occurring (other than on an **Embedded Medium Power Station** or an **Embedded Small Power Station**) which, in the opinion of **NGET** or a **User**, has or may have a serious and/or widespread effect, in the case of an **Event** on a **User(s) System(s)** (other than on an **Embedded Medium Power Station** or **Embedded Small Power Station**), on the **GB Transmission System**, and in the case of an **Event** on the **GB Transmission System**, on a **User(s) System(s)** (other than on an **Embedded Medium Power Station** or **Embedded Small Power Station**).

**Key Safe**

A device for the secure retention of keys.

**Key Safe Key**

A key unique at a **Location** capable of operating a lock, other than a control lock, on a **Key Safe**.

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| **Large Power Station** | A **Power Station** which is<br>(A) directly connected to:<br>(a) **NGET's Transmission System** where such **Power Station** has a **Registered Capacity** of 100MW or more; or<br>(b) **SPT's Transmission System** where such **Power Station** has a **Registered Capacity** of 30MW or more; or<br>(c) **SHETL's Transmission System** where such **Power Station** has a **Registered Capacity** of 10MW or more;<br>or,<br>(B) **Embedded** within a **User System** (or part thereof) where such **User System** (or part thereof) is connected under normal operating conditions to:<br>(a) **NGET's Transmission System** and such **Power Station** has a **Registered Capacity** of 100MW or more; or<br>(b) **SPT's Transmission System** and such **Power Station** has a **Registered Capacity** of 30MW or more; or<br>(c) **SHETL's Transmission System** and such **Power Station** has a **Registered Capacity** of 10MW or more;<br>or,<br>(C) **Embedded** within a **User System** (or part thereof) where the **User System** (or part thereof) is not connected to the **GB Transmission System**, although such **Power Station** is in:<br>(a) **NGET's Transmission Area** where such **Power Station** has a **Registered Capacity** of 100MW or more; or<br>(b) **SPT's Transmission Area** where such **Power Station** has a **Registered Capacity** of 30MW or more; or<br>(c) **SHETL's Transmission Area** where such **Power Station** has a **Registered Capacity** of 10MW or more; |
| **Licence** | Any licence granted to **NGET** or a **Relevant Transmission Licensee** or a **User**, under Section 6 of the **Act**. |
| **Licence Standards** | Those standards set out or referred to in Condition C17 of **NGET's Transmission Licence** and/or Condition D3 of a **Relevant Transmission Licensee's Transmission Licence**. |
| **Limited Frequency Sensitive Mode** | A mode whereby the operation of the **Genset** (or **DC Converter** at a **DC Converter Station** exporting **Active Power** to the **Total System)** is **Frequency** insensitive except when the **System Frequency** exceeds 50.4Hz, from which point **Limited High Frequency Response** must be provided. |
| **Limited High Frequency Response** | A response of a **Genset** (or **DC Converter** at a **DC Converter Station** exporting **Active Power** to the **Total System)** to an increase in **System Frequency** above 50.4Hz leading to a reduction in **Active Power** in accordance with the provisions of BC3.7.2. |
| **Load** | The **Active**, **Reactive** or **Apparent Power**, as the context requires, generated, transmitted or distributed. |
| **Loaded** | Supplying electrical power to the **System**. |

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| **Load Factor** | The ratio of the actual output of a **Generating Unit** to the possible maximum output of that **Generating Unit**. |
| **Load Management Block** | A block of **Demand** controlled by a **Supplier** or other party through the means of radio teleswitching or by some other means. |
| **Local Joint Restoration Plan** | A plan produced under OC9.4.7.11 detailing the agreed method and procedure by which a **Genset** at a **Black Start Station** (possibly with other **Gensets** at that **Black Start Station**) will energise part of the **Total System** and meet complementary blocks of local **Demand** so as to form a **Power Island**.<br><br>In Scotland, the plan may also: cover more than one **Black Start Station**; include **Gensets** other than those at a **Black Start Station** and cover the creation of one or more **Power Islands**. |
| **Local Safety Instructions** | For safety co-ordination in England and Wales, instructions on each **User Site** and **Transmission Site**, approved by the relevant **NGET** or **User's** manager, setting down the methods of achieving the objectives of **NGET's** or the **User's Safety Rules**, as the case may be, to ensure the safety of personnel carrying out work or testing on **Plant** and/or **Apparatus** on which his **Safety Rules** apply and, in the case of a **User**, any other document(s) on a **User Site** which contains rules with regard to maintaining or securing the isolating position of an **Isolating Device**, or maintaining a physical separation or maintaining or securing the position of an **Earthing Device**. |
| **Local Switching Procedure** | A procedure produced under OC7.6 detailing the agreed arrangements in respect of carrying out of **Operational Switching** at **Connection Sites** and parts of the **GB Transmission System** adjacent to those **Connection Sites**. |
| **Localised Negative Reserve Active Power Margin** or **Localised NRAPM** | That margin of **Active Power** sufficient to allow transfers to and from a **System Constraint Group** (as the case may be) to be contained within such reasonable limit as **NGET** may determine. |
| **Location** | Any place at which **Safety Precautions** are to be applied. |
| **Locked** | A condition of **HV Apparatus** that cannot be altered without the operation of a locking device. |
| **Locking** | The application of a locking device which enables **HV Apparatus** to be **Locked**. |
| **Low Frequency Relay** | Has the same meaning as **Under Frequency Relay**. |

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| **Low Voltage** or **LV** | In England and Wales a voltage not exceeding 250 volts. In Scotland, a voltage exceeding 50 voltage but not exceeding 1000 volts. |
| **Main Protection** | **Protection** equipment or system expected to have priority in initiating either a fault clearance or an action to terminate an abnormal condition in a power system. |
| **Material Effect** | An effect causing **NGET** or a **Relevant Transmission Licensee** to effect any works or to alter the manner of operation of **Transmission Plant** and/or **Transmission Apparatus** at the **Connection Site** (which term shall, in this definition and in the definition of "**Modification**" only, have the meaning ascribed thereto in the **CUSC**) or the site of connection or a **User** to effect any works or to alter the manner of operation of its **Plant** and/or **Apparatus** at the **Connection Site** or the site of connection which in either case involves that party in expenditure of more than £10,000. |
| **Maximum Generation Service, MGS** | A service utilised by **NGET** in accordance with the **CUSC** and the **Balancing Principles Statement** in operating the **Total System**. |
| **Maximum Generation Service Agreement** | An agreement between a **User** and **NGET** for the payment by **NGET** to that **User** in respect of the provision by such **User** of a **Maximum Generation Service**. |
| **Medium Power Station** | A **Power Station** which is<br>(A) directly connected to **NGET's Transmission System** where such Power Station has a **Registered Capacity** of 50MW or more but less than 100MW;<br>or,<br>(B) **Embedded** within a **User System** (or part thereof) where such **User System** (or part thereof) is connected under normal operating conditions to **NGET's Transmission System** and such **Power Station** has a **Registered Capacity** of 50MW or more but less than 100MW;<br>or,<br>(C) **Embedded** within a **User System** (or part thereof) where the **User System** (or part thereof) is not connected to the **GB Transmission System**, although such **Power Station** is in **NGET's Transmission Area** and such **Power Station** has a **Registered Capacity** of 50MW or more but less than 100MW. |
| **Medium Voltage** or **MV** | In England and Wales a voltage exceeding 250 volts but not exceeding 650 volts. |
| **Mills** | Milling plant which supplies pulverised fuel to the boiler of a coal fired **Power Station**. |

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| **Minimum Generation** | The minimum output (in whole MW) which a **Genset** can generate or **DC Converter** at a **DC Converter Station** can import or export to the **Total System** under stable operating conditions, as registered with **NGET** under the **PC** (and amended pursuant to the **PC**). For the avoidance of doubt, the output may go below this level as a result of operation in accordance with BC3.7. |
| **Minimum Import Capacity** | The minimum input (in whole MW) into a **DC Converter** at a **DC Converter Station** (in any of its operating configurations) at the **Grid Entry Point** (or in the case of an **Embedded DC Converter** at the **User System Entry Point**) at which a **DC Converter** can operate in a stable manner, as registered with **NGET** under the **PC** (and amended pursuant to the **PC**). |
| **Modification** | Any actual or proposed replacement, renovation, modification, alteration or construction by or on behalf of a **User** or **NGET** to either that **User's Plant** or **Apparatus** or **Transmission Plant** or **Apparatus**, as the case may be, or the manner of its operation which has or may have a **Material Effect** on **NGET** or a **User**, as the case may be, at a particular **Connection Site**. |
| **Mothballed DC Converter** at a **DC Converter Station** | A **DC Converter** at a **DC Converter Station** that has previously imported or exported power which the **DC Converter Station** owner plans not to use to import or export power for the remainder of the current **Financial Year** but which could be returned to service. |
| **Mothballed Generating Unit** | A **Generating Unit** that has previously generated which the **Generator** plans not to use to generate for the remainder of the current **NGET Financial Year** but which could be returned to service. |
| **Mothballed Power Park Module** | A **Power Park Module** that has previously generated which the **Generator** plans not to use to generate for the remainder of the current **Financial Year** but which could be returned to service. |
| **Multiple Point of Connection** | A double (or more) **Point of Connection**, being two (or more) **Points of Connection** interconnected to each other through the **User's System**. |
| **Network Data** | The data to be provided by **NGET** to **Users** in accordance with the **PC**, as listed in Part 3 of the Appendix to the **PC**. |
| **Network Operator** | A person with a **User System** directly connected to the **GB Transmission System** to which **Customers** and/or **Power Stations** (not forming part of the **User System**) are connected, acting in its capacity as an operator of the **User System**, but shall not include a person acting in the capacity of an **Externally Interconnected System Operator**. |
| **NGET** | National Grid Electricity Transmission plc (NO: 2366977) whose registered office is at 1-3 Strand, London, WC2N 5EH. |

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| **NGET Control Engineer** | The nominated person employed by **NGET** to direct the operation of the **GB Transmission System** or such person as nominated by **NGET**. |
| **NGET Operational Strategy** | **NGET's** operational procedures which form the guidelines for operation of the **GB Transmission System**. |
| **No-Load Field Voltage** | Shall have the meaning ascribed to that term in **IEC** 34-16-1:1991 [equivalent to **British Standard BS**4999 Section 116.1 : 1992]. |
| **Non-Embedded Customer** | A **Customer** in **Great Britain**, except for a **Network Operator** acting in its capacity as such, receiving electricity direct from the **GB Transmission System** irrespective of from whom it is supplied. |
| **Non-Synchronous Generating Unit** | A **Generating Unit** that is not a **Synchronous Generating Unit** including for the avoidance of doubt a **Power Park Unit**. |
| **Normal CCGT Module** | A **CCGT Module** other than a **Range CCGT Module**. |
| **Novel Unit** | A tidal, wave, wind, geothermal, or any similar, **Generating Unit**. |
| **OC9 De-synchronised Island Procedure** | Has the meaning set out in OC9.5.4. |
| **On-Site Generator Site** | A site which is determined by the **BSC Panel** to be a Trading Unit under the **BSC** by reason of having fulfilled the Class 1 or Class 2 requirements as such terms are used in the **BSC**. |
| **Operating Code** or **OC** | That portion of the **Grid Code** which is identified as the **Operating Code**. |
| **Operating Margin** | **Contingency Reserve** plus **Operating Reserve**. |
| **Operating Reserve** | The additional output from **Large Power Stations** or the reduction in **Demand**, which must be realisable in real-time operation to respond in order to contribute to containing and correcting any **System Frequency** fall to an acceptable level in the event of a loss of generation or a loss of import from an **External Interconnection** or mismatch between generation and **Demand**. |
| **Operation** | A scheduled or planned action relating to the operation of a **System** (including an **Embedded Power Station**). |
| **Operational Data** | Data required under the **Operating Codes** and/or **Balancing Codes**. |
| **Operational Day** | The period from 0500 hours on one day to 0500 on the following day. |

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| **Operation Diagrams** | Diagrams which are a schematic representation of the **HV Apparatus** and the connections to all external circuits at a **Connection Site**, incorporating its numbering, nomenclature and labelling. |
| **Operational Effect** | Any effect on the operation of the relevant other **System** which causes the **GB Transmission System** or the **System** of the other **User** or **Users**, as the case may be, to operate (or be at a materially increased risk of operating) differently to the way in which they would or may have operated in the absence of that effect. |
| **Operational Intertripping** | The automatic tripping of circuit-breakers 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) which includes **System** to **Generating Unit**, **System** to **CCGT Module, System** to **Power Park Module, System** to **DC Converter** and **System** to **Demand** intertripping schemes. |
| **Operational Planning** | Planning through various timescales the matching of generation output with forecast **GB Transmission System Demand** together with a reserve of generation to provide a margin, taking into account outages of certain **Generating Units**, of parts of the **GB Transmission System** and of parts of **User Systems** to which **Power Stations** and/or **Customers** are connected, carried out to achieve, so far as possible, the standards of security set out in **NGET's Transmission Licence**, each **Relevant Transmission Licensee's Transmission Licence** or **Electricity Distribution Licence**, as the case may be. |
| **Operational Planning Margin** | An operational planning margin set by **NGET**. |
| **Operational Planning Phase** | The period from 8 weeks to the end of the 5th year ahead of real time operation. |
| **Operational Procedures** | Management instructions and procedures, both in support of the **Safety Rules** and for the local and remote operation of **Plant** and **Apparatus**, issued in connection with the actual operation of **Plant** and/or **Apparatus** at or from a **Connection Site**. |
| **Operational Switching** | Operation of **Plant** and/or **Apparatus** to the instruction of the relevant **Control Engineer.** For the avoidance of doubt, the operation of **Transmission Plant** and/or **Apparatus** forming part of the **GB Transmission System** in England and Wales, will be to the instruction of **NGET** and in Scotland will be to the instruction of the **Relevant Transmission Licensee**. |
| **Other Relevant Data** | The data listed in BC1.4.2(f) under the heading **Other Relevant Data** |

**Out of Synchronism** — The condition where a **System** or **Generating Unit** cannot meet the requirements to enable it to be **Synchronised**.

**Output Usable** or **OU** — The (daily or weekly) forecast value (in MW), at the time of the (daily or weekly) peak demand, of the maximum level at which the **Genset** can export to the **Grid Entry Point**, or in the case of **Embedded Power Stations**, to the **User System Entry Point**.

**Over-excitation Limiter** — Shall have the meaning ascribed to that term in **IEC** 34-16-1:1991 [equivalent to **British Standard BS**4999 Section 116.1 : 1992].

**Part 1 System Ancillary Services** — **Ancillary Services** which are required for **System** reasons and which must be provided by **Users** in accordance with the **Connection Conditions**. An exhaustive list of **Part 1 System Ancillary Services** is included in that part of CC.8.1 headed Part 1.

**Part 2 System Ancillary Services** — **Ancillary Services** which are required for **System** reasons and which must be provided by a **User** if the **User** has agreed to provide them under a **Bilateral Agreement**. A non-exhaustive list of **Part 2 System Ancillary Services** is included in that part of CC.8.1 headed Part 2.

**Part Load** — The condition of a **Genset**, or **Cascade Hydro Scheme** which is **Loaded** but is not running at its Maximum Export Limit.

**Permit for Work for proximity work** — In England and Wales, a document issued by **NGET** or a **User** in accordance with its respective **Safety Rules** to enable work to be carried out in accordance with OC8A.8 and which provides for **Safety Precautions** to be applied and maintained. An example format of **NGET**'s permit for work is attached as Appendix E to **OC8A**.

In Scotland, a document issued by a **Relevant Transmission Licensee** or a **User** in accordance with its respective **Safety Rules** to enable work to be carried out in accordance with OC8B.8 and which provides for **Safety Precautions** to be applied and maintained. Example formats of the **Relevant Transmission Licensees'** permits for work are attached as Appendix E to **OC8B**.

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

**Phase (Voltage) Unbalance** — The ratio (in percent) between the rms values of the negative sequence component and the positive sequence component of the voltage.

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| **Physical Notification** | Data that describes the **BM Participant**'s best estimate of the expected input or output of **Active Power** of a **BM Unit** and/or (where relevant) **Generating Unit**. |
| **Planning Code** or **PC** | That portion of the **Grid Code** which is identified as the **Planning Code**. |
| **Planned Maintenance Outage** | An outage of **NGET** electronic data communication facilities as provided for in CC.6.5.8 and **NGET's** associated computer facilities of which normally at least 5 days notice is given, but in any event of which at least twelve hours notice has been given by **NGET** to the **User** and which is anticipated to last no longer than 2 hours. The length of such an outage may in exceptional circumstances be extended where at least 24 hours notice has been given by **NGET** to the **User**. It is anticipated that normally any planned outage would only last around one hour. |
| **Planned Outage** | An outage of a **Large Power Station** or of part of the **GB Transmission System**, or of part of a **User System**, co-ordinated by **NGET** under **OC2**. |
| **Plant** | Fixed and movable items used in the generation and/or supply and/or transmission of electricity, other than **Apparatus**. |
| **Point of Common Coupling** | That point on the **GB Transmission System** electrically nearest to the **User** installation at which either **Demands** or **Loads** are, or may be, connected. |
| **Point of Connection** | An electrical point of connection between the **GB Transmission System** and a **User's System**. |
| **Point of Isolation** | The point on **Apparatus** (as defined in OC8A.1.6.2 and OC8B.1.7.2) at which **Isolation** is achieved. |
| **Post-Control Phase** | The period following real time operation. |
| **Power Factor** | The ratio of **Active Power** to **Apparent Power**. |
| **Power Island** | **Gensets** at an isolated **Power Station**, together with complementary local **Demand**. In Scotland a **Power Island** may include more than one **Power Station.** |
| **Power Park Module** | A collection of **Non-synchronous Generating Units** (registered as a **Power Park Module** under the **PC**) that are powered by an **Intermittent Power Source**, joined together by a **System** with a single electrical point of connection to the **GB Transmission System** (or **User System** if **Embedded).** The connection to the **GB Transmission System** (or **User System** if **Embedded**) may include a **DC Converter.** |

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| **Power Park Module Availability Matrix** | The matrix described in Appendix 1 to BC1 under the heading **Power Park Module Availability Matrix**. |
| **Power Park Module Planning Matrix** | A matrix in the form set out in Appendix 4 of OC2 showing the combination of **Power Park Units** within a **Power Park Module** which would be expected to be running under normal conditions. |
| **Power Park Unit** | A **Generating Unit** within a **Power Park Module**. |
| **Power Station** | An installation comprising one or more **Generating Units** or **Power Park Modules** (even where sited separately) owned and/or controlled by the same **Generator**, which may reasonably be considered as being managed as one **Power Station**. |
| **Power System Stabiliser** or **PSS** | Equipment controlling the **Exciter** output via the voltage regulator in such a way that power oscillations of the synchronous machines are dampened. Input variables may be speed, frequency or power (or a combination of these). |
| **Preface** | The preface to the **Grid Code** (which does not form part of the **Grid Code** and therefore is not binding). |
| **Preliminary Notice** | A notice in writing, sent by **NGET** both to all **Users** identified by it under OC12.4.2.1 and to the **Test Proposer**, notifying them of a proposed **System Test**. |
| **Preliminary Project Planning Data** | Data relating to a proposed **User Development** at the time the **User** applies for a **CUSC Contract** but before an offer is made and accepted. |
| **Primary Response** | The automatic increase in **Active Power** output of a **Genset** or, as the case may be, the decrease in **Active Power Demand** in response to a **System Frequency** fall. This increase in **Active Power** output or, as the case may be, the decrease in **Active Power Demand** must be in accordance with the provisions of the relevant **Ancillary Services Agreement** which will provide that it will be released increasingly with time over the period 0 to 10 seconds from the time of the start of the **Frequency** fall on the basis set out in the **Ancillary Services Agreement** and fully available by the latter, and sustainable for at least a further 20 seconds. The interpretation of the **Primary Response** to a – 0.5 Hz frequency change is shown diagrammatically in Figure CC.A.3.2. |
| **Programming Phase** | The period between **Operational Planning Phase** and the **Control Phase**. It starts at the 8 weeks ahead stage and finishes at 17:00 on the day ahead of real time. |
| **Proposal Notice** | A notice submitted to **NGET** by a **User** which would like to undertake a **System Test**. |

**Proposal Report** A report submitted by the **Test Panel** which contains:

a) proposals for carrying out a **System Test** (including the manner in which the **System Test** is to be monitored);

b) an allocation of costs (including un-anticipated costs) between the affected parties (the general principle being that the **Test Proposer** will bear the costs); and

c) such other matters as the **Test Panel** considers appropriate.

The report may include requirements for indemnities to be given in respect of claims and losses arising from a **System Test**.

**Protection** The provisions for detecting abnormal conditions on a **System** and initiating fault clearance or actuating signals or indications.

**Protection Apparatus** A group of one or more **Protection** relays and/or logic elements designated to perform a specified **Protection** function.

**Pumped Storage Generator** A **Generator** which owns and/or operates any **Pumped Storage Plant**.

**Pumped Storage Plant** The Dinorwig, Ffestiniog, Cruachan and Foyers **Power Stations**.

**Pumped Storage Unit** A **Generating Unit** within a **Pumped Storage Plant**.

**Quiescent Physical Notification** or **QPN**

Data that describes the MW levels to be deducted from the **Physical Notification** of a **BM Unit** to determine a resultant operating level to which the **Dynamic Parameters** associated with that **BM Unit** apply, and the associated times for such MW levels. The MW level of the **QPN** must always be set to zero.

**Range CCGT Module**

A **CCGT Module** where there is a physical connection by way of a steam or hot gas main between that **CCGT Module** and another **CCGT Module** or other **CCGT Modules**, which connection contributes (if open) to efficient modular operation, and which physical connection can be varied by the operator.

**Rated Field Voltage**

Shall have the meaning ascribed to that term in **IEC** 34-16-1:1991 [equivalent to **British Standard BS**4999 Section 116.1 : 1992].

**Rated MW**

The "rating-plate" MW output of a **Generating Unit, Power Park Module** or **DC Converter**, being:

(a) that output up to which the **Generating Unit** was designed to operate (Calculated as specified in **British Standard BS** EN 60034 – 1: 1995); or

(b) the nominal rating for the MW output of a **Power Park Module** being the maximum continuous electric output power which the **Power Park Module** was designed to achieve under normal operating conditions; or

(c) the nominal rating for the MW import capacity and export capacity (if at a **DC Converter Station**) of a **DC Converter**.

**Reactive Energy**

The integral with respect to time of the **Reactive Power**.

**Reactive Power**

The product of voltage and current and the sine of the phase angle between them measured in units of voltamperes reactive and standard multiples thereof, ie:

1000 VAr = 1 kVAr
1000 kVAr = 1 Mvar

**Record of Inter-System Safety Precautions** or **RISSP**

A written record of inter-system **Safety Precautions** to be compiled in accordance with the provisions of **OC8**.

**Registered Capacity**

(a) In the case of a **Generating Unit** other than that forming part of a **CCGT Module** or **Power Park Module**, the normal full load capacity of a **Generating Unit** as declared by the **Generator**, less the MW consumed by the **Generating Unit** through the **Generating Unit's Unit Transformer** when producing the same (the resultant figure being expressed in whole MW, or in MW to one decimal place).

(b) In the case of a **CCGT Module** or **Power Park Module**, the normal full load capacity of the **CCGT Module** or **Power Park Module** (as the case may be) as declared by the **Generator**, being the **Active Power** declared by the **Generator** as being deliverable by the **CCGT Module** or **Power Park Module** at the **Grid Entry Point** (or in the case of an **Embedded CCGT Module** or **Power Park Module**, at the **User System Entry Point**), expressed in whole MW, or in MW to one decimal place.

(c) In the case of a **Power Station**, the maximum amount of **Active Power** deliverable by the **Power Station** at the **Grid Entry Point** (or in the case of an **Embedded Power Station** at the **User System Entry Point**), as declared by the **Generator**, expressed in whole **MW**, or in MW to one decimal place. The maximum **Active Power** deliverable is the maximum amount deliverable simultaneously by the **Generating Units** and/or **CCGT Modules** and/or **Power Park Modules** less the **MW** consumed by the **Generating Units** and/or **CCGT Modules** in producing that **Active Power**.

(d) In the case of a **DC Converter** at a **DC Converter Station,** the normal full load amount of **Active Power** transferable from a **DC Converter** at the **Grid Entry Point** (or in the case of an **Embedded DC Converter Station** at the **User System Entry Point**), as declared by the **DC Converter Station** owner, expressed in whole MW.

(e) In the case of a **DC Converter Station,** the maximum amount of Active **Power** transferable from a **DC Converter Station** at the **Grid Entry Point** (or in the case of an **Embedded DC Converter Station** at the **User System Entry Point**), as declared by the **DC Converter Station** owner, expressed in whole MW.

**Registered Data**

Those items of **Standard Planning Data** and **Detailed Planning Data** which upon connection become fixed (subject to any subsequent changes).

**Registered Import Capability**

In the case of a **DC Converter Station** containing **DC Converters** connected to an **External System**, the maximum amount of **Active Power** transferable into a **DC Converter Station** at the **Grid Entry Point** (or in the case of an **Embedded DC Converter Station** at the **User System Entry Point**), as declared by the **DC Converter Station** owner, expressed in whole MW.

In the case of a **DC Converter** connected to an **External System** and in a **DC Converter Station**, the normal full load amount of **Active Power** transferable into a **DC Converter** at the **Grid Entry Point** (or in the case of an **Embedded DC Converter Station** at the **User System Entry Point**), as declared by the **DC Converter** owner, expressed in whole MW.

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| **Regulations** | The Utilities Contracts Regulations 1996, as amended from time to time. |
| **Reheater Time Constant** | Determined at **Registered Capacity**, the reheater time constant will be construed in accordance with the principles of the IEEE Committee Report "Dynamic Models for Steam and Hydro Turbines in Power System Studies" published in 1973 which apply to such phrase. |
| **Relevant Transmission Licensee** | Means SP Transmission Ltd (**SPT**) in its **Transmission Area** and Scottish Hydro-Electric Transmission Ltd (**SHETL**) in its **Transmission Area**. |
| **Remote Transmission Assets** | Any **Plant** and **Apparatus** or meters owned by **NGET** which:<br>a) are **Embedded** in a **User System** and which are not directly connected by **Plant** and/or **Apparatus** owned by **NGET** to a sub-station owned by **NGET**; and<br>b) are by agreement between **NGET** and such **User** operated under the direction and control of such **User**. |
| **Requesting Safety Co-ordinator** | The **Safety Co-ordinator** requesting **Safety Precautions**. |
| **Responsible Engineer/ Operator** | A person nominated by a **User** to be responsible for **System** control. |
| **Responsible Manager** | A manager who has been duly authorised by a **User** or **NGET** to sign **Site Responsibility Schedules** on behalf of that **User** or **NGET**, as the case may be.<br><br>For **Connection Sites** in Scotland a manager who has been duly authorised by the **Relevant Transmission Licensee** to sign **Site Responsibility Schedules** on behalf of that **Relevant Transmission Licensee**. |
| **Re-synchronisation** | The bringing of parts of the **Network Operator's User System** which have become **Out of Synchronism** with each other back into **Synchronism**, and like terms shall be construed accordingly. |
| **Safety Co-ordinator** | A person or persons nominated by **NGET** and each **User** in relation to **Connection Points** in England and Wales and/or by the **Relevant Transmission Licensee** and each **User** in relation to **Connection Points** in Scotland to be responsible for the co-ordination of **Safety Precautions** at each **Connection Point** when work (which includes testing) is to be carried out on a **System** which necessitates the provision of **Safety Precautions** on **HV Apparatus** (as defined in OC8A.1.6.2 and OC8B.1.7.2), pursuant to **OC8**. |

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| **Safety From The System** | That condition which safeguards persons when work is to be carried out on or near a **System** from the dangers which are inherent in the **System**. |
| **Safety Key** | A key unique at the **Location** capable of operating a lock which will cause an **Isolating Device** and/or **Earthing Device** to be **Locked**. |
| **Safety Log** | A chronological record of messages relating to safety co-ordination sent and received by each **Safety Co-ordinator** under **OC8**. |
| **Safety Precautions** | **Isolation** and/or **Earthing**. |
| **Safety Rules** | The rules of **NGET** (in England and Wales) and the **Relevant Transmission Licensee** (in Scotland) or a **User** that seek to ensure that persons working on **Plant** and/or **Apparatus** to which the rules apply are safeguarded from hazards arising from the **System**. |
| **Secondary Response** | The automatic increase in **Active Power** output of a **Genset** or, as the case may be, the decrease in **Active Power Demand** in response to a **System Frequency** fall. This increase in **Active Power** output or, as the case may be, the decrease in **Active Power Demand** must be in accordance with the provisions of the relevant **Ancillary Services Agreement** which will provide that it will be fully available by 30 seconds from the time of the start of the **Frequency** fall and be sustainable for at least a further 30 minutes. The interpretation of the **Secondary Response** to a -0.5 Hz frequency change is shown diagrammatically in Figure CC.A.3.2. |
| **Secretary of State** | Has the same meaning as in the **Act**. |
| **Secured Event** | Has the meaning set out in the **Security and Quality of Supply Standard**. |
| **Security and Quality of Supply Standard** | The version of the document entitled 'Security and Quality of Supply Standard' established pursuant to the **Transmission Licence** in force at the time of entering into the relevant **Bilateral Agreement**. |
| **Settlement Period** | A period of 30 minutes ending on the hour and half-hour in each hour during a day. |
| **Seven Year Statement** | A statement, prepared by **NGET** in accordance with the terms of **NGET's Transmission Licence**, showing for each of the seven succeeding **Financial Years**, the opportunities available for connecting to and using the **GB Transmission System** and indicating those parts of the **GB Transmission System** most suited to new connections and transport of further quantities of electricity. |
| **$SF_6$ Gas Zone** | A segregated zone surrounding electrical conductors within a casing containing $SF_6$ gas. |

**SHETL** Scottish Hydro-Electric Transmission Limited

**Shutdown** The condition of a **Generating Unit** where the generator rotor is at rest or on barring.

**Significant Incident** An **Event** which either:

a) was notified by a **User** to **NGET** under **OC7**, and which **NGET** considers has had or may have had a significant effect on the **GB Transmission System**, and **NGET** requires the **User** to report that **Event** in writing in accordance with **OC10** and notifies the **User** accordingly; or

b) was notified by **NGET** to a **User** under **OC7**, and which that **User** considers has had or may have had a significant effect on that **User's System**, and that **User** requires **NGET** to report that **Event** in writing in accordance with the provisions of **OC10** and notifies **NGET** accordingly.

**Simultaneous Tap Change** A tap change implemented on the generator step-up transformers of **Synchronised Gensets**, effected by **Generators** in response to an instruction from **NGET** issued simultaneously to the relevant **Power Stations**. The instruction, preceded by advance notice, must be effected as soon as possible, and in any event within one minute of receipt from **NGET** of the instruction.

**Single Line Diagram** A schematic representation of a three-phase network in which the three phases are represented by single lines. The diagram shall include (but not necessarily be limited to) busbars, overhead lines, underground cables, power transformers and reactive compensation equipment. It shall also show where **Large Power Stations** are connected, and the points at which **Demand** is supplied.

**Single Point of Connection** A single **Point of Connection**, with no interconnection through the **User's System** to another **Point of Connection**.

**Site Common Drawings** Drawings prepared for each **Connection Site** which incorporate **Connection Site** layout drawings, electrical layout drawings, common protection/ control drawings and common services drawings.

**Site Responsibility Schedule** A schedule containing the information and prepared on the basis of the provisions set out in Appendix 1 of the **CC**.

**Slope** The ratio of the steady state change in voltage to the steady state change in **Reactive Power** output.

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| **Small Power Station** | A **Power Station** which is<br>(A) directly connected to:<br>(a) **NGET's Transmission System** where such **Power Station** has a **Registered Capacity** of less than 50MW; or<br>(b) **SPT's Transmission System** where such **Power Station** has a **Registered Capacity** of less than 30MW; or<br>(c) **SHETL's Transmission System** where such a **Power Station** has a **Registered Capacity** of less than 10 MW;<br><br>or,<br>(B) **Embedded** within a **User System** (or part thereof) where such **User System** (or part thereof) is connected under normal operating conditions to:<br>(a) **NGET's Transmission System** and such **Power Station** has a **Registered Capacity** of less than 50MW; or<br>(b) **SPT's Transmission System** and such **Power Station** has a **Registered Capacity** of less than 30MW; or<br>(c) **SHETL's Transmission System** and such **Power Station** has a **Registered Capacity** of less than 10MW;<br>or,<br>(C) **Embedded** within a **User System** (or part thereof) where the **User System** (or part thereof) is not connected to the **GB Transmission System**, although such Power Station is in:<br>(a) **NGET's Transmission Area** and such **Power Station** has a **Registered Capacity** of less than 50MW; or<br>(b) **SPT's Transmission Area** and such **Power Station** has a **Registered Capacity** of less than 30MW; or<br>(c) **SHETL's Transmission Area** and such **Power Station** has a **Registered Capacity** of less than 10MW; |
| **Speeder Motor Setting Range** | The minimum and maximum no-load speeds (expressed as a percentage of rated speed) to which the turbine is capable of being controlled, by the speeder motor or equivalent, when the **Generating Unit** terminals are on open circuit. |
| **SPT** | SP Transmission Limited |
| **Standard Planning Data** | The general data required by **NGET** under the **PC**. It is generally also the data which **NGET** requires from a new **User** in an application for a **CUSC Contract**, as reflected in the **PC**. |
| **Start Time** | The time named as such in an instruction issued by **NGET** pursuant to the **BC**s. |
| **Start-Up** | The action of bringing a **Generating Unit** from **Shutdown** to **Synchronous Speed**. |
| **Statement of Readiness** | Has the meaning set out in the **Bilateral Agreement** and/or **Construction Agreement**. |

**Station Board**

A switchboard through which electrical power is supplied to the **Auxiliaries** of a **Power Station**, and which is supplied by a **Station Transformer**. It may be interconnected with a **Unit Board**.

**Station Transformer**

A transformer supplying electrical power to the **Auxiliaries** of

- a **Power Station**, which is not directly connected to the **Generating Unit** terminals (typical voltage ratios being 132/11kV or 275/11kV),or
- a **DC Converter Station**.

**STC Committee**

The committee established under the **STC**.

**Steam Unit**

A **Generating Unit** whose prime mover converts the heat-energy in steam to mechanical energy.

**Subtransmission System**

The part of a **User's System** which operates at a single transformation below the voltage of the relevant **Transmission System**.

**Supergrid Voltage**

Any voltage greater than 200kV.

**Supplier**

(a) A person supplying electricity under an **Electricity Supply Licence**; or

(b) A person supplying electricity under exemption under the **Act**;

in each case acting in its capacity as a supplier of electricity to **Customers** in **Great Britain**.

**Surplus**

A MW figure relating to a **System Zone** equal to the total **Output Usable** in the **System Zone:**

a) minus the forecast of **Active Power Demand** in the **System Zone**, and

b) minus the export limit in the case of an export limited **System Zone**,

or

plus the import limit in the case of an import limited **System Zone**,

and

c) (only in the case of a **System Zone** comprising the **GB Transmission System**) minus the **Operational Planning Margin**.

For the avoidance of doubt, a **Surplus** of more than zero in an export limited **System Zone** indicates an excess of generation in that **System Zone**; and a **Surplus** of less than zero in an import limited **System Zone** indicates insufficient generation in that **System Zone.**

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| **Synchronised** | a) The condition where an incoming **Generating Unit or Power Park Module** or **DC Converter** or **System** is connected to the busbars of another **System** so that the **Frequencies** and phase relationships of that **Generating Unit, Power Park Module**, **DC Converter** or **System**, as the case may be, and the **System** to which it is connected are identical, like terms shall be construed accordingly.<br><br>b) The condition where an importing **BM Unit** is consuming electricity. |
| **Synchronising Generation** | The amount of MW (in whole MW) produced at the moment of synchronising. |
| **Synchronising Group** | A group of two or more **Gensets**) which require a minimum time interval between their **Synchronising** or **De-Synchronising** times. |
| **Synchronous Compensation** | The operation of rotating synchronous **Apparatus** for the specific purpose of either the generation or absorption of **Reactive Power**. |
| **Synchronous Generating Unit** | A **Generating Unit** including, for the avoidance of doubt, a **CCGT Unit** in which, under all steady state conditions, the rotor rotates at a mechanical speed equal to the electrical frequency of the **GB Transmission System** divided by the number of pole pairs of the **Generating Unit** . |
| **Synchronous Speed** | That speed required by a **Generating Unit** to enable it to be **Synchronised** to a **System**. |
| **System** | Any **User System** and/or the **GB Transmission System**, as the case may be. |
| **System Ancillary Services** | Collectively **Part 1 System Ancillary Services** and **Part 2 System Ancillary Services**. |
| **System Constraint** | A limitation on the use of a **System** due to lack of transmission capacity or other **System** conditions. |
| **System Constrained Capacity** | That portion of **Registered Capacity** or **Registered Import Capacity** not available due to a **System Constraint**. |
| **System Constraint Group** | 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. |

**System Fault Dependability Index** or **Dp**

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:

$$\mathbf{Dp} = 1 - F_1/A$$

Where:

A = Total number of **System** faults

$F_1$ = Number of **System** faults where there was a failure to trip a circuit-breaker.

**System Margin**

The margin in any period between

(a) the sum of Maximum Export Limits and

(b) forecast **Demand** and the **Operating Margin**,

for that period.

**System Negative Reserve Active Power Margin** or **System NRAPM**

That margin of **Active Power** sufficient to allow the largest loss of **Load** at any time.

**System Operator - Transmission Owner Code** or **STC**

Has the meaning set out in **NGET's Transmission Licence**

**System Tests**

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.

**System to Demand Intertrip Scheme**

An intertrip scheme which disconnects **Demand** when a **System** fault has arisen to prevent abnormal conditions occurring on the **System**.

**System to Generator Operational Intertripping**

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).

**System to Generator Operational Intertripping Scheme**

A **System** to **Generating Unit** or **System** to **CCGT Module 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.**

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| **System Zone** | 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. |
| **Target Frequency** | 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. |
| **Technical Specification** | In relation to **Plant** and/or **Apparatus**,<br>a) the relevant **European Specification**; or<br>b) if there is no relevant **European Specification**, other relevant standards which are in common use in the European Community. |
| **Test Co-ordinator** | A person who co-ordinates **System Tests**. |
| **Test Panel** | A panel, whose composition is detailed in **OC12**, which is responsible, inter alia, for considering a proposed **System Test**, and submitting a **Proposal Report** and a **Test Programme**. |
| **Test Programme** | A programme submitted by the **Test Panel** to **NGET**, the **Test Proposer**, and each **User** identified by **NGET** under OC12.4.2.1, which states the switching sequence and proposed timings of the switching sequence, a list of those staff involved in carrying out the **System Test** (including those responsible for the site safety) and such other matters as the **Test Panel** deems appropriate. |
| **Test Proposer** | The person who submits a **Proposal Notice**. |
| **Total Shutdown** | The situation existing when all generation has ceased and there is no electricity supply from **External Interconnections** and, therefore, the **Total System** has shutdown with the result that it is not possible for the **Total System** to begin to function again without **NGET's** directions relating to a **Black Start**. |
| **Total System** | The **GB Transmission System** and all **User Systems** in **Great Britain**. |
| **Trading Point** | A commercial and, where so specified in the **Grid Code**, an operational interface between a **User** and **NGET**, which a **User** has notified to **NGET**. |
| **Transfer Date** | Such date as may be appointed by the **Secretary of State** by order under section 65 of the **Act**. |

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| **Transmission** | Means, when used in conjunction with another term relating to equipment or a site, whether defined or not, that the associated term is to be read as being part of or directly associated with the **GB Transmission System**, and not of or with the **User System**. |
| **Transmission Area** | Has the meaning set out in the **Transmission Licence** of a **Transmission Licensee**. |
| **Transmission Entry Capacity** | Has the meaning set out in the **CUSC**. |
| **Transmission Licence** | A licence granted under Section 6(1)(b) of the **Act**. |
| **Transmission Licensee** | Means the holder for the time being of a **Transmission Licence**. |
| **Transmission Site** | In England and Wales, means a site owned (or occupied pursuant to a lease, licence or other agreement) by **NGET** in which there is a **Connection Point**. For the avoidance of doubt, a site owned by a **User** but occupied by **NGET** as aforesaid, is a **Transmission Site**.<br><br>In Scotland, means a site owned (or occupied pursuant to a lease, licence or other agreement) by a **Relevant Transmission Licensee** in which there is a **Connection Point**. For the avoidance of doubt, a site owned by a **User** but occupied by the **Relevant Transmission Licensee** as aforesaid, is a **Transmission Site**. |
| **Transmission System** | Has the same meaning as the term "licensee's transmission system" in the **Transmission Licence** of a **Transmission Licensee**. |
| **Turbine Time Constant** | Determined at **Registered Capacity**, the turbine time constant will be construed in accordance with the principles of the IEEE Committee Report "Dynamic Models for Steam and Hydro Turbines in Power System Studies" published in 1973 which apply to such phrase. |
| **Two Shifting Limit** | The maximum number of times in any **Operational Day** that a **Genset** may **De-Synchronise**. |
| **Unbalanced Load** | The situation where the **Load** on each phase is not equal. |
| **Under-excitation Limiter** | Shall have the meaning ascribed to that term in **IEC** 34-16-1:1991 [equivalent to **British Standard BS**4999 Section 116.1 : 1992]. |
| **Under Frequency Relay** | An electrical measuring relay intended to operate when its characteristic quantity (**Frequency**) reaches the relay settings by decrease in **Frequency**. |

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| **Unit Board** | A switchboard through which electrical power is supplied to the **Auxiliaries** of a **Generating Unit** and which is supplied by a **Unit Transformer**. It may be interconnected with a **Station Board**. |
| **Unit Transformer** | A transformer directly connected to a **Generating Unit's** terminals, and which supplies power to the **Auxiliaries** of a **Generating Unit**. Typical voltage ratios are 23/11kV and 15/6.6Kv. |
| **Unit Load Controller Response Time Constant** | The time constant, expressed in units of seconds, of the power output increase which occurs in the **Secondary Response** timescale in response to a step change in **System Frequency**. |
| **User** | A term utilised in various sections of the **Grid Code** to refer to the persons using the **GB Transmission System**, as more particularly identified in each section of the **Grid Code** concerned. In the **Preface** and the **General Conditions** the term means any person to whom the **Grid Code** applies. |
| **User Development** | In the **PC** means either **User's Plant** and/or **Apparatus** to be connected to the **GB Transmission System**, or a **Modification** relating to a **User's Plant** and/or **Apparatus** already connected to the **GB Transmission System**, or a proposed new connection or **Modification** to the connection within the **User System**. |
| **User Site** | In England and Wales, a site owned (or occupied pursuant to a lease, licence or other agreement) by a **User** in which there is a **Connection Point**. For the avoidance of doubt, a site owned by **NGET** but occupied by a **User** as aforesaid, is a **User Site**.<br><br>In Scotland, a site owned (or occupied pursuant to a lease, licence or other agreement) by a **User** in which there is a **Connection Point**. For the avoidance of doubt, a site owned by a **Relevant Transmission Licensee** but occupied by a **User** as aforesaid, is a **User Site**. |

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| **User System** | Any system owned or operated by a **User** comprising:-<br><br>(a) **Generating Units**; and/or<br><br>(b) Systems consisting (wholly or mainly) of electric lines used for the distribution of electricity from **Grid Supply Points** or **Generating Units** or other entry points to the point of delivery to **Customers**, or other **Users**;<br><br>and **Plant** and/or **Apparatus** connecting:-<br><br>(c) The system as described above; or<br><br>(d) **Non-Embedded Customers** equipment;<br><br>to the **GB Transmission System** or to the relevant other **User System**, as the case may be.<br><br>The **User System** includes any **Remote Transmission Assets** operated by such **User** or other person and any **Plant** and/or **Apparatus** and meters owned or operated by the **User** or other person in connection with the distribution of electricity but does not include any part of the **GB Transmission System**. |
| **User System Entry Point** | A point at which a **Generating Unit**, a **CCGT Module** or a **CCGT Unit** or a **Power Park Module** or a **DC Converter**, as the case may be, which is **Embedded** connects to the **User System**. |
| **Water Time Constant** | Bears the meaning ascribed to the term "Water inertia time" in **IEC**308. |
| **Weekly ACS Conditions** | Means that particular combination of weather elements that gives rise to a level of peak **Demand** within a week, taken to commence on a Monday and end on a Sunday, which has a particular chance of being exceeded as a result of weather variation alone. This particular chance is determined such that the combined probabilities of **Demand** in all weeks of the year exceeding the annual peak **Demand** under **Annual ACS Conditions** is 50%, and in the week of maximum risk the weekly peak **Demand** under **Weekly ACS Conditions** is equal to the annual peak **Demand** under **Annual ACS Conditions**. |
| **Zonal System Security Requirements** | That generation required, within the boundary circuits defining the **System Zone**, which when added to the secured transfer capability of the boundary circuits exactly matches the **Demand** within the **System Zone**. |

A number of the terms listed above are defined in other documents, such as the **Balancing and Settlement Code** and the **Transmission Licence**. Appendix 1 sets out the current definitions from the other documents of those terms so used in the **Grid Code** and defined in other documents for ease of reference, but does not form part of the **Grid Code**.

2. Construction of References

In the **Grid Code**:

(i) a table of contents, a Preface, a Revision section, headings, and the Appendix to this **Glossary and Definitions** are inserted for convenience only and shall be ignored in construing the **Grid Code**;

(ii) unless the context otherwise requires, all references to a particular paragraph, sub-paragraph, Appendix or Schedule shall be a reference to that paragraph, sub-paragraph Appendix or Schedule in or to that part of the **Grid Code** in which the reference is made;

(iii) unless the context otherwise requires, the singular shall include the plural and vice versa, references to any gender shall include all other genders and references to persons shall include any individual, body corporate, corporation, joint venture, trust, unincorporated association, organisation, firm or partnership and any other entity, in each case whether or not having a separate legal personality;

(iv) references to the words "include" or "including" are to be construed without limitation to the generality of the preceding words;

(v) unless there is something in the subject matter or the context which is inconsistent therewith, any reference to an Act of Parliament or any Section of or Schedule to, or other provision of an Act of Parliament shall be construed at the particular time, as including a reference to any modification, extension or re-enactment thereof then in force and to all instruments, orders and regulations then in force and made under or deriving validity from the relevant Act of Parliament;

(vi) where the **Glossary and Definitions** refers to any word or term which is more particularly defined in a part of the **Grid Code**, the definition in that part of the **Grid Code** will prevail (unless otherwise stated) over the definition in the **Glossary & Definitions** in the event of any inconsistency;

(vii) a cross-reference to another document or part of the **Grid Code** shall not of itself impose any additional or further or co-existent obligation or confer any additional or further or co-existent right in the part of the text where such cross-reference is contained;

(viii) nothing in the **Grid Code** is intended to or shall derogate from **NGET's** statutory or licence obligations;

(ix) a "holding company" means, in relation to any person, a holding company of such person within the meaning of section 736, 736A and 736B of the Companies Act 1985 as substituted by section 144 of the Companies Act 1989 and, if that latter section is not in force at the **Transfer Date**, as if such latter section were in force at such date;

(x) a "subsidiary" means, in relation to any person, a subsidiary of such person within the meaning of section 736, 736A and 736B of the Companies Act 1985 as substituted by section 144 of the Companies Act 1989 and, if that latter section is not in force at the **Transfer Date**, as if such latter section were in force at such date;

(xi) references to time are to London time; and

(xii) (a) Save where (b) below applies, where there is a reference to an item of data being expressed in a whole number of MW, fractions of a MW below 0.5 shall be rounded down to the nearest whole MW and fractions of a MW of 0.5 and above shall be rounded up to the nearest whole MW;

(b) In the case of the definition of **Registered Capacity**, where the figure is submitted to more than one decimal place, fractions of a MW below 0.05 shall be rounded down to one decimal place and fractions of a MW of 0.05 and above shall be rounded up to once decimal place.

< End of GD >

**CONNECTION CONDITIONS**

# CONTENTS

(This contents page does not form part of the Grid Code)

(c) For the avoidance of doubt in the case of a **Generating Unit** or **Power Park Module** using an **Intermittent Power Source** where the mechanical power input will not be constant over time, the requirement is that the **Active Power** output shall be independent of **System Frequency** under (a) above and should not drop with **System Frequency** by greater than the amount specified in (b) above.

(d) A **DC Converter Station** must be capable of maintaining its **Active Power** input (i.e. when operating in a mode analogous to **Demand**) from the **GB Transmission System** (or **User System** in the case of an **Embedded DC Converter Station**) at a level not greater than the figure determined by the linear relationship shown in Figure 3 for **System Frequency** changes within the range 49.5 to 47 Hz, such that if the **System Frequency** drops to 47.8 Hz the **Active Power** input decreases by more than 60%.

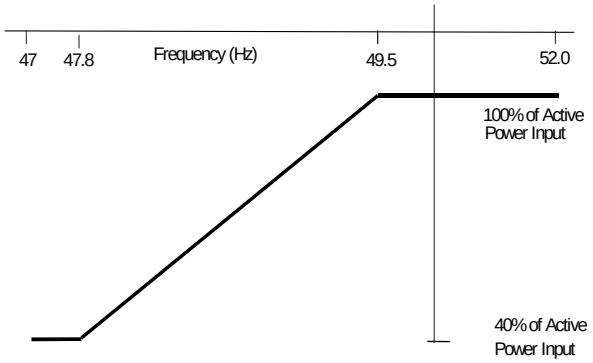


Figure 3

CC.6.3.4 At the **Grid Entry Point** the **Active Power** output under steady state conditions of any **Generating Unit, DC Converter** or **Power Park Module** directly connected to the **GB Transmission System** should not be affected by voltage changes in the normal operating range specified in paragraph CC.6.1.4 by more than the change in **Active Power** losses at reduced or increased voltage. The **Reactive Power** output under steady state conditions should be fully available within the voltage range ±5% at 400kV, 275kV and 132kV and lower voltages, except for a **Power Park Module** or **Non-synchronous Generating Unit** if **Embedded** at 33kV and below (or directly connected to the **GB Transmission System** in England and Wales at 33kV and below) where the requirement shown in Figure 4 applies.

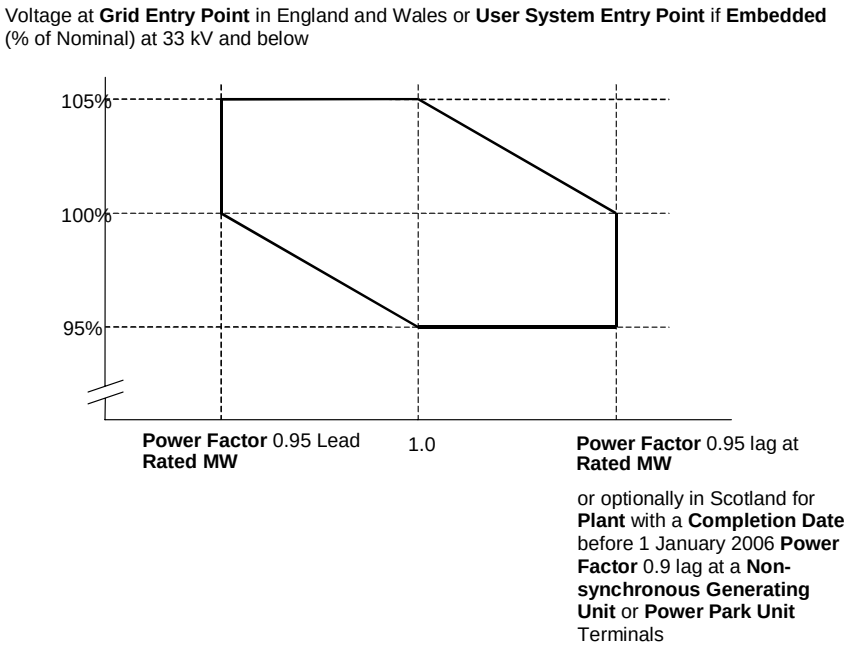


Figure 4

CC.6.3.5 It is an essential requirement that the **GB Transmission System** must incorporate a **Black Start Capability**. This will be achieved by agreeing a **Black Start Capability** at a number of strategically located **Power Stations**. For each **Power Station NGET** will state in the **Bilateral Agreement** whether or not a **Black Start Capability** is required.

Control Arrangements

CC.6.3.6 (a) Each:

(i) **Generating Unit**; or,

(ii) **DC Converter** with a **Completion Date** on or after 1 April 2005; or,

(iii) **Power Park Module** in England and Wales with a **Completion Date** on or after 1 January 2006; or,

(iv) **Power Park Module** in operation in Scotland on or after 1 January 2006 (with a **Completion Date** after 1 July 2004 and in a **Power Station** with a **Registered Capacity** of 50MW or more),

must be capable of contributing to **Frequency** control by continuous modulation of **Active Power** supplied to the **GB Transmission System** or the **User System** in which it is **Embedded**.

(b) Each:

(i) **Generating Unit**; or,

(ii) **DC Converter** (with a **Completion Date** on or after 1 April 2005 excluding current source technologies); or

(iii) **Power Park Module** in England and Wales with a **Completion Date** on or after 1 January 2006; or,

(iv) **Power Park Module** in Scotland irrespective of **Completion Date,**

must be capable of contributing to voltage control by continuous changes to

the **Reactive Power** supplied to the **GB Transmission System** or the **User System** in which it is **Embedded**.

CC.6.3.7 (a) Each **Generating Unit, DC Converter** or **Power Park Module** (excluding **Power Park Modules** in Scotland with a **Completion Date** before 1 July 2004 or **Power Park Modules** in a **Power Station** in Scotland with a **Registered Capacity** less than 50MW) must be fitted with a fast acting proportional **Frequency** control device (or turbine speed governor) and unit load controller or equivalent control device to provide **Frequency** response under normal operational conditions in accordance with **Balancing Code 3** (**BC3**). The Frequency control device (or speed governor) must be designed and operated to the appropriate:

(i) **European Specification**; or

(ii) in the absence of a relevant **European Specification**, such other standard which is in common use within the European Community (which may include a manufacturer specification);

as at the time when the installation of which it forms part was designed or (in the case of modification or alteration to the **Frequency** control device (or turbine speed governor)) when the modification or alteration was designed.

The **European Specification** or other standard utilised in accordance with sub-paragraph CC.6.3.7 (a) (ii) will be notified to **NGET** by the **Generator** or **DC Converter Station** owner or, in the case of an **Embedded Medium Power Station** not subject to a **Bilateral Agreement** or **Embedded DC Converter Station** not subject to a **Bilateral Agreement**, the relevant **Network Operator**:

(i) as part of the application for a **Bilateral Agreement;** or

(ii) as part of the application for a varied **Bilateral Agreement;** or

(iii) in the case of an **Embedded Development**, within 28 days of entry into the **Embedded Development Agreement** (or such later time as agreed with **NGET**); or

(iv) as soon as possible prior to any modification or alteration to the **Frequency** control device (or governor); and

(b) The **Frequency** control device (or speed governor) in co-ordination with other control devices must control the **Generating Unit, DC Converter** or **Power Park Module Active Power Output** with stability over the entire operating range of the **Generating Unit, DC Converter** or **Power Park Module**; and

(c) The **Frequency** control device (or speed governor) must meet the following minimum requirements:

(i) Where a **Generating Unit, DC Converter** or **Power Park Module** becomes isolated from the rest of the **Total System** but is still supplying **Customers**, the **Frequency** control device (or speed governor) must also be able to control **System Frequency** below 52Hz unless this causes the **Generating Unit, DC Converter** or **Power Park Module** to operate below its **Designed Minimum Operating Level** when it is

possible that it may, as detailed in BC 3.7.3, trip after a time. For the avoidance of doubt the **Generating Unit, DC Converter** or **Power Park Module** is only required to operate within the **System Frequency** range 47 - 52 Hz as defined in CC.6.1.3.;

(ii) the **Frequency** control device (or speed governor) must be capable of being set so that it operates with an overall speed **Droop** of between 3% and 5%;

(iii) in the case of all **Generating Units, DC Converter** or **Power Park Module** other than the **Steam Unit** within a **CCGT Module** the **Frequency** control device (or speed governor) deadband should be no greater than 0.03Hz (for the avoidance of doubt, ±0.015Hz). In the case of the **Steam Unit** within a **CCGT Module**, the speed governor deadband should be set to an appropriate value consistent with the requirements of CC.6.3.7(c)(i) and the requirements of BC3.7.2 for the provision of **Limited High Frequency Response**;

For the avoidance of doubt, the minimum requirements in (ii) and (iii) for the provision of **System Ancillary Services** do not restrict the negotiation of **Commercial Ancillary Services** between **NGET** and the **User** using other parameters; and

(d) A facility to modify, so as to fulfil the requirements of the **Balancing Codes**, the **Target Frequency** setting either continuously or in a maximum of 0.05 Hz steps over at least the range 50 ±0.1 Hz should be provided in the unit load controller or equivalent device.

(e) (i) 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, must be capable of meeting the minimum **Frequency** response requirement profile subject to and in accordance with the provisions of Appendix 3.

(ii) Each **DC Converter** at a **DC Converter Station** which has a **Completion Date** on or after 1 April 2005 must be capable of meeting the minimum **Frequency** response requirement profile subject to and in accordance with the provisions of Appendix 3**.**

(iii) Each **Power Park Module** in operation in England and Wales with a **Completion Date** on or after 1 January 2006 must be capable of meeting the minimum **Frequency** response requirement profile subject to and in accordance with the provisions of Appendix 3.

(iv) Each **Power Park Module** in operation on or after 1 January 2006 in Scotland (with a **Completion Date** on or after 1 April 2005 and a **Registered Capacity** of 50MW or more) must be capable of meeting the minimum **Frequency** response requirement profile subject to and in accordance with the provisions of Appendix 3.

(f) For the avoidance of doubt, the requirements of Appendix 3 do not apply to:

(i) **Generating Units** and/or **CCGT Modules** which have a **Completion Date** before 1 January 2001 in England and Wales, and before 1 April 2005 in Scotland, for whom the remaining requirements of this clause CC.6.3.7 shall continue to apply unchanged: or

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**. The **Control Point** shall be continuously manned (except for **Embedded Power Stations** containing **Power Park Modules** in the **SHETL Transmission Area** which have a **Registered Capacity** less than 30MW where the **Control Point** shall be manned between the hours of 0800 and 1800 each day) 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.

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;

(d) Operations issues comprising applicable **Operational Procedures** and control engineer;

(e) Responsibility to undertake statutory inspections, fault investigation and maintenance.

Each **Connection Point** shall be precisely shown.

Detail

CC.A.1.1.5 (a) In the case of **Site Responsibility Schedules** referred to in CC.A.1.1.1(b) and (c), with the exception of **Protection Apparatus** and **Intertrip Apparatus** operation, it will be sufficient to indicate the responsible **User** or **Transmission Licensee**, as the case may be.

(b) In the case of the **Site Responsibility Schedule** referred to in CC.A.1.1.1(a) and for **Protection Apparatus** and **Intertrip Apparatus**, the responsible management unit must be shown in addition to the **User** or **Transmission Licensee**, as the case may be.

CC.A.1.1.6 The **HV Apparatus Site Responsibility Schedule** for each **Connection Site** must include lines and cables emanating from or traversing[1] the **Connection Site**.

Issue Details

CC.A.1.1.7 Every page of each **Site Responsibility Schedule** shall bear the date of issue and the issue number.

Accuracy Confirmation

CC.A.1.1.8 When a **Site Responsibility Schedule** is prepared it shall be sent by **NGET** to the **Users** involved for confirmation of its accuracy.

CC.A.1.1.9 The **Site Responsibility Schedule** shall then be signed on behalf of **NGET** by its **Responsible Manager** (see CC.A.1.1.16) and on behalf of each **User** involved by its **Responsible Manager** (see CC.A.1.1.16), by way of written confirmation of its accuracy. For **Connection Sites** in Scotland, the **Site Responsibility Schedule** will also be signed on behalf of the **Relevant Transmission Licensee** by its **Responsible Manager**.

Distribution and Availability

CC.A.1.1.10 Once signed, two copies will be distributed by **NGET**, not less than two weeks prior to its implementation date, to each **User** which is a party on the **Site Responsibility Schedule**, accompanied by a note indicating the issue number and the date of implementation.

CC.A.1.1.11 **NGET** and **Users** must make the **Site Responsibility Schedules** readily available to operational staff at the **Complex** and at the other relevant control points.

[1] Details of circuits traversing the **Connection Site** are only needed from the date which is the earlier of the date when the **Site Responsibility Schedule** is first updated and 15th October 2004. In Scotland, from a date to be agreed between **NGET** and **the Relevant Transmission Licensee**.

Alterations to Existing **Site Responsibility Schedules**

CC.A 1.1.12 Without prejudice to the provisions of CC.A.1.1.15 which deals with urgent changes, when a **User** identified on a **Site Responsibility Schedule** becomes aware that an alteration is necessary, it must inform **NGET** immediately and in any event 8 weeks prior to any change taking effect (or as soon as possible after becoming aware of it, if less than 8 weeks remain when the **User** becomes aware of the change). This will cover the commissioning of new **Plant** and/or Apparatus at the **Connection Site,** whether requiring a revised **Bilateral Agreement** or not, de-commissioning of **Plant** and/or **Apparatus**, and other changes which affect the accuracy of the **Site Responsibility Schedule.**

CC.A 1.1.13 Where **NGET** has been informed of a change by a **User**, or itself proposes a change, it will prepare a revised **Site Responsibility Schedule** by not less than six weeks prior to the change taking effect (subject to it having been informed or knowing of the change eight weeks prior to that time) and the procedure set out in CC.A.1.1.8 shall be followed with regard to the revised **Site Responsibility Schedule**.

CC.A 1.1.14 The revised **Site Responsibility Schedule** shall then be signed in accordance with the procedure set out in CC.A.1.1.9 and distributed in accordance with the procedure set out in CC.A.1.1.10, accompanied by a note indicating where the alteration(s) has/have been made, the new issue number and the date of implementation.

Urgent Changes

CC.A.1.1.15 When a **User** identified on a **Site Responsibility Schedule**, or **NGET**, as the case may be, becomes aware that an alteration to the **Site Responsibility Schedule** is necessary urgently to reflect, for example, an emergency situation which has arisen outside its control, the **User** shall notify **NGET**, or **NGET** shall notify the **User**, as the case may be, immediately and will discuss:

(a) what change is necessary to the **Site Responsibility Schedule;**

(b) whether the **Site Responsibility Schedule** is to be modified temporarily or permanently;

(c) the distribution of the revised **Site Responsibility Schedule**.

**NGET** will prepare a revised **Site Responsibility Schedule** as soon as possible, and in any event within seven days of it being informed of or knowing the necessary alteration. The **Site Responsibility Schedule** will be confirmed by **Users** and signed on behalf of **NGET** and **Users** (by the persons referred to in CC.A.1.1.9) as soon as possible after it has been prepared and sent to **Users** for confirmation.

**Responsible Managers**

CC.A.1.1.16 Each **User** shall, prior to the **Completion Date** under each **Bilateral Agreement** and/or **Construction Agreement**, supply to **NGET** a list of Managers who have been duly authorised to sign **Site Responsibility Schedules** on behalf of the **User** and **NGET** shall, prior to the **Completion Date** under each **Bilateral Agreement** and/or **Construction Agreement**, supply to that **User** the name of its **Responsible Manager** and for **Connection Sites** in Scotland, the name of the **Relevant Transmission Licensee's Responsible Manager** and each shall supply to the other any changes to such list six weeks before the change takes effect where the

change is anticipated, and as soon as possible after the change, where the change was not anticipated.

De-commissioning of **Connection Sites**

CC.A.1.1.17 Where a **Connection Site** is to be de-commissioned, whichever of **NGET** or the **User** who is initiating the de-commissioning must contact the other to arrange for the **Site Responsibility Schedule** to be amended at the relevant time.

ATTACHMENT TO APPENDIX 1 OF **CONNECTION CONDITIONS**

PROFORMA FOR **SITE RESPONSIBILITY SCHEDULE**

_____ AREA

COMPLEX: _____ SCHEDULE: _____

CONNECTION SITE: _____

| ITEM OF PLANT/ APPARATUS | PLANT APPARATUS OWNER | SITE MANAGER | SAFETY | | OPERATIONS | | PARTY RESPONSIBLE FOR UNDERTAKING STATUTORY INSPECTIONS, FAULT INVESTIGATION & MAINTENANCE | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | | SAFETY RULES | CONTROL OR OTHER RESPONSIBLE PERSON (SAFETY CO-ORDINATOR | OPERATIONAL PROCEDURES | CONTROL OR OTHER RESPONSIBLE ENGINEER | | |
| | | | | | | | | |

PAGE: _____ ISSUE NO: _____ DATE: _____

ATTACHMENT TO APPENDIX 1 OF **CONNECTION CONDITIONS**

PROFORMA FOR **SITE RESPONSIBILITY SCHEDULE**

_____ AREA

COMPLEX: _____ SCHEDULE: _____

CONNECTION SITE: _____

| ITEM OF PLANT/ APPARATUS | PLANT APPARATUS OWNER | SITE MANAGER | SAFETY | | OPERATIONS | | PARTY RESPONSIBLE FOR UNDERTAKING STATUTORY INSPECTIONS, FAULT INVESTIGATION & MAINTENANCE | REMARKS |
|---|---|---|---|---|---|---|---|---|
| | | | SAFETY RULES | CONTROL OR OTHER RESPONSIBLE PERSON (SAFETY CO-ORDINATOR | OPERATIONAL PROCEDURES | CONTROL OR OTHER RESPONSIBLE ENGINEER | | |
| | | | | | | | | |

NOTES:

SIGNED: _____ NAME: _____ COMPANY: _____ DATE: _____

SIGNED: _____ NAME: _____ COMPANY: _____ DATE: _____

SIGNED: _____ NAME: _____ COMPANY: _____ DATE: _____

SIGNED: _____ NAME: _____ COMPANY: _____ DATE: _____

PAGE: _____ ISSUE NO: _____ DATE: _____

**SP TRANSMISSION Ltd**
**SITE RESPONSIBILITY SCHEDULE**
**OWNERSHIP, MAINTENANCE AND OPERATIONS OF EQUIPMENT**
**IN JOINT USER SITUATIONS**

**Network Area:**

Sheet No.
Revision:
Date:

**SECTION 'A' BUILDING AND SITE**

| | | | |
|---|---|---|---|
| OWNER | | ACCESS REQUIRED:- | |
| LESSEE | | | |
| MAINTENANCE | | SPECIAL CONDITIONS:- | |
| SAFETY | | | |
| SECURITY | | LOCATION OF SUPPLY TERMINALS:- | |
| | | | |

**SECTION 'B' CUSTOMER OR OTHER PARTY**

| | | | | | |
|---|---|---|---|---|---|
| NAME:- | | | | | |
| ADDRESS:- | | | | | |
| TEL NO:- | | | | | |
| SUB STATION:- | | | | | |
| LOCATION:- | | | | | |

**SECTION 'C' PLANT**

| ITEM Nos. | EQUIPMENT | IDENTIFICATION | OWNER | SAFETY RULES APPLICABLE | OPERATION | | | | MAINTENANCE | | FAULT INVESTIGATION | | | TESTING | | RELAY SETTINGS | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Tripping | Closing | Isolating | Earthing | Primary Equip. | Protection Equip. | Primary Equip. | Protection Equip | Reclosure | Trip and Alarm | Primary Equip. | | |
| | | | | | | | | | | | | | | | | | |

**SECTION 'D' CONFIGURATION AND CONTROL**

| ITEM Nos. | CONFIGURATION RESPONSIBILITY | TELEPHONE NUMBER | REMARKS |
|---|---|---|---|
| | | | |
| ITEM Nos. | CONTROL RESPONSIBILITY | TELEPHONE NUMBER | REMARKS |
| | | | |

**SECTION 'E' ADDITIONAL INFORMATION**

**ABBREVIATIONS:-**
D - SP AUTHORISED PERSON - DISTRIBUTION SYSTEM
NGC - NATIONAL GRID COMPANY
SPD - SP DISTRIBUTION Ltd
SPPS - POWERSYSTEMS
SPT - SP TRANSMISSION Ltd
ST - SCOTTISH POWER TELECOMMUNICATIONS
T - SP AUTHORISED PERSON - TRANSMISSION SYSTEM
U - USER

SIGNED _____ FOR SP Transmission DATE _____

SIGNED _____ FOR SP Distribution DATE _____

SIGNED _____ FOR PowerSystems/User DATE _____

**Scottish Hydro-Electric Transmission Limited**

**Site Responsibility Schedule**

| Substation Type | | | | Number: | | | Revision: | | |
|---|---|---|---|---|---|---|---|---|---|
| **Equipment** | **Owner** | **Controller** | **Maintainer** | **Responsible System User** | **Responsible Management Unit** | **Control Authority** | **Safety Rules** | **Operational Procedures** | **Notes** |
| | | | | | | | | | |
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# CONNECTION CONDITIONS

## APPENDIX 2

## PART 1A

## PROCEDURES RELATING TO OPERATION DIAGRAMS

FIXED CAPACITOR

EARTH

EARTHING RESISTOR

LIQUID EARTHING RESISTOR

ARC SUPPRESSION COIL

FIXED MAINTENANCE EARTHING DEVICE

CARRIER COUPLING EQUIPMENT (WITHOUT VT)

R&Y

CARRIER COUPLING EQUIPMENT (WITH VT ON ONE PHASE)

Y

R&Y

CARRIER COUPLING EQUIPMENT (WITH VT ON 3 PHASES)

R&Y

AC GENERATOR

G

SYNCHRONOUS COMPENSATOR

SC

CIRCUIT BREAKER

CIRCUIT BREAKER WITH DELAYED AUTO RECLOSE

DAR

WITHDRAWABLE METALCLAD SWITCHGEAR

SWITCH DISCONNECTOR

SWITCH DISCONNECTOR WITH INCORPORATED EARTH SWITCH

S

DISCONNECTOR (CENTRE ROTATING POST)

DISCONNECTOR (SINGLE BREAK DOUBLE ROTATING)

DISCONNECTOR (SINGLE BREAK)

DISCONNECTOR (NON-INTERLOCKED)

NI

DISCONNECTOR (POWER OPERATED)
NA - NON-AUTOMATIC
A - AUTOMATIC
SO - SEQUENTIAL OPERATION
FI - FAULT INTERFERING OPERATION

NA

EARTH SWITCH

FAULT THROWING SWITCH (PHASE TO PHASE)

FT

FAULT THROWING SWITCH (EARTH FAULT)

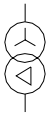
FT

SURGE ARRESTOR

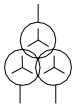
THYRISTOR

TRANSFORMERS
(VECTORS TO INDICATE
WINDING CONFIGURATION)

TWO WINDING

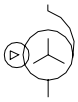


THREE WINDING



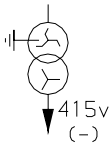
AUTO

AUTO WITH DELTA TERTIARY



EARTHING OR AUX. TRANSFORMER

(-) INDICATE REMOTE SITE
IF APPLICABLE




VOLTAGE TRANSFORMERS

SINGLE PHASE WOUND


THREE PHASE WOUND

SINGLE PHASE CAPACITOR


TWO SINGLE PHASE CAPACITOR


THREE PHASE CAPACITOR

* CURRENT TRANSFORMER
(WHERE SEPARATE PRIMARY
APPARATUS)

* COMBINED VT/CT UNIT
FOR METERING

REACTOR

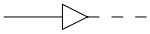
* BUSBARS



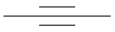
* OTHER PRIMARY CONNECTIONS



* CABLE & CABLE SEALING END

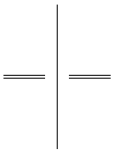


* THROUGH WALL BUSHING



* BYPASS FACILITY

* CROSSING OF CONDUCTORS
(LOWER CONDUCTOR
TO BE BROKEN)



PREFERENTIAL ABBREVIATIONS

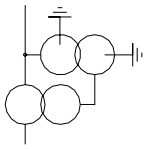
| | |
|---|---|
| AUXILIARY TRANSFORMER | Aux T |
| EARTHING TRANSFORMER | ET |
| GAS TURBINE | Gas T |
| GENERATOR TRANSFORMER | Gen T |
| GRID TRANSFORMER | Gr T |
| SERIES REACTOR | Ser Reac |
| SHUNT REACTOR | Sh Reac |
| STATION TRANSFORMER | Stn T |
| SUPERGRID TRANSFORMER | SGT |
| UNIT TRANSFORMER | UT |

* NON-STANDARD SYMBOL

PORTABLE MAINTENANCE
EARTH DEVICE

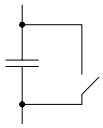
DISCONNECTOR
(PANTOGRAPH TYPE)

QUADRATURE BOOSTER



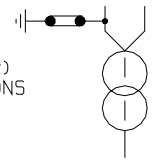
DISCONNECTOR
(KNEE TYPE)

SHORTING/DISCHARGE SWITCH

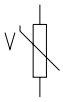


CAPACITOR
(INCLUDING HARMONIC FILTER)

SINGLE PHASE TRANSFORMER(BR)
NEUTRAL AND PHASE CONNECTIONS



RESISTOR WITH INHERENT
NON-LINEAR VARIABILITY,
VOLTAGE DEPENDANT

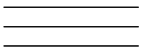


## APPENDIX 2

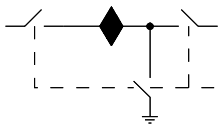
## PART 1B

## PROCEDURES RELATING TO GAS ZONE DIAGRAMS

GAS INSULATED BUSBAR



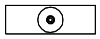
DOUBLE-BREAK DISCONNECTOR



GAS BOUNDARY



EXTERNAL MOUNTED CURRENT TRANSFORMER (WHERE SEPARATE PRIMARY APPARATUS)



GAS/GAS BOUNDARY

STOP VALVE NORMALLY CLOSED

GAS/CABLE BOUNDARY

STOP VALVE NORMALLY OPEN

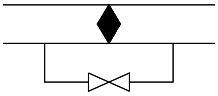
GAS/AIR BOUNDARY

GAS MONITOR

GAS/TRANSFORMER BOUNDARY

FILTER

MAINTENANCE VALVE



QUICK ACTING COUPLING

# CONNECTION CONDITIONS

## APPENDIX 2

## NON-EXHAUSTIVE LIST OF **APPARATUS** TO BE INCLUDED ON **OPERATION DIAGRAMS**

## PART 2

### Basic Principles

1. Where practicable, all the **HV Apparatus** on any **Connection Site** shall be shown on one **Operation Diagram**. Provided the clarity of the diagram is not impaired, the layout shall represent as closely as possible the geographical arrangement on the **Connection Site**.

2. Where more than one **Operation Diagram** is unavoidable, duplication of identical information on more than one **Operation Diagram** must be avoided.

3. The **Operation Diagram** must show accurately the current status of the **Apparatus** eg. whether commissioned or decommissioned. Where decommissioned, the associated switchbay will be labelled "spare bay".

4. Provision will be made on the **Operation Diagram** for signifying approvals, together with provision for details of revisions and dates.

5. **Operation Diagrams** will be prepared in A4 format or such other format as may be agreed with **NGET**.

6. The **Operation Diagram** should normally be drawn single line. However, where appropriate, detail which applies to individual phases shall be shown. For example, some **HV Apparatus** is numbered individually per phase.

APPARATUS TO BE SHOWN ON **OPERATION DIAGRAM**

1. Busbars
2. Circuit Breakers
3. Disconnector (Isolator) and Switch Disconnecters (Switching Isolators)
4. Disconnectors (Isolators) - Automatic Facilities
5. Bypass Facilities
6. Earthing Switches
7. Maintenance Earths
8. Overhead Line Entries
9. Overhead Line Traps
10. Cable and Cable Sealing Ends
11. Generating Unit
12. Generator Transformers
13. Generating Unit Transformers, Station Transformers, including the lower voltage circuit-breakers.
14. Synchronous Compensators
15. Static Variable Compensators
16. Capacitors (including Harmonic Filters)
17. Series or Shunt Reactors (Referred to as "Inductors" at nuclear power station sites)
18. Supergrid and Grid Transformers
19. Tertiary Windings
20. Earthing and Auxiliary Transformers
21. Three Phase VT's
22. Single Phase VT & Phase Identity
23. High Accuracy VT and Phase Identity
24. Surge Arrestors/Diverters
25. Neutral Earthing Arrangements on HV Plant
26. Fault Throwing Devices
27. Quadrature Boosters
28. Arc Suppression Coils
29. Single Phase Transformers (BR) Neutral and Phase Connections
30. Current Transformers (where separate plant items)
31. Wall Bushings
32. Combined VT/CT Units
33. Shorting and Discharge Switches
34. Thyristor
35. Resistor with Inherent Non-Linear Variability, Voltage Dependent
36. Gas Zone

## CONNECTION CONDITIONS

APPENDIX 3

## MINIMUM FREQUENCY RESPONSE REQUIREMENT PROFILE AND OPERATING RANGE for new Power Stations and DC Converter Stations.

CC.A.3.1 SCOPE

The frequency response capability is defined in terms of **Primary Response**, **Secondary Response** and **High Frequency Response**. This appendix defines the minimum frequency response requirement profile for:

(a) each **Generating Unit** and/or **CCGT Module** which has a **Completion Date** after 1 January 2001 in England and Wales and 1 April 2005 in Scotland,

(b) each **DC Converter** at a **DC Converter Station** which has a **Completion Date** on or after 1 April 2005.

(c) each **Power Park Module** in England and Wales with a **Completion Date** on or after 1 January 2006.

(d) each **Power Park Module** in operation in Scotland after 1 January 2006 with a **Completion Date** after 1 April 2005 and in **Power Stations** with a **Registered Capacity** of 50MW or more.

For the avoidance of doubt, this appendix does not apply to:-

(i) **Generating Units** and/or **CCGT Modules** which have a **Completion Date** before 1 January 2001 in England and Wales and before 1 April 2005 in Scotland,

(ii) **DC Converters** at a **DC Converter Station** which have a **Completion Date** before 1 April 2005.

(iii) **Power Park Modules** in England and Wales with a **Completion Date** before 1 January 2006.

(iv) **Power Park Modules** in operation in Scotland before 1 January 2006.

(v) **Power Park Modules** in Scotland with a **Completion Date** before 1 April 2005.

(vi) **Power Park Modules** in **Power Stations** with a **Registered Capacity** less than 50MW.

(vii) **Small Power Stations** or individually to **Power Park Units**.

The functional definition provides appropriate performance criteria relating to the provision of **Frequency** control by means of **Frequency** sensitive generation in addition to the other requirements identified in CC.6.3.7.

In this Appendix 3 to the **CC**, for a **CCGT Module** or a **Power Park Module** with more than one **Generating Unit**, the phrase **Minimum Generation** applies to the entire **CCGT**

**Module** or **Power Park Module** operating with all **Generating Units Synchronised** to the **System**.

The minimum **Frequency** response requirement profile is shown diagrammatically in Figure CC.A.3.1. The capability profile specifies the minimum required levels of **Primary Response**, **Secondary Response** and **High Frequency Response** throughout the normal plant operating range. The definitions of these **Frequency** response capabilities are illustrated diagrammatically in Figures CC.A.3.2 & CC.A.3.3.

CC.A.3.2 PLANT OPERATING RANGE

The upper limit of the operating range is the **Registered Capacity** of the **Generating Unit** or **CCGT Module** or **DC Converter** or **Power Park Module**.

The **Minimum Generation** level may be less than, but must not be more than, 65% of the **Registered Capacity**. Each **Generating Unit** and/or **CCGT Module** and/or **Power Park Module** and/or **DC Converter** must be capable of operating satisfactorily down to the **Designed Minimum Operating Level** as dictated by **System** operating conditions, although it will not be instructed to below its **Minimum Generation** level. If a **Generating Unit** or **CCGT Module** or **Power Park Module** or **DC Converter** is operating below **Minimum Generation** because of high **System Frequency**, it should recover adequately to its **Minimum Generation** level as the **System Frequency** returns to **Target Frequency** so that it can provide **Primary** and **Secondary Response** from **Minimum Generation** if the **System Frequency** continues to fall. For the avoidance of doubt, under normal operating conditions steady state operation below **Minimum Generation** is not expected. The **Designed Minimum Operating Level** must not be more than 55% of **Registered Capacity**.

In the event of a **Generating Unit** or **CCGT Module** or **Power Park Module** or **DC Converter** load rejecting down to no less than its **Designed Minimum Operating Level** it should not trip as a result of automatic action as detailed in BC3.7. If the load rejection is to a level less than the **Designed Minimum Operating Level** then it is accepted that the condition might be so severe as to cause it to be disconnected from the **System**.

CC.A.3.3 MINIMUM FREQUENCY RESPONSE REQUIREMENT PROFILE

Figure CC.A.3.1 shows the minimum **Frequency** response requirement profile diagrammatically for a 0.5 Hz change in **Frequency**. The percentage response capabilities and loading levels are defined on the basis of the **Registered Capacity** of the **Generating Unit** or **CCGT Module** or **Power Park Module** or **DC Converter**. Each **Generating Unit** and/or **CCGT Module** and/or **Power Park Module** and/or **DC Converter** must be capable of operating in a manner to provide **Frequency** response at least to the solid boundaries shown in the figure. If the **Frequency** response capability falls within the solid boundaries, the **Generating Unit** or **CCGT Module** or **Power Park Module** or **DC Converter** is providing response below the minimum requirement which is not acceptable. Nothing in this appendix is intended to prevent a **Generating Unit** or **CCGT Module** or **Power Park Module** or **DC Converter** from being designed to deliver a **Frequency** response in excess of the identified minimum requirement.

The **Frequency** response delivered for **Frequency** deviations of less than 0.5 Hz should be no less than a figure which is directly proportional to the minimum **Frequency** response requirement for a **Frequency** deviation of 0.5 Hz. For example, if the **Frequency** deviation is 0.2 Hz, the corresponding minimum **Frequency** response requirement is 40% of the level shown in Figure CC.A.3.1. The **Frequency** response delivered for **Frequency** deviations of more than 0.5 Hz should be no less than the response delivered for a **Frequency** deviation of 0.5 Hz.

Each **Generating Unit** and/or **CCGT Module** and/or **Power Park Module** and/or **DC Converter** must be capable of providing some response, in keeping with its specific operational characteristics, when operating between 95% to 100% of **Registered Capacity** as illustrated by the dotted lines in Figure CC.A.3.1.

At the **Minimum Generation** level, each **Generating Unit** and/or **CCGT Module** and/or **Power Park Module** and/or **DC Converter** is required to provide high and low frequency response depending on the **System Frequency** conditions. Where the **Frequency** is high, the **Active Power** output is therefore expected to fall below the **Minimum Generation** level.

The **Designed Minimum Operating Level** is the output at which a **Generating Unit** and/or **CCGT Module** and/or **Power Park Module** and/or **DC Converter** has no **High Frequency Response** capability. It may be less than, but must not be more than, 55% of the **Registered Capacity**. This implies that a **Generating Unit** or **CCGT Module** or **Power Park Module** or **DC Converter** is not obliged to reduce its output to below this level unless the **Frequency** is at or above 50.5 Hz (cf BC3.7).

CC.A.3.4 TESTING OF FREQUENCY RESPONSE CAPABILITY

The response capabilities shown diagrammatically in Figure CC.A.3.1 are measured by taking the responses as obtained from some of the dynamic response tests specified by **NGET** and carried out by **Generators** and **DC Converter Station** owners for compliance purposes and to validate the content of **Ancillary Services Agreements** using an injection of a **Frequency** change to the plant control system (i.e. governor and load controller). The injected signal is a linear ramp from zero to 0.5 Hz **Frequency** change over a ten second period, and is sustained at 0.5 Hz **Frequency** change thereafter, as illustrated diagrammatically in figures CC.A.3.2 and CC.A.3.3. In the case of an **Embedded Medium Power Station** not subject to a **Bilateral Agreement** or **Embedded DC Converter Station** not subject to a **Bilateral Agreement**, **NGET** may require the **Network Operator** within whose **System** the **Embedded Medium Power Station** or **Embedded DC Converter Station** is situated, to ensure that the **Embedded Person** performs the dynamic response tests reasonably required by NGET in order to demonstrate compliance within the relevant requirements in the **CC**s.

The **Primary Response** capability (P) of a **Generating Unit** or a **CCGT Module** or **Power Park Module** or **DC Converter** is the minimum increase in **Active Power** output between 10 and 30 seconds after the start of the ramp injection as illustrated diagrammatically in Figure CC.A.3.2.

The **Secondary Response** capability (S) of a **Generating Unit** or a **CCGT Module** or **Power Park Module** or **DC Converter** is the minimum increase in **Active Power** output between 30 seconds and 30 minutes after the start of the ramp injection as illustrated diagrammatically in Figure CC.A.3.2.

The **High Frequency Response** capability (H) of a **Generating Unit** or a **CCGT Module** or **Power Park Module** or **DC Converter** is the decrease in **Active Power** output provided 10 seconds after the start of the ramp injection and sustained thereafter as illustrated diagrammatically in Figure CC.A.3.3.

CC.A.3.5 REPEATABILITY OF RESPONSE

When a **Generating Unit** or **CCGT Module** or **Power Park Module** or **DC Converter** has responded to a significant **Frequency** disturbance, its response capability must be fully restored as soon as technically possible. Full response capability should be

restored no later than 20 minutes after the initial change of **System Frequency** arising from the **Frequency** disturbance.

**Figure CC.A.3.1 - Minimum Frequency Response Requirement Profile**

for a 0.5 Hz frequency change from Target Frequency

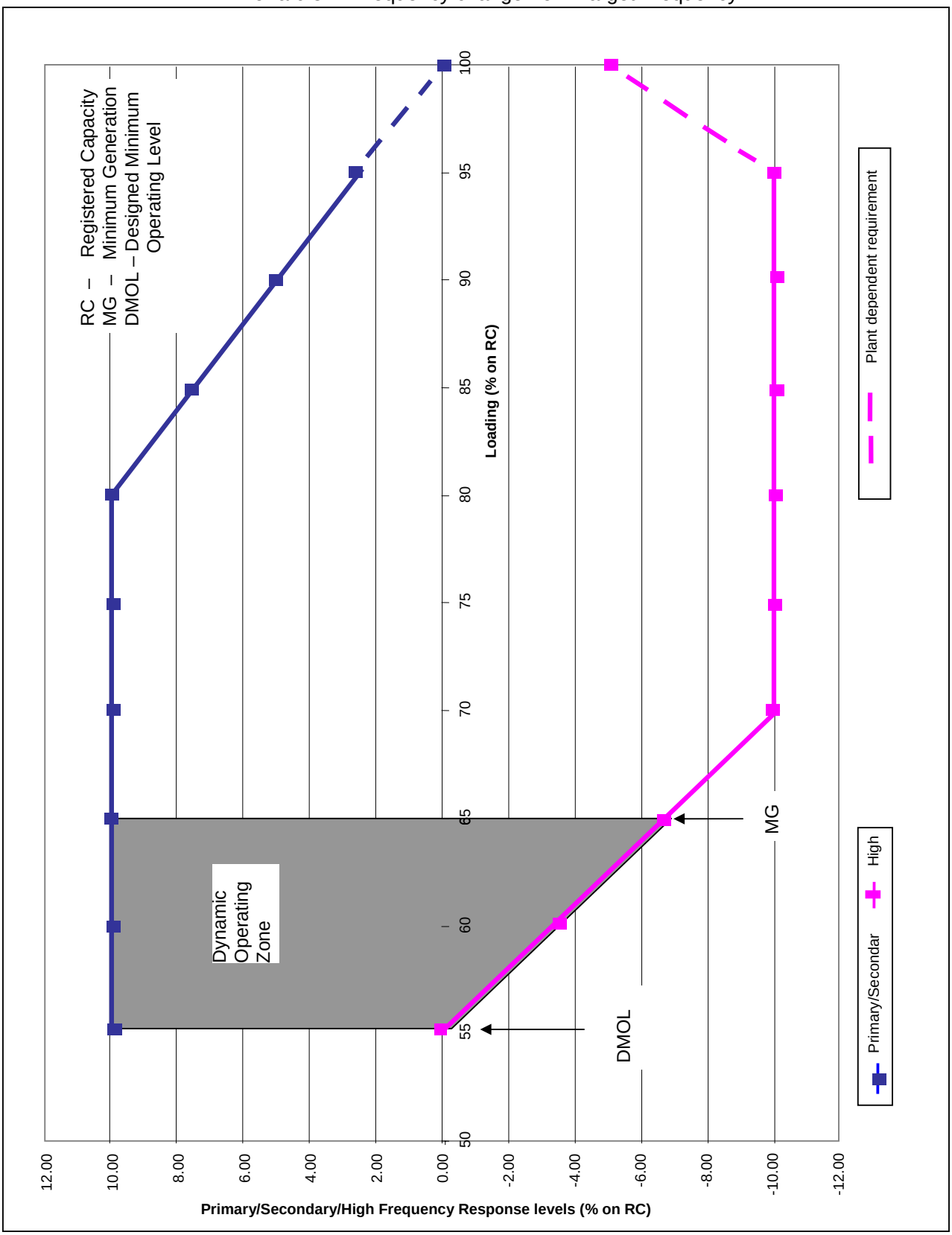


**Figure CC.A.3.2 - Interpretation of Primary and Secondary Response Values**

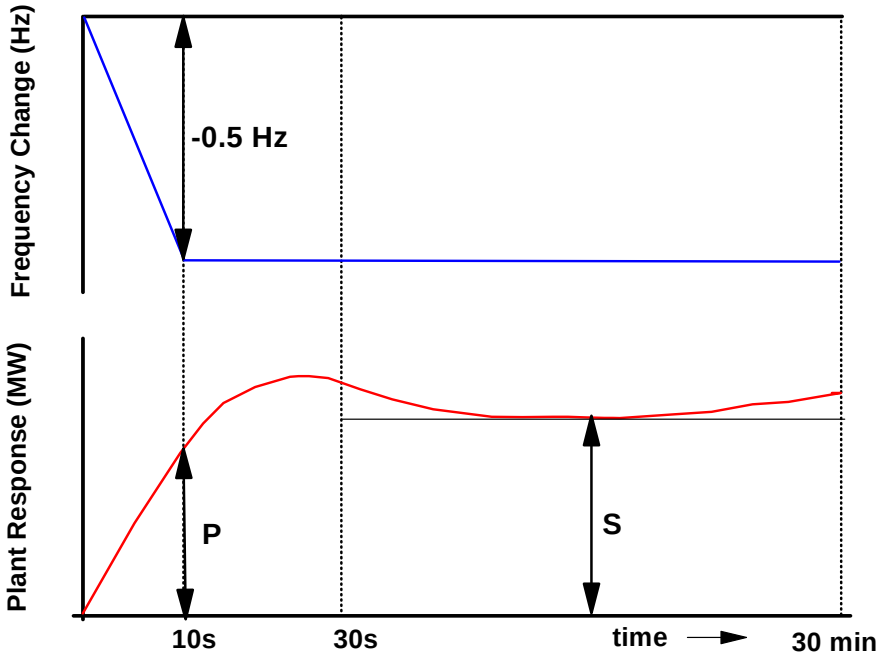
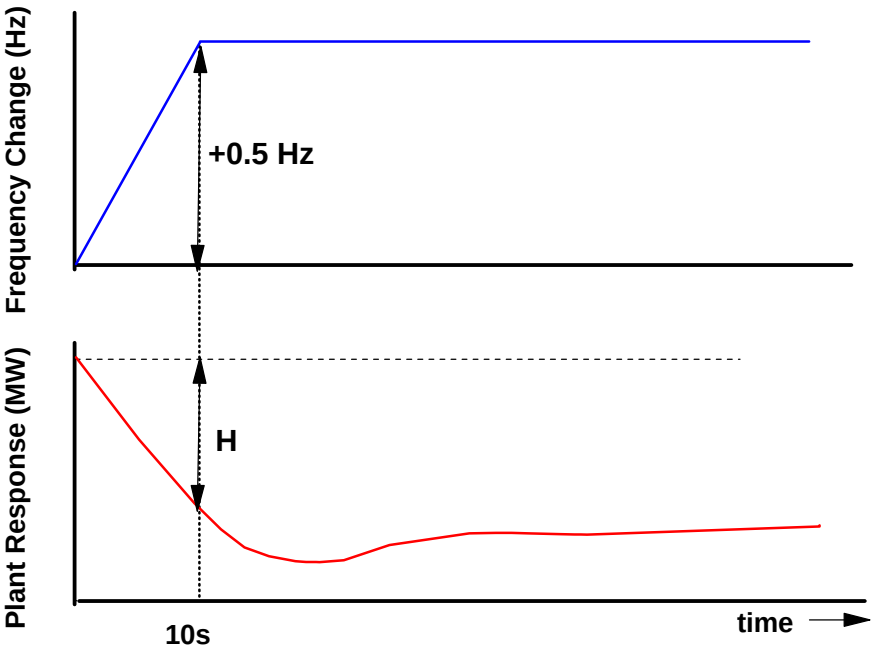



**Figure CC.A.3.3 - Interpretation of High Frequency Response Values**



## APPENDIX 4

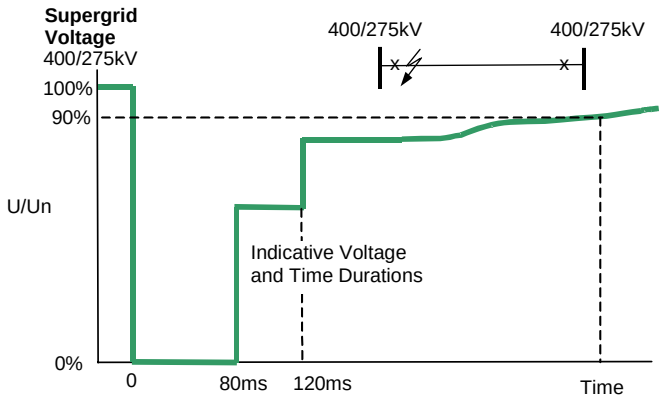
### FAULT RIDE THROUGH REQUIREMENT FOR GENERATING UNITS, POWER PARK MODULES AND DC CONVERTERS

CC.A.4.1 SCOPE

The fault ride through requirement is defined in CC.6.3.15 (a), (b) and (c). This Appendix provides illustrations by way of examples only of CC.6.3.15 (a) (i) and further background and illustrations to CC.6.3.15 (b) (i) and is not intended to show all possible permutations.

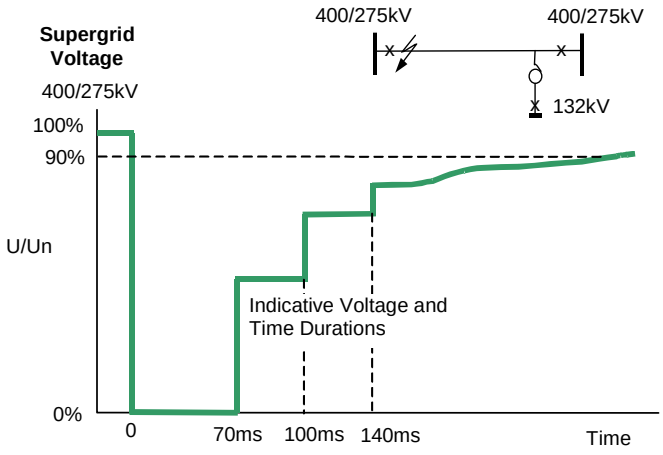
CC.A.4.2 SHORT CIRCUIT FAULTS AT **SUPERGRID VOLTAGE** UP TO 140MS IN DURATION

For short circuit faults at **Supergrid Voltage** up to 140ms in duration, the fault ride through requirement is defined in CC.6.3.15 (a) (i). Figures CC.A.4.1 (a) and (b) illustrate two typical examples of voltage recovery for short-circuit faults cleared within 140ms by two circuit breakers (a) and three circuit breakers (b) respectively.




Typical fault cleared in less than 140ms: 2 ended circuit

Figure CC.A.4.1 (a)




Typical fault cleared in 140ms:- 3 ended circuit

Figure CC.A.4.1 (b)

## CCA.4.3 **SUPERGRID VOLTAGE** DIPS GREATER THAN 140MS IN DURATION

For balanced **Supergrid voltage** dips having durations greater than 140ms and up to 3 minutes the fault ride through requirement is defined in CC6.3.15 (b) (i) and Figure 5 which is reproduced in this Appendix as Figure CC.A.4.2 and termed the the voltage–duration profile.

This profile is not a voltage-time response curve that would be obtained by plotting the transient voltage response at a point on the **GB Transmission System** or **User System** to a disturbance. Rather, each point on the profile (ie the heavy black line) represents a voltage level and an associated time duration which connected **Generating Units, or Power Park Modules** must withstand or ride through.

Figures CC.A.4.3 (c), (d) and (e) illustrate the meaning of the voltage-duration profile for voltage dips having durations greater than 140ms.

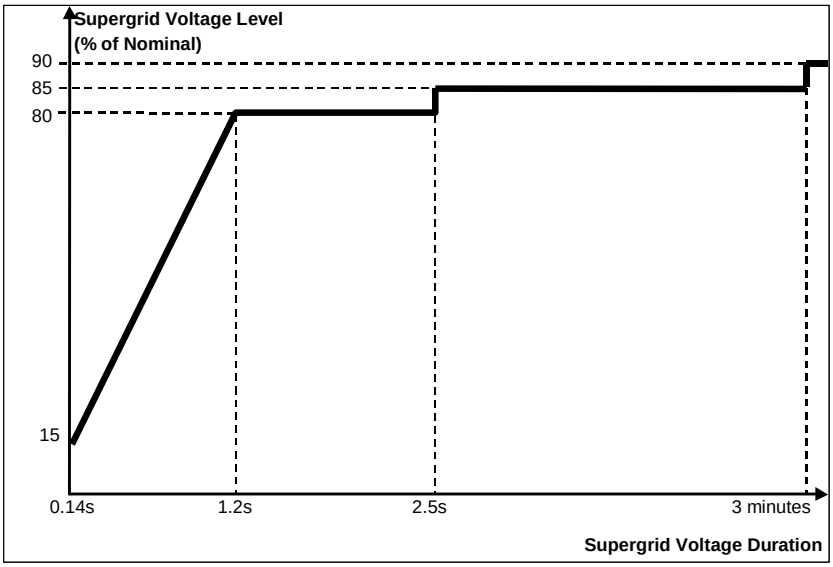
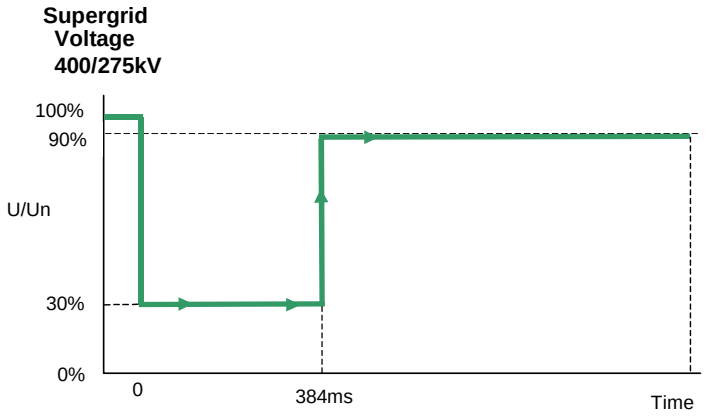
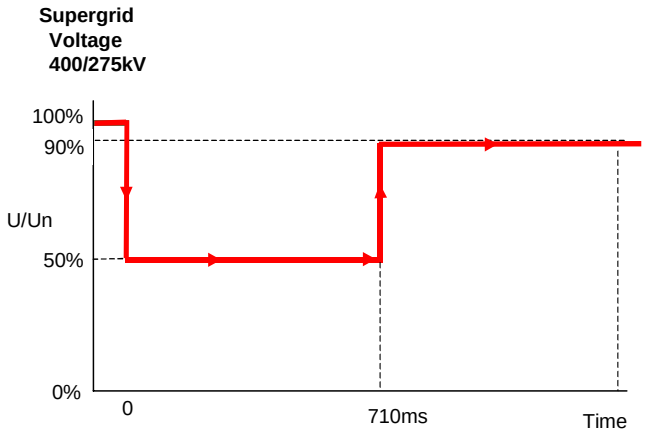



Figure CC.A.4.2



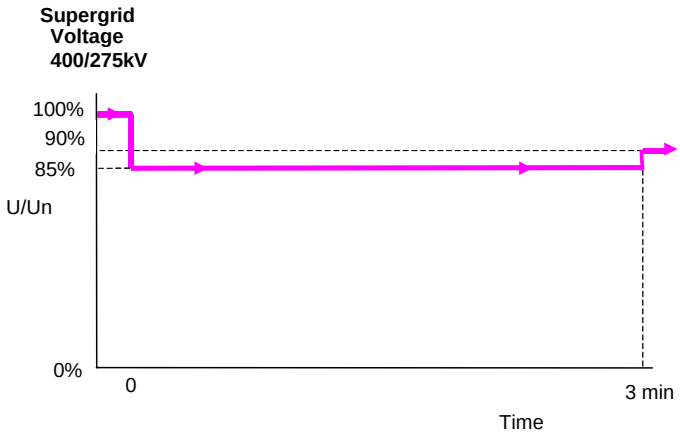

30% retained voltage, 384ms duration

Figure CC.A.4.3(a)




50% retained voltage, 710ms duration

Figure CC.A.4.3(b)




85% retained voltage, 3 minutes duration

Figure CC.A.4.3(c)

APPENDIX 5

TECHNICAL REQUIREMENTS
**LOW FREQUENCY RELAYS** FOR THE AUTOMATIC
DISCONNECTION OF SUPPLIES AT LOW **FREQUENCY**

CC.A.5.1 **LOW FREQUENCY RELAYS**

CC.A.5.1.1 The **Low Frequency Relays** to be used shall be in accordance with the requirements of the **Bilateral Agreement**. They should have a setting range of 47.0 to 50Hz and be suitable for operation from a nominal AC input of 63.5, 110 or 240V. The following general parameters on the requirements of approved **Low Frequency Relays** for automatic installations is given as an indication, without prejudice to the provisions that may be included in a **Bilateral Agreement**:

| | | |
|---|---|---|
| (a) | **Frequency** settings: | 47-50Hz in steps of 0.05Hz or better, preferably 0.01Hz; |
| (b) | Measurement period settings: | Within a minimum selectable settings range of 4 to 6 cycles; |
| (c) | Operating time: | Between 100 and 150ms dependent on measurement period setting; |
| (d) | Voltage lock-out: | Selectable within a range of 55 to 90% of nominal voltage; |
| (e) | Facility stages: | One or two stages of **Frequency** operation; |
| (f) | Output contacts: | Two output contacts per stage to be capable of repetitively making and breaking for 1000 operations. |

CC.A.5.2 **LOW FREQUENCY RELAY** VOLTAGE SUPPLIES

CC.A.5.2.1 It is essential that the voltage supply to the **Low Frequency Relays** shall be derived from the primary **System** at the supply point concerned so that the **Frequency** of the **Low Frequency Relays** input voltage is the same as that of the primary **System**. This requires either:

(a) the use of a secure supply obtained from voltage transformers directly associated with the grid transformer(s) concerned, the supply being obtained where necessary via a suitable automatic voltage selection scheme; or

(b) the use of the substation 240V phase-to-neutral selected auxiliary supply, provided that this supply is always derived at the supply point concerned and is never derived from a standby

supply **Generating Unit** or from another part of the **User System**.

CC.A.5.3 SCHEME REQUIREMENTS

CC.A.5.3.1 The tripping facility should be engineered in accordance with the following reliability considerations:

(a) Dependability

Failure to trip at any one particular **Demand** shedding point would not harm the overall operation of the scheme. However, many failures would have the effect of reducing the amount of **Demand** under low **Frequency** control. An overall reasonable minimum requirement for the dependability of the **Demand** shedding scheme is 96%, ie. the average probability of failure of each **Demand** shedding point should be less than 4%. Thus the **Demand** under low **Frequency** control will not be reduced by more than 4% due to relay failure.

(b) Outages

Low **Frequency Demand** shedding schemes will be engineered such that the amount of **Demand** under control is as specified by **NGET** and is not reduced unacceptably during equipment outage or maintenance conditions.

< End of CC >

**BALANCING CODE No 1**

PRE GATE CLOSURE PROCESS

# CONTENTS

(This contents page does not form part of the Grid Code)

expressly provided. **NGET** shall not by the inclusion of this provision be prevented from utilising the provisions of BC1.4.5 if necessary.

The data may be modified by further data submissions at any time prior to **Gate Closure**, in accordance with the other provisions of **BC1**. The data to be used by **NGET** for operational planning will be determined from the most recent data that has been received by **NGET** by 11:00 hours on the day before the **Operational Day** to which the data applies, or from the data that has been defaulted at 11:00 hours on that day in accordance with BC1.4.5. Any subsequent revisions received by **NGET** under the **Grid Code** will also be utilised by **NGET**. In the case of all data items listed below, with the exception of item (e), **Dynamic Parameters** (Day Ahead), the latest submitted or defaulted data, as modified by any subsequent revisions, will be carried forward into operational timescales. The individual data items are listed below:-

(a) **Physical Notifications**

**Physical Notifications**, being the data listed in **BC1** Appendix 1 under that heading, are required by **NGET** at 11:00 hours each day for each **Settlement Period** of the next following **Operational Day,** in respect of;

(1) **BM Units**:-

(i) with a **Demand Capacity** with a magnitude of 50MW or more in **NGET's Transmission Area** or 10MW or more in **SHETL's Transmission** Area or 30MW or more in **SPT's Transmission Area**; or

(ii) comprising **Generating Units** (as defined in the Glossary and Definitions and not limited by BC1.2) and/or **CCGT Modules** at and/or **Power Park Modules** in each case **Large Power Stations** and **Medium Power Stations;** or

(iii) where the **BM Participant** chooses to submit **Bid-Offer Data** in accordance with BC1.4.2(d) for **BM Units** not falling within (i) or (ii) above,

and

(2) each **Generating Unit** where applicable under BC1.2.

**Physical Notifications** may be submitted to **NGET** by **BM Participants,** for the **BM Units**, and **Generating Units**, specified in this BC1.4.2(a) at an earlier time, or **BM Participants** may rely upon the provisions of BC1.4.5 to create the **Physical Notifications** by data defaulting pursuant to the **Grid Code** utilising the rules referred to in that paragraph at 11:00 hours in any day.

**Physical Notifications** (which must comply with the limits on maximum rates of change listed in **BC1** Appendix 1) must, subject to the following operating limits, represent the **User's** best estimate of expected input or output of **Active Power** and shall be prepared in accordance with **Good Industry Practice**. **Physical Notifications** for any **BM Unit**, and any **Generating Units**, should normally be consistent with the **Dynamic Parameters** and **Export and Import Limits** and must not reflect any **BM Unit** or any **Generating Units**, proposing to operate outside the limits of its **Demand Capacity** and (and in the case of **BM Units**) **Generation Capacity** and, in the case of a **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) or **CCGT Module** or **Power Park Module**, its **Registered Capacity.**

These **Physical Notifications** provide, amongst other things, indicative **Synchronising** and **De-Synchronising** times to **NGET** in respect of any **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) or **CCGT Module** or **Power Park Module**, and for any **Generating Units**, and provide an indication of significant **Demand** changes in respect of other **BM Units**.

(b) **Quiescent Physical Notifications**

Each **BM Participant** may, in respect of each of its **BM Units**, submit to **NGET** for each **Settlement Period** of the next following **Operational Day** the data listed in **BC1** Appendix 1 under the heading of "**Quiescent Physical Notifications**" to amend the data already held by **NGET** in relation to **Quiescent Physical Notifications,** which would otherwise apply for those **Settlement Periods**.

(c) **Export and Import Limits**

Each **BM Participant** may, in respect of each of its **BM Units** and its **Generating Units** submit to **NGET** for any part or for the whole of the next following **Operational Day** the data listed in **BC1** Appendix 1 under the heading of "**Export and Import Limits**" to amend the data already held by **NGET** in relation to **Export and Import Limits,** which would otherwise apply for those **Settlement Periods.**

**Export and Import Limits** respectively represent the maximum export to or import from the **GB Transmission System** for a **BM Unit** and a **Generating Unit** and are the maximum levels that the **BM Participant** wishes to make available and must be prepared in accordance with **Good Industry Practice**.

(d) **Bid-Offer Data**

Each **BM Participant** may, in respect of each of its **BM Units**, but must not in respect of its **Generating Units** submit to **NGET** for any **Settlement Period** of the next following **Operational Day** the data listed in **BC1** Appendix 1 under the heading of "**Bid-Offer Data**" to amend the data already held by **NGET** in relation to **Bid-Offer Data**, which would otherwise apply to those **Settlement Periods**. The submitted **Bid-Offer Data** will be utilised by **NGET** in the preparation and analysis of its operational plans for the next following **Operational Day**. **Bid-Offer Data** may not be submitted unless an automatic logging device has been installed at the **Control Point** for the **BM Unit** in accordance with CC.6.5.8(b).

(e) **Dynamic Parameters** (Day Ahead)

Each **BM Participant** may, in respect of each of its **BM Units**, but must not in respect of its **Generating Units** submit to **NGET** for the next following **Operational Day** the data listed in **BC1** Appendix 1 under the heading of "**Dynamic Parameters**" to amend that data already held by **NGET.**

These **Dynamic Parameters** shall reasonably reflect the expected true operating characteristics of the **BM Unit** and shall be prepared in accordance with **Good Industry Practice**. In any case where non-zero **QPN** data has been provided in accordance with BC1.4.2(b), the **Dynamic Parameters** will apply to the element being offered for control only, i.e. to the component of the **Physical Notification** between the **QPN** and the full level of the **Physical Notification**.

The **Dynamic Parameters** applicable to the next following **Operational Day** will be utilised by **NGET** in the preparation and analysis of its operational plans for the next following **Operational Day** and may be used to instruct certain **Ancillary Services**. For the avoidance of doubt, the **Dynamic Parameters** to be used in the current **Operational Day** will be those submitted in accordance with BC2.5.3.1.

(f) **Other Relevant Data**

By 11:00 hours each day each **BM Participant,** in respect of each of its **BM Units** and **Generating Units** for which **Physical Notifications** are being submitted, shall, if it has not already done so, submit to **NGET** (save in respect of item (vi) where the item shall be submitted only when reasonably required by **NGET**), in respect of the next following **Operational Day** the following:

(i) in the case of a **CCGT Module**, a **CCGT Module Matrix** as described in **BC1** Appendix 1;

(ii) details of any special factors which in the reasonable opinion of the **BM Participant** may have a material effect or present an enhanced risk of a material effect on the likely output (or consumption) of such **BM Unit(s)**. Such factors may include risks, or potential interruptions, to **BM Unit** fuel supplies, or developing plant problems, details of tripping tests, etc. This information will normally only be used to assist in determining the appropriate level of **Operating Margin** that is required under OC2.4.6;

(iii) in the case of **Generators**, any temporary changes, and their possible duration, to the **Registered Data** of such **BM Unit**;

(iv) in the case of **Suppliers**, details of **Customer Demand Management** taken into account in the preparation of its **BM Unit Data**;

(v) details of any other factors which **NGET** may take account of when issuing **Bid-Offer Acceptances** for a **BM Unit** (e.g., **Synchronising** or **De-Synchronising** Intervals, the minimum notice required to cancel a **Synchronisation**, etc); and

(vi) in the case of a **Cascade Hydro Scheme**, the **Cascade Hydro Scheme Matrix** as described in **BC1** Appendix 1.

(vii) in the case of a **Power Park Module**, a **Power Park Module Availability Matrix** as described in **BC1** Appendix 1.

(g) **Joint BM Unit Data**

**BM Participants** may submit **Joint BM Unit Data** in accordance with the provisions of the **BSC**. For the purposes of the **Grid Code**, such data shall be treated as data submitted under **BC1**.

BC1.4.3 Data Revisions

The **BM Unit Data**, and **Generating Unit Data**, derived at 1100 hours each day under BC1.4.2 above may need to be revised by the **BM Participant** for a number of reasons, including for example, changes to expected output or input arising from revised contractual positions, plant breakdowns, changes to expected **Synchronising** or **De-Synchronising** times, etc, occurring before **Gate Closure**. **BM Participants** should use reasonable endeavours to ensure that the data held by **NGET** in relation to its **BM Units** and **Generating Units**, is accurate at all times. Revisions to **BM Unit Data**, and **Generating Unit Data** for any period of time up to **Gate Closure** should be submitted to **NGET** as soon as reasonably practicable after a change becomes apparent to the **BM Participant**. **NGET** will use reasonable endeavours to utilise the most recent data received from **Users,** subject to the application of the provisions of BC1.4.5, for its preparation and analysis of operational plans.

BC1.4.4 Receipt of **BM Unit Data** prior to **Gate Closure**

**BM Participants** submitting **Bid-Offer Data,** in respect of any **BM Unit** for use in the **Balancing Mechanism** for any particular **Settlement Period** in accordance with the **BSC**, must ensure that **Physical Notifications** and **Bid-Offer Data** for such **BM Units** are received in their entirety and logged into **NGET's** computer systems by the time of **Gate Closure** for that **Settlement Period**. In all cases the data received will be subject to the application under the **Grid Code** of the provisions of BC1.4.5**.**

For the avoidance of doubt, no changes to the **Physical Notification, QPN** data or **Bid-Offer Data** for any **Settlement Period** may be submitted to **NGET** after **Gate Closure** for that **Settlement Period**.

BC1.4.5 **BM Unit Data** Defaulting, Validity and Consistency Checking

In the event that no submission of any or all of the **BM Unit Data** and **Generating Unit Data** in accordance with BC1.4.2 in respect of an **Operational Day**, is received by **NGET** by 11:00 hours on the day before that **Operational Day**, **NGET** will apply the **Data Validation, Consistency and Defaulting Rules**, with the default rules applicable to **Physical Notifications**, **Quiescent Physical Notifications** and **Export and Import Limits** data selected as follows:

(a) for an **Interconnector User's BM Unit**, the defaulting rules will set some or all of the data for that **Operational Day** to zero, unless the relevant Interconnector arrangements, as agreed with **NGET**, state otherwise (in which case (b) applies); and

(b) for all other **BM Units** or **Generating Units**, the defaulting rules will set some or all of the data for that **Operational Day** to the values prevailing in the current **Operational Day**.

A subsequent submission by a **User** of a data item which has been so defaulted under the **Grid Code** will operate as an amendment to that defaulted data and thereby replace it. Any such subsequent submission is itself subject to the application under the **Grid Code** of the **Data Validation, Consistency and Defaulting Rules.**

**BM Unit Data** and **Generating Unit Data** submitted in accordance with the provisions of BC1.4.2 to BC1.4.4 will be checked under the **Grid Code** for validity and consistency in accordance with the **Data Validation, Consistency and Defaulting Rules**. If any **BM Unit Data** and **Generating Unit Data** so submitted fails the data validity and consistency checking, this will result in the rejection of all data submitted for that **BM Unit** or **Generating Unit** included in the electronic data file containing that data item and that **BM Unit's** or **Generating Unit's** data items will be defaulted under the **Grid Code** in accordance with the **Data Validation, Consistency and Defaulting Rules**. Data for other **BM Units** and **Generating Units** included in the same electronic data file will not be affected by such rejection and will continue to be validated and checked for consistency prior to acceptance. In the event that rejection of any **BM Unit Data** and **Generating Unit Data** occurs, details will be made available to the relevant **BM Participant** via the electronic data communication facilities. In the event of a difference between the **BM Unit Data** for the **Cascade Hydro Scheme** and sum of the data submitted for the **Generating Units** forming part of such **Cascade Hydro Scheme**, **the BM Unit Data** shall take precedence.

BC1.4.6 Special Provisions relating to **Interconnector Users**

(a) The total of the relevant **Physical Notifications** submitted by **Interconnector Users** in respect of any period of time should not exceed the capability (in MW) of the respective **External Interconnection** for that period of time. In

the event that it does, then **NGET** shall advise the **Externally Interconnected System Operator** accordingly. In the period between such advice and **Gate Closure**, one or more of the relevant **Interconnector Users** would be expected to submit revised **Physical Notifications** to **NGET** to eliminate any such over-provision.

(b) In any case where, as a result of a reduction in the capability (in MW) of the **External Interconnection** in any period during an **Operational Day** which is agreed between **NGET** and an **Externally Interconnected System Operator** after 0900 hours on the day before the beginning of such **Operational Day**, the total of the **Physical Notifications** in the relevant period using that **External Interconnection**, as stated in the **BM Unit Data** exceeds the reduced capability (in MW) of the respective **External Interconnection** in that period then **NGET** shall notify the **Externally Interconnected System Operator** accordingly.

## BC1.5 INFORMATION PROVIDED BY **NGET**

**NGET** shall provide data to the **Balancing Mechanism Reporting Agent** or **BSCCo** each day in accordance with the requirements of the **BSC** in order that the data may be made available to **Users** via the **Balancing Mechanism Reporting Service** (or by such other means) in each case as provided in the **BSC**. Where **NGET** provides such information associated with the secure operation of the **System** to the **Balancing Mechanism Reporting Agent**, the provision of that information is additionally provided for in the following sections of this BC1.5. **NGET** shall be taken to have fulfilled its obligations to provide data under BC1.5.1, BC1.5.2, and BC1.5.3 by so providing such data to the **Balancing Mechanism Reporting Agent**.

### BC1.5.1 **Demand** Estimates

Normally by 0900 hours each day, **NGET** will make available to **Users** a forecast of **GB National Demand** and the **Demand** for a number of pre-determined constraint groups (which may be updated from time to time, as agreed between **NGET** and **BSCCo**) for each **Settlement Period** of the next following **Operational Day**. Normally by 1200 hours each day, **NGET** will make available to **Users** a forecast of **GB Transmission System Demand** for each **Settlement Period** of the next **Operational Day**. Further details are provided in Appendix 2.

### BC1.5.2 **Indicated Margin** and **Indicated Imbalance**

Normally by 1200 hours each day, **NGET** will make available to **Users** an **Indicated Margin** and an **Indicated Imbalance** for each **Settlement Period** of the next following **Operational Day**. **NGET** will use reasonable endeavours to utilise the most recent data received from **Users** in preparing for this release of data. Further details are provided in Appendix 2.

### BC1.5.3 Provision of Updated Information

**NGET** will provide updated information on **Demand** and other information at various times throughout each day, as detailed in Appendix 2. **NGET** will use reasonable endeavours to utilise the most recent data received from **Users** in preparing for this release of data.

### BC1.5.4 Reserve and Inadequate **System Margin**

**Contingency Reserve**

(a) The amount of **Contingency Reserve** required at the day ahead stage and in subsequent timescales will be decided by **NGET** on the basis of historical

trends in the reduction in availability of **Large Power Stations** and increases in forecast **Demand** up to real time operation. Where **Contingency Reserve** is to be allocated to thermal **Gensets**, **NGET** will instruct through a combination of **Ancillary Services** instructions and **Bid-Offer Acceptances**, the time at which such **Gensets** are required to synchronise, such instructions to be consistent with **Dynamic Parameters** and other contractual arrangements.

**Operating Reserve**

(b) The amount of **Operating Reserve** required at any time will be determined by **NGET** having regard to the **Demand** levels, **Large Power Station** availability shortfalls and the greater of the largest secured loss of generation (ie, the loss of generation against which, as a requirement of the **Licence Standards,** the **GB Transmission System** must be secured) or loss of import from or sudden export to **External Interconnections**. **NGET** will allocate **Operating Reserve** to the appropriate **BM Units** and **Generating Units** so as to fulfil its requirements according to the **Ancillary Services** available to it and as provided in the **BCs**.

Inadequate **System Margin**

(c) In the period following 1200 hours each day and in relation to the following **Operational Day, NGET** will monitor the total of the Maximum Export Limit component of the **Export and Import Limits** received against forecast **GB Transmission System Demand** and the **Operating Margin** and will take account of **Dynamic Parameters** to see whether the anticipated level of the **System Margin** for any period is insufficient.

(d) Where the level of the **System Margin** for any period is, in **NGET's** reasonable opinion, anticipated to be insufficient, **NGET** will send (by such data transmission facilities as have been agreed) a **GB Transmission System Warning** - **Inadequate System Margin** in accordance with OC7.4.8 to each **Generator**, **Supplier, Externally Interconnected System Operator, Network Operator** and **Non-Embedded Customer**.

(e) Where, in **NGET's** judgement the **System Margin** at any time during the current **Operational Day** is such that there is a high risk of **Demand** reduction being instructed, a **GB Transmission System Warning** - **High Risk of Demand Reduction** will be issued, in accordance with OC7.4.8.

(f) The monitoring will be conducted on a regular basis and a revised **GB Transmission System Warning** - **Inadequate System Margin** or **High Risk of Demand Reduction** may be sent out from time to time, including within the post **Gate Closure** phase. This will reflect any changes in **Physical Notifications** and **Export and Import Limits** which have been notified to **NGET**, and will reflect any **Demand Control** which has also been so notified. This will also reflect generally any changes in the forecast **Demand** and the relevant **Operating Margin**.

(g) To reflect changing conditions, a **GB Transmission System Warning - Inadequate System Margin** may be superseded by a **GB Transmission System Warning - High Risk of Demand Reduction** and vice-versa.

(h) If the continuing monitoring identifies that the **System Margin** is anticipated, in **NGET's** reasonable opinion, to be sufficient for the period for which previously a **GB Transmission System Warning** had been issued, **NGET**

will send (by such data transmission facilities as have been agreed) a **Cancellation of GB Transmission System Warning** to each **User** who had received a **GB Transmission System Warning - Inadequate System Margin** or **High Risk of Demand Reduction** for that period. The issue of a **Cancellation of GB Transmission System Warning** is not an assurance by **NGET** that in the event the **System Margin** will be adequate, but reflects **NGET's** reasonable opinion that the insufficiency is no longer anticipated.

(i) If continued monitoring indicates the **System Margin** becoming inadequate **NGET** may issue further **GB Transmission System Warnings - Inadequate System Margin** or **High Risk of Demand Reduction.**

(j) **NGET** may issue a **GB Transmission System Warning - Inadequate System Margin** or **High Risk of Demand Reduction** for any period, not necessarily relating to the following **Operational Day**, where it has reason to believe there will be inadequate **System Margin** over a period (for example in periods of protracted **Plant** shortage, the provisions of OC7.4.8.6 apply).

## BC1.5.5 System and Localised NRAPM (Negative Reserve Active Power Margin)

(a) (i) **System Negative Reserve Active Power Margin**

**Synchronised Gensets** must at all times be capable of reducing output such that the total reduction in output of all **Synchronised Gensets** is sufficient to offset the loss of the largest secured demand on the **System** and must be capable of sustaining this response;

(ii) **Localised Negative Reserve Active Power Margin**

**Synchronised Gensets** must at all times be capable of reducing output to allow transfers to and from the **System Constraint Group** (as the case may be) to be contained within such reasonable limit as **NGET** may determine and must be capable of sustaining this response.

(b) **NGET** will monitor the total of **Physical Notifications** of exporting **BM Units** and **Generating Units** (where appropriate) received against forecast **Demand** and, where relevant, the appropriate limit on transfers to and from a **System Constraint Group** and will take account of **Dynamic Parameters** and **Export and Import Limits** received to see whether the level of **System NRAPM** or **Localised NRAPM** for any period is likely to be insufficient. In addition, **NGET** may increase the required margin of **System NRAPM** or **Localised NRAPM** to allow for variations in forecast **Demand**. In the case of **System NRAPM**, this may be by an amount (in **NGET's** reasonable discretion) not exceeding five per cent of forecast **Demand** for the period in question. In the case of **Localised NRAPM**, this may be by an amount (in **NGET's** reasonable discretion) not exceeding ten per cent of the forecast **Demand** for the period in question;

(c) Where the level of **System NRAPM** or **Localised NRAPM** for any period is, in **NGET 's** reasonable opinion, likely to be insufficient **NGET** may contact all **Generators** in the case of low **System NRAPM** and may contact **Generators** in relation to relevant **Gensets** in the case of low **Localised NRAPM**. **NGET** will raise with each **Generator** the problems it is anticipating due to low **System NRAPM** or **Localised NRAPM** and will discuss whether, in advance of **Gate Closure**:-

(i) any change is possible in the **Physical Notification** of a **BM Unit** which has been notified to **NGET**; or

(ii) any change is possible to the **Physical Notification** of a **BM Unit** within an **Existing AGR Plant** within the **Existing AGR Plant Flexibility Limit;**

in relation to periods of low **System NRAPM** or (as the case may be) low **Localised NRAPM. NGET** will also notify each **Externally Interconnected System Operator** of the anticipated low **System NRAPM** or **Localised NRAPM** and request assistance in obtaining changes to **Physical Notifications** from **BM Units** in that **External System**.

(d) Following **Gate Closure**, the procedure of BC2.9.4 will apply.

## BC1.6 Special Provisions relating to **Network Operators**

### BC1.6.1 **User System** Data from **Network Operators**

(a) By 1000 hours each day each **Network Operator** will submit to **NGET** in writing, confirmation or notification of the following in respect of the next **Operational Day**:

(i) constraints on its **User System** which **NGET** may need to take into account in operating the **GB Transmission System**. In this BC1.6.1 the term "constraints" shall include restrictions on the operation of **Embedded CCGT Units,** and/or **Embedded Power Park Modules** as a result of the **User System** to which the **CCGT Unit** and/or **Power Park Module** is connected at the **User System Entry Point** being operated or switched in a particular way, for example, splitting the relevant busbar. It is a matter for the **Network Operator** and the **Generator** to arrange the operation or switching, and to deal with any resulting consequences. The **Generator,** after consultation with the **Network Operator**, is responsible for ensuring that no **BM Unit Data** submitted to **NGET** can result in the violation of any such constraint on the **User System**.

(ii) the requirements of voltage control and Mvar reserves which **NGET** may need to take into account for **System** security reasons.

(b) The form of the submission will be:

(i) that of a **BM Unit** output or consumption (for MW and for Mvar, in each case a fixed value or an operating range, on the **User System** at the **User System Entry Point**, namely in the case of a **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) on the higher voltage side of the generator step-up transformer, or in the case of a **Power Park Module**, at the point of connection) required for particular **BM Units** (identified in the submission) connected to that **User System** for each **Settlement Period** of the next **Operational Day**;

(ii) adjusted in each case for MW by the conversion factors applicable for those **BM Units** to provide output or consumption at the relevant **Grid Supply Points**.

(c) At any time and from time to time, between 1000 hours each day and the expiry of the next **Operational Day**, each **Network Operator** must submit to **NGET** in writing any revisions to the information submitted under this BC1.6.1.

BC1.6.2 Notification of Times to **Network Operators**

**NGET** will make available indicative **Synchronising** and **De-Synchronising** times to each **Network Operator**, but only relating to **BM Units** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) or a **Power Park Module** or a **CCGT Module Embedded** within that **Network Operator's User System** and those **Gensets** directly connected to the **GB Transmission System** which **NGET** has identified under **OC2** as being those which may, in the reasonable opinion of **NGET**, affect the integrity of that **User System**. If in preparing for the operation of the **Balancing Mechanism**, **NGET** becomes aware that a **BM Unit** directly connected to the **GB Transmission System** may, in its reasonable opinion, affect the integrity of that other **User System** which, in the case of a **BM Unit** comprising a **Generating Unit** (as defined in the Glossary and Definitions and not limited by BC1.2) or a **CCGT Module** or a **Power Park Module,** it had not so identified under **OC2**, then **NGET** may make available details of its indicative **Synchronising** and **De-Synchronising** times to that other **User** and shall inform the relevant **BM Participant** that it has done so, identifying the **BM Unit** concerned.

## BC1.7 Special Actions

BC1.7.1 **NGET** may need to identify special actions (either pre- or post-fault) that need to be taken by specific **Users** in order to maintain the integrity of the **GB Transmission System** in accordance with the **Licence Standards** and **NGET Operational Strategy**.

(a) For a **Generator** special actions will generally involve a **Load** change or a change of required Notice to Deviate from Zero NDZ, in a specific timescale on individual or groups of **Gensets**.

(b) For **Network Operators** these special actions will generally involve **Load** transfers between **Grid Supply Points** or arrangements for **Demand** reduction by manual or automatic means.

(c) For **Externally Interconnected System Operators** (in their co-ordinating role for **Interconnector Users** using their **External System**) these special actions will generally involve an increase or decrease of net power flows across an **External Interconnection** by either manual or automatic means.

BC1.7.2 These special actions will be discussed and agreed with the relevant **User** as appropriate. The actual implementation of these special actions may be part of an "emergency circumstances" procedure described under **BC2**. If not agreed, generation or **Demand** may be restricted or may be at risk.

BC1.7.3 **NGET** will normally issue the list of special actions to the relevant **Users** by 1700 hours on the day prior to the day to which they are to apply.

# APPENDIX 1

# BM UNIT DATA

More detail about valid values required under the **Grid Code** for **BM Unit Data** and **Generating Unit Data** may be identified by referring to the **Data Validation, Consistency and Defaulting Rules.** In the case of **Embedded BM Units** and **Generating Units** the **BM Unit Data** and the **Generating Unit Data** shall represent the value at the relevant **Grid Supply Point**. Where data is submitted on a **Generating Unit** basis, the provisions of this Appendix 1 shall in respect of such data submission apply as if references to **BM Unit** were replaced with **Generating Unit**. Where **NGET** and the relevant **User** agree, submission on a **Generating Unit** basis (in whole or in part) may be otherwise than in accordance with the provisions of the Appendix 1.

## *BC1.A.1.1 **Physical Notifications***

For each **BM Unit**, the **Physical Notification** is a series of MW figures and associated times, making up a profile of intended input or output of **Active Power** at the **Grid Entry Point** or **Grid Supply Point**, as appropriate. For each **Settlement Period**, the first "from time" should be at the start of the **Settlement Period** and the last "to time" should be at the end of the **Settlement Period**.

The input or output reflected in the **Physical Notification** for a single **BM Unit** (or the aggregate **Physical Notifications** for a collection of **BM Units** at a **Grid Entry Point** or **Grid Supply Point** or to be transferred across an **External Interconnection,** owned or controlled by a single **BM Participant**) must comply with the following limits regarding maximum rates of change, either for a single change or a series of related changes :

- for a change of up to 300MW — no limit;
- for a change greater than 300MW and less than 1000MW — 50MW per minute;
- for a change of 1000MW or more — 40MW per minute,

unless prior arrangements have been discussed and agreed with **NGET**. This limitation is not intended to limit the Run-Up or Run-Down Rates provided as **Dynamic Parameters.**

An example of the format of **Physical Notification** is shown below. The convention to be applied is that where it is proposed that the **BM Unit** will be importing, the **Physical Notification** is negative.

| Data Name | BMU name | Time From | From level (MW) | Time To | To Level MW) |
|---|---|---|---|---|---|
| PN | TAGENT | BMUNIT01 | 2001-11-03 06:30 | 77 | 2001-11-03 07:00 | 100 |
| PN | TAGENT | BMUNIT01 | 2001-11-03 07:00 | 100 | 2001-11-03 07:12 | 150 |
| PN | TAGENT | BMUNIT01 | 2001-11-03 07:12 | 150 | 2001-11-03 07:30 | 175 |

A linear interpolation will be assumed between the **Physical Notification** From and To levels specified for the **BM Unit** by the **BM Participant**.

cause the **System Frequency** to deviate further from 50Hz without first using reasonable endeavours to discuss the proposed actions with **NGET**. **NGET** shall either agree to these changes in input or output or issue a **Bid-Offer Acceptance** in accordance with BC2.7 to delay the change.

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

BC2.5.5 Commencement or Termination of Participation in the **Balancing Mechanism**

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

(a) no longer submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** no longer has to meet the requirements of BC2.5.1 nor the requirements of CC6.5.8(b) in relation to that **BM Unit**. Also, with effect from that **Operational Day**, any defaulted **Physical Notification** and defaulted **Bid-Offer Data** in relation to that **BM Unit** arising from the **Data Validation, Consistency and Defaulting Rules** will be disregarded and the provisions of BC2.5.2 will not apply;

(b) submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** will need to meet the requirements of BC2.5.1 and the requirements of CC6.5.8(b) in relation to that **BM Unit**.

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

(a) no longer submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** no longer has to meet the requirements of CC6.5.8(b) in relation to that **BM Unit**; Also, with effect from that **Operational Day**, any defaulted **Bid-Offer Data** in relation to that **BM Unit** arising from the **Data Validation, Consistency and Defaulting Rules** will be disregarded;

(b) submit **Bid-Offer Data** under BC1.4.2(d), then with effect from that **Operational Day** that **BM Participant** will need to meet the requirements of CC6.5.8(b) in relation to that **BM Unit**.

## BC2.6 COMMUNICATIONS

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

BC2.6.1 Normal Communication with **Control Points**

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

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

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

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

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

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

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

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

BC2.6.2 Communication with **Control Points** in Emergency Circumstances

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

BC2.6.3 Communication with **Network Operators** in Emergency Circumstances

**NGET** will issue **Emergency Instructions** direct to the **Network Operator** at each **Control Centre** in relation to special actions and **Demand Control**. **Emergency Instructions** to a **Network Operator** will normally be given by telephone (and will

**BALANCING CODE NO.3**

FREQUENCY CONTROL PROCESS

# CONTENTS

(This contents page does not form part of the Grid Code)

BALANCING CODE NO.3

# FREQUENCY CONTROL PROCESS

## BC3.1 INTRODUCTION

BC3.1.1 **BC3** sets out the procedure for **NGET** to use in relation to **Users** to undertake **System Frequency** control. **System Frequency** will be controlled by response from **Gensets** (and **DC Converters** at **DC Converter Stations**) operating in **Limited Frequency Sensitive Mode** or **Frequency Sensitive Mode**, by the issuing of instructions to **Gensets** (and **DC Converters** at **DC Converter Stations**) and by control of **Demand**. The requirements for **Frequency** control are determined by the consequences and effectiveness of the **Balancing Mechanism**, and accordingly, **BC3** is complementary to **BC1** and **BC2**.

BC3.1.2 Inter-relationship with **Ancillary Services**

The provision of response (other than by operation in **Limited Frequency Sensitive Mode** or in accordance with BC3.7.1(c)) in order to contribute towards **Frequency** control, as described in **BC3**, by **Generators** or **DC Converter Station** owners will be an **Ancillary Service**. **Ancillary Services** are divided into three categories, **System Ancillary Services** Parts 1 and 2 and **Commercial Ancillary Services**. **System Ancillary Services**, Parts 1 and 2, are those **Ancillary Services** listed in CC.8.1; those in Part 1 of CC.8.1 are those for which the **Connection Conditions** require the capability as a condition of connection and those in Part 2 are those which may be agreed to be provided by **Users** and which can only be utilised by **NGET** if so agreed. **Commercial Ancillary Services** like those **System Ancillary Services** set out in Part 2 of CC.8.1, may be agreed to be provided by **Users** and which can only be utilised by **NGET** if so agreed.

BC3.1.3 The provision of **Frequency** control services, if any, from an **External System** via a **DC Converter Station** will be provided for in the **Ancillary Services Agreement** and/or **Bilateral Agreement** with the **DC Converter Station** owner and/or any other relevant agreements with the relevant **EISO.**

## BC3.2 OBJECTIVE

The procedure for **NGET** to direct **System Frequency** control is intended to enable (as far as possible) **NGET** to meet the statutory requirements of **System Frequency** control.

## BC3.3 SCOPE

**BC3** applies to **NGET** and to **Users**, which in this **BC3** means:-

(a) **Generators** with regard to their **Large Power Stations** (except those **Large Power Stations** with a **Registered Capacity** less than 50MW comprising of **Power Park Modules**),

(b) **Network Operators,**

(c) **DC Converter Station** owners,

(d) other providers of **Ancillary Services**, and

(e) **Externally Interconnected System Operators**.

## BC3.4 MANAGING **SYSTEM FREQUENCY**

### BC3.4.1 Statutory Requirements

When **NGET** determines it is necessary (by having monitored the **System Frequency**), it will, as part of the procedure set out in **BC2**, issue instructions (including instructions for **Commercial Ancillary Services**) in order to seek to regulate **System Frequency** to meet the statutory requirements of **Frequency** control. **Gensets** (except those comprising of a **Power Park Module** in a **Power Station** with a **Registered Capacity** less than 50MW and those comprising of a **Power Park Module** in Scotland with a **Completion Date** before 1 July 2004) and **DC Converters** at **DC Converter Stations** when transferring **Active Power** to the **Total System,** operating in **Frequency Sensitive Mode** will be instructed by **NGET** to operate taking due account of the **Target Frequency** notified by **NGET**.

### BC3.4.2 **Target Frequency**

**NGET** will give 15 minutes notice of variation in **Target Frequency**.

### BC3.4.3 Electric Time

**NGET** will endeavour (in so far as it is able) to control electric clock time to within plus or minus 10 seconds by specifying changes to **Target Frequency,** by accepting bids and offers in the **Balancing Mechanism**. Errors greater than plus or minus 10 seconds may be temporarily accepted at **NGET's** reasonable discretion.

## BC3.5 RESPONSE FROM **GENSETS** (AND **DC CONVERTERS** AT **DC CONVERTER STATIONS** WHEN TRANSFERRING **ACTIVE POWER** TO THE **TOTAL SYSTEM**)

### BC3.5.1 Capability

Each **Genset** (except those comprising of **Power Park Modules** in a **Power Station** with a **Registered Capacity** less than 50MW and those comprising of **Power Park Modules** in Scotland with a **Completion Date** before 1 July 2004) and each **DC Converter** at a **DC Converter Station** must at all times have the capability to operate automatically so as to provide response to changes in **Frequency** in accordance with the requirements of CC.6.3.7 in order to contribute to containing and correcting the **System Frequency** within the statutory requirements of **Frequency** control. . For **DC Converters** at **DC Converter Stations,** BC.3.1.3 also applies**.** In addition each **Genset** (and each **DC Converter** at a **DC Converter Station**) must at all times have the capability to operate in a **Limited Frequency Sensitive Mode** by operating so as to provide **Limited High Frequency Response**.

### BC3.5.2 **Limited Frequency Sensitive Mode**

Each **Synchronised Genset** producing **Active Power** (and each **DC Converter** at a **DC Converter Station**) must operate at all times in a **Limited Frequency Sensitive Mode** (unless instructed in accordance with BC3.5.4 below to operate in **Frequency Sensitive Mode**). Operation in **Limited Frequency Sensitive Mode** must achieve the capability requirement described in CC.6.3.3 for **System Frequencies** up to 50.4Hz and shall be deemed not to be in contravention of CC.6.3.7.

BC3.5.3 (a) **Existing Gas Cooled Reactor Plant**

**NGET** will permit **Existing Gas Cooled Reactor Plant** other than **Frequency Sensitive AGR Units** to operate in **Limited Frequency Sensitive Mode** at all times.

(b) **Power Park Modules** in operation before 1 January 2006

**NGET** will permit **Power Park Modules** in operation before 1 January 2006 to operate in **Limited Frequency Sensitive Mode** at all times. For the avoidance of doubt **Power Park Modules** in England and Wales with a **Completion Date** on or after 1 January 2006 and **Power Park Modules** in operation in Scotland after 1 January 2006 with a completion date after 1 July 2004 and in a **Power Station** with a **Registered Capacity** of 50MW or more will be required to operate in both **Limited Frequency Sensitive Mode** and **Frequency Sensitive Mode** of operation depending on **System** conditions.

BC3.5.4 **Frequency Sensitive Mode**

(a) **NGET** may issue an instruction to a **Genset** (or **DC Converter** at a **DC Converter Station** if agreed as described in BC.3.1.3) to operate so as to provide **Primary Response** and/or **Secondary Response** and/or **High Frequency Response** (in the combinations agreed in the relevant **Ancillary Services Agreement**). When so instructed, the **Genset** or **DC Converter** at a **DC Converter Station** must operate in accordance with the instruction and will no longer be operating in **Limited Frequency Sensitive Mode**, but by being so instructed will be operating in **Frequency Sensitive Mode**.

(b) **Frequency Sensitive Mode** is the generic description for a **Genset** (or **DC Converter** at a **DC Converter Station)** operating in accordance with an instruction to operate so as to provide **Primary Response** and/or **Secondary Response** and/or **High Frequency Response** (in the combinations agreed in the relevant **Ancillary Services Agreement**).

(c) The magnitude of the response in each of those categories instructed will be in accordance with the relevant **Ancillary Services Agreement** with the **Generator** or **DC Converter Station** owner**.**

(d) Such instruction will continue until countermanded by **NGET** or until;

(i) the **Genset** is **De-Synchronised;**, or

(ii) the **DC Converter** ceases to transfer **Active Power** to or from the **Total System** subject to the conditions of any relevant agreement relating to the operation of the **DC Converter Station**,

whichever is the first to occur.

(e) **NGET** will not so instruct **Generators** in respect of **Existing Gas Cooled Reactor Plant** other than **Frequency Sensitive AGR Units**.

(f) **NGET** will not so instruct **Generators** in respect of **Power Park Modules**:

(i) in Scotland in a **Power Station** with a **Completion Date** before 1 July 2004; or,

(ii) in a **Power Station** with a **Registered Capacity** of less than 50MW.

(iii) in England and Wales with a **Completion Date** before 1 January 2006.

BC3.5.5 **System Frequency** Induced Change

A **System Frequency** induced change in the **Active Power** output of a **Genset** (or **DC Converter** at a **DC Converter Station**) which assists recovery to **Target Frequency** must not be countermanded by a **Generator** or **DC Converter Station** owner except where it is done purely on safety grounds (relating to either personnel or plant) or, where necessary, to ensure the integrity of the **Power Station** or **DC Converter Station**.

BC3.6 RESPONSE TO **LOW FREQUENCY**

BC3.6.1 **Low Frequency Relay** Initiated Response from **Gensets** and **DC Converters** at **DC Converter Stations**

(a) **NGET** may utilise **Gensets** (and **DC Converters** at **DC Converter Stations**) with the capability of **Low Frequency Relay** initiated response as:

(i) synchronisation and generation from standstill;

(ii) generation from zero generated output;

(iv) increase in generated output;

(iv) increase in **DC Converter** output to the **Total System** (if so agreed as described in BC3.1.3);

(v) decrease in **DC Converter** input from the **Total System** (if so agreed as described in BC3.1.3);

in establishing its requirements for **Operating Reserve**.

(b) (i) **NGET** will specify within the range agreed with **Generators** and/or **EISOs** and/or **DC Converter Station** owners (if so agreed as described in BC3.1.3), **Low Frequency Relay** settings to be applied to **Gensets** or **DC Converters at DC Converter Stations** pursuant to BC3.6.1 (a) and instruct the **Low Frequency Relay** initiated response placed in and out of service.

(ii) **Generators** and/or **EISOs** and/or **DC Converter Station** owners (if so agreed as described in BC3.1.3) will comply with **NGET** instructions for **Low Frequency Relay** settings and **Low Frequency Relay** initiated response to be placed in or out of service. **Generators** or **DC Converter Station** owners or EISOs may not alter such **Low Frequency Relay** settings or take **Low Frequency Relay** initiated response out of service without **NGET's** agreement (such agreement not to be unreasonably withheld or delayed), except for safety reasons.

BC3.6.2 **Low Frequency Relay** Initiated Response from **Demand** and other **Demand** modification arrangements (which may include a **DC Converter Station** when importing **Active Power** from the **Total System**)

(a) **NGET** may, pursuant to an **Ancillary Services Agreement**, utilise **Demand** with the capability of **Low Frequency Relay** initiated **Demand** reduction in establishing its requirements for **Frequency Control**.

(b) (i) **NGET** will specify within the range agreed the **Low Frequency Relay** settings to be applied pursuant to BC3.6.2 (a), the amount of **Demand** reduction to be available and will instruct the **Low Frequency Relay** initiated response to be placed in or out of service.

(ii) **Users** will comply with **NGET** instructions for **Low Frequency Relay** settings and **Low Frequency Relay** initiated **Demand** reduction to be placed in or out of service. **Users** may not alter such **Low Frequency Relay** settings or take **Low Frequency Relay** initiated response out of service without **NGET's** agreement, except for safety reasons.

(iii) In the case of any such **Demand** which is **Embedded**, **NGET** will notify the relevant **Network Operator** of the location of the **Demand**, the amount of **Demand** reduction to be available, and the **Low Frequency Relay** settings.

(c) **NGET** may also utilise other **Demand** modification arrangements pursuant to an agreement for **Ancillary Services**, in order to contribute towards **Operating Reserve.**

BC3.7 RESPONSE TO **HIGH FREQUENCY** REQUIRED FROM **SYNCHRONISED GENSETS** (AND **DC CONVERTERS** AT **DC CONVERTER STATIONS** WHEN TRANSFERRING **ACTIVE POWER** TO THE **TOTAL SYSTEM**)

BC3.7.1 Plant in **Frequency Sensitive Mode** instructed to provide **High Frequency Response**

(a) Each **Synchronised Genset** (or each **DC Converter** at a **DC Converter Station**) in respect of which the **Generator** or **DC Converter Station** owner and/or **EISO** has been instructed to operate so as to provide **High Frequency Response**, which is producing **Active Power** and which is operating above the **Designed Minimum Operating Level**, is required to reduce **Active Power** output in response to an increase in **System Frequency** above the **Target Frequency** (or such other level of **Frequency** as may have been agreed in an **Ancillary Services Agreement**). The **Target Frequency** is normally 50.00 Hz except where modified as specified under BC3.4.2.

(b) (i) The rate of change of **Active Power** output with respect to **Frequency** up to 50.5 Hz shall be in accordance with the provisions of the relevant **Ancillary Services Agreement** with each **Generator** or **DC Converter Station** owner. If more than one rate is provided for in the **Ancillary Services Agreement NGET** will instruct the rate when the instruction to operate to provide **High Frequency Response** is given.

(ii) The reduction in **Active Power** output by the amount provided for in the relevant **Ancillary Services Agreement** must be fully achieved within 10 seconds of the time of the **Frequency** increase and must be sustained at no lesser reduction thereafter.

(iii) It is accepted that the reduction in **Active Power** output may not be to below the **Designed Minimum Operating Level.**

(c) In addition to the **High Frequency Response** provided, the **Genset** (or **DC Converter** at a **DC Converter Station**) must continue to reduce **Active Power** output in response to an increase in **System Frequency** to 50.5 Hz or above at a minimum rate of 2 per cent of output per 0.1 Hz deviation of **System Frequency** above that level, such reduction to be achieved within five minutes of the rise to or above 50.5 Hz. For the avoidance of doubt, the provision of this reduction in **Active Power** output is not an **Ancillary Service**.

BC3.7.2 Plant in **Limited Frequency Sensitive Mode**

(a) Each **Synchronised Genset** (or **DC Converter** at a **DC Converter Station**) operating in a **Limited Frequency Sensitive Mode** which is producing **Active Power** is also required to reduce **Active Power** output in response to **System Frequency** when this rises above 50.4 Hz. In the case of **DC Converters** at **DC Converter Stations,** the provisions of **BC.3.7.7** are also applicable. For the avoidance of doubt, the provision of this reduction in **Active Power** output is not an **Ancillary Service**. Such provision is known as "**Limited High Frequency Response**".

(b) (i) The rate of change of **Active Power** output must be at a minimum rate of 2 per cent of output per 0.1 Hz deviation of **System Frequency** above 50.4 Hz.

(ii) The reduction in **Active Power** output must be continuously and linearly proportional, as far as is practicable, to the excess of **Frequency** above 50.4 Hz and must be provided increasingly with time over the period specified in (iii) below.

(iii) As much as possible of the proportional reduction in **Active Power** output must result from the frequency control device (or speed governor) action and must be achieved within 10 seconds of the time of the **Frequency** increase above 50.4 Hz.

(iv) The residue of the proportional reduction in **Active Power** output which results from automatic action of the **Genset** (or **DC Converter** at a **DC Converter Station**) output control devices other than the frequency control devices (or speed governors) must be achieved within 3 minutes from the time of the **Frequency** increase above 50.4 Hz.

(v) Any further residue of the proportional reduction which results from non-automatic action initiated by the **Generator** or **DC Converter Station** owner shall be initiated within 2 minutes, and achieved within 5 minutes, of the time of the **Frequency** increase above 50.4 Hz.

(c) Each **Genset** (or **DC Converter** at a **DC Converter Station**) which is providing **Limited High Frequency Response** in accordance with this BC3.7.2 must continue to provide it until the **Frequency** has returned to or below 50.4 Hz or until otherwise instructed by **NGET**.

BC3.7.3 Plant operation to below **Minimum Generation**

(a) As stated in CC.A.3.2, steady state operation below **Minimum Generation** is not expected but if **System** operating conditions cause operation below **Minimum Generation** which give rise to operational difficulties for the **Genset** (or **DC Converter** at a **DC Converter Station**) then **NGET** should not, upon request, unreasonably withhold issuing a **Bid-Offer Acceptance** to return the **Generating Unit** or **CCGT Module** or **Power Park Module** or **DC Converter** to an output not less than **Minimum Generation**. In the case of a **DC Converter** not participating in the **Balancing Mechanism**, then **NGET** will, upon request, attempt to return the **DC Converter** to an output not less than **Minimum Generation** or to zero transfer or to reverse the transfer of **Active Power**.

(b) It is possible that a **Synchronised Genset** (or a **DC Converter** at a **DC Converter Station**) which responded as required under BC3.7.1 or BC3.7.2 to an excess of **System Frequency**, as therein described, will (if the output reduction is large or if the **Genset** (or a **DC Converter** at a **DC Converter Station**) output has reduced to below the **Designed Minimum Operating Level**) trip after a time.

(c) All reasonable efforts should in the event be made by the **Generator** or **DC Converter Station** owner to avoid such tripping, provided that the **System Frequency** is below 52Hz.

(d) If the **System Frequency** is at or above 52Hz, the requirement to make all reasonable efforts to avoid tripping does not apply and the **Generator Generator** or **DC Converter Station** owner is required to take action to protect the **Generating Units, Power Park Modules** or **DC Converters** as specified in CC.6.3.13.

(e) In the event of the **System Frequency** becoming stable above 50.5Hz, after all **Genset** and **DC Converter** action as specified in BC3.7.1 and BC3.7.2 has taken place, **NGET** will issue appropriate **Bid-Offer Acceptances** and/or **Ancillary Service** instructions, which may include **Emergency Instructions** under **BC2** to trip **Gensets** (or**,** in the case of **DC Converters** at **DC Converter Stations**, to stop or reverse the transfer of **Active Power**) so that the **Frequency** returns to below 50.5Hz and ultimately to **Target Frequency**.

(f) If the **System Frequency** has become stable above 52 Hz, after all **Genset** and **DC Converter** action as specified in BC3.7.1 and BC3.7.2 has taken place, **NGET** will issue **Emergency Instructions** under **BC2** to trip appropriate **Gensets** (or in the case of **DC Converters** at **DC Converter Stations** to stop or reverse the transfer of **Active Power**) to bring the **System Frequency** to below 52Hz and follow this with appropriate **Bid-Offer Acceptances** or **Ancillary Service** instructions or further **Emergency Instructions** under **BC2** to return the **System Frequency** to below 50.5 Hz and ultimately to **Target Frequency**.

BC3.7.4 The **Generator** or **DC Converter Station** owner will not be in breach of any of the provisions of BC2 by following the provisions of BC3.7.1, BC3.7.2 or BC3.7.3.

BC3.7.5 Information update to **NGET**

In order that **NGET** can deal with the emergency conditions effectively, it needs as much up to date information as possible and accordingly **NGET** must be informed of the action taken in accordance with BC3.7.1(c) and BC3.7.2 as soon as possible and in any event within 7 minutes of the rise in **System Frequency**, directly by telephone from the **Control Point** for the **Power Station** or **DC Converter Station**.

BC3.7.6 (a) **Existing Gas Cooled Reactor Plant**

For the avoidance of doubt, **Generating Units** within **Existing Gas Cooled Reactor Plant** are required to comply with the applicable provisions of this BC3.7 (which, for the avoidance of doubt, other than for **Frequency Sensitive AGR Units**, do not include BC3.7.1).

(b) **Power Park Modules** in operation before 1 January 2006.

For the avoidance of doubt, **Power Park Modules** in operation (irrespective of their **Completion Dates**) before 1 January 2006 are required to comply with the applicable provisions of this BC3.7 (which, for the avoidance of doubt do not include BC3.7.1).

BC3.7.7 **Externally Interconnected System Operators**

**NGET** will use reasonable endeavours to ensure that, if **System Frequency** rises above 50.4Hz, and an **Externally Interconnected System Operator** (in its role as operator of the **External System**) is transferring power into the **GB Transmission System** from its **External System**, the amount of power transferred in to the **GB Transmission System** from the **System** of that **Externally Interconnected System Operator** is reduced at a rate equivalent to (or greater than) that which applies for **Synchronised Gensets** operating in **Limited Frequency Sensitive Mode** which are producing **Active Power**. This will be done either by utilising existing arrangements which are designed to achieve this, or by issuing **Emergency Instructions** under **BC2**.

< End of BC3 >

| | | |
|---|---|---|
| | | OC5.6.1 amended<br>OC5.6.3 amended |
| | 15 to 18 | OC5.8 added |
| | | |
| OC12 | 1 | OC12.2.1 (a) amended<br>OC12.3 (a) amended |
| | 2 | OC12.3 (d) amended<br>OC12.3.2 amended<br>OC12.3.3 amended<br>OC12.4.1.1 amended |
| | 5 | OC12.4.4.1 amended |
| | | |
| DRC | 5 and 6 | DRC.6.2 amended |
| | | |
| GC | 8 | GC.15.1 amended |

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| CODE | PAGE | CLAUSE |
|---|---|---|
| G&D | 18 | Definition of Generating Unit Data revised |
| | | |
| BC1 | 1 | BC1.2 amended |
| | 3 | BC1.4.2 (a) amended |
| | | |
| BC2 | 1 | BC2.2 amended |

Revision 17 Effective Date: 01 September 2006

| CODE | PAGE | CLAUSE |
|---|---|---|
| G&D | 23 | Definition of Large Power Station revised |
| | 25 | Definition of Medium Power Station revised |

| | | |
|---|---|---|
| | 34 | Definition of Registered Capacity revised |
| | 38 | Definition of Small Power Station revised |
| | 47 | Construction of References xii (a) inserted and amended, xii(b) added |
| | | |
| CC | 18 | CC.6.3.6 amended |
| | 19 and 20 | CC.6.3.7 amended |
| | 36 | CC.8.1 amended |
| | 26 | CC.A.3.1 amended |
| | | |
| BC1 | 3 | BC1.4.2 (a) amended |
| | | |
| BC2 | 7 | BC2.5.5.1 amended |
| | 7 | BC2.5.5.2 amended |
| | | |
| BC3 | 1 | BC3.3 amended |
| | 2 | BC3.4.1 amended |
| | 2 | BC3.5.1 amended |
| | 3 | BC3.5.3 amended |
| | 4 | BC3.5.4 amended |