

GRID CODE CONSULTATION DOCUMENT

Grid Code changes associated with Licence Exempt Embedded Medium Power Stations

The purpose of this document is to consult on the above Grid Code Modification Proposal with authorised electricity operators liable to be materially affected by the proposed changes

Consultation Ref	D/05
Issue	1
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Responses required by	7 October 2005
Prepared by	National Grid

DOCUMENT LOCATION

National Grid website:

http://www.nationalgridinfo.co.uk/grid_code/mn_consultation_papers.html

DISTRIBUTION

Name	Organisation
AEO's	Various
GCRP Members/Alternates	Various
Interested Parties	Various
National Grid Industry Information Website	

A. INTRODUCTION

1. National Grid Electricity Transmission plc ("National Grid"), in accordance with its obligations under paragraph 2 of Condition C14 of the Transmission Licence, believes that the time has come to review, in consultation with authorised electricity operators liable to be materially affected thereby, the Grid Code and its implementation in certain respects.
2. In May 2003 a joint Grid Code Review Panel and Distribution Code Review Panel working group was set up to consider how changes to the Licence regime could be reflected in the Grid Code. The main objective of this group was to ensure that existing Grid Code technical requirements were transparently applied to embedded Medium Power Stations such that Generators owning only embedded Medium Power Stations would not need to have any enduring requirement for an agreement with National Grid. Following discussions the working group proposed that the Grid Code should be amended such that current relevant Grid Code obligations are passed through to the host Distribution Network Operator (DNO). The same obligations would then be placed on the Generator via the Distribution Code. Further details regarding the work undertaken by this group are given in section C below.
3. The proposed changes to the Grid Code were presented by National Grid and discussed at the Extra ordinary Grid Code Review Panel meeting held on 20th July 2005. At this stage, proposed revised text for Grid Code was presented, and following some further discussion it was agreed that a Consultation Paper would be issued.
4. Following receipt of comments from those authorised electricity operators which it has consulted by this Paper, National Grid intends, in accordance with paragraph 2 of Condition 14 of the Transmission Licence, to send to the Authority :-
 - (a) a report on the outcome of its review, including this consultation process;
 - (b) the proposed revisions to the Grid Code which National Grid (having regard to the outcome of such review) reasonably thinks fit for the achievement of the objectives of the Grid Code referred to in subparagraph (b) of paragraph 1 of Condition 14 of the Transmission Licence; and
 - (c) any written representations or objections from authorised electricity operators (including any proposals by such operators for revisions to the Grid Code not accepted by National Grid in the course of the review) arising during the consultation process and subsequently maintained.
5. The report will also be made publicly available on National Grid's website.
6. The revisions to the Grid Code proposed by National Grid and sent to the Authority then require approval by that body and will, if approved, come into force on such date (or dates) of which you will be notified by National Grid, in accordance with the Authority's approval.

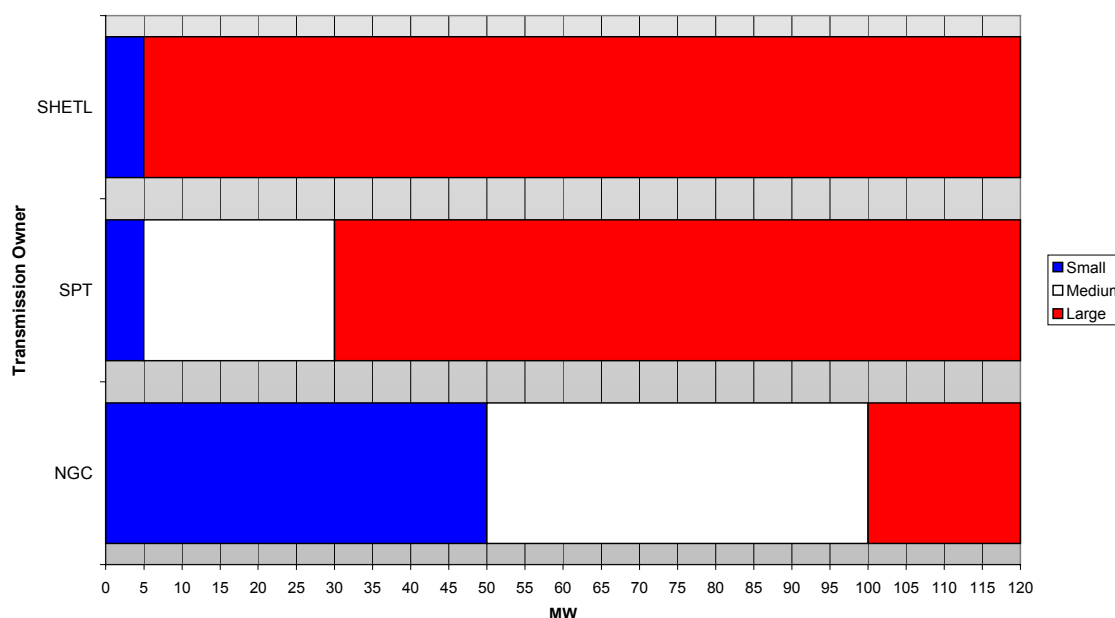
7. All responses received related to this consultation will be included on National Grid's Industry Information microsite except where it is indicated that the response is to be treated as confidential.

B. BACKGROUND INFORMATION - MEDIUM POWER STATIONS

8. The definition of Small, Medium or Large Power Stations varies according to the Transmission Owner within whose Transmission Network they are located:

	Small	Medium	Large
National Grid	<50MW	≥50MW & <100MW	≥100MW
SP Transmission Ltd	<5MW	≥5MW & <30MW	≥30MW
Scottish Hydro-Electric Transmission Ltd	<5MW	-	≥5MW

Regional Differences: Small, Medium and Large Power Stations



C. LEEMPS JOINT GCRP/DCRP WORKING GROUP

9. The LEEMPS Working Group was formed by the GCRP and the DCRP to consider how changes to the Licence regime could be reflected in the Grid Code. The main objective of this group was to ensure that existing Grid Code technical requirements were transparently applied to embedded Medium Power Stations such that Generators owning only embedded Medium Power Stations would not need to have any enduring requirement for an agreement with National Grid.
10. The LEEMPS Working Group considered a number of potential mechanisms that could be utilised to address the issues brought about by the change in licensing regime. These were:

	Option / mechanism	Description
1	CUSC to DNO to Generator	The CUSC places an obligation on the DNO to ensure that the Generator complies with relevant Grid Code obligations.
2	Grid Code to DNO to Generator	The Grid Code places an obligation on the DNO to ensure that the Generator complies with relevant Grid Code obligations.
3	NGC to Generator	A direct agreement, outside the CUSC framework, between NGC and the Generator, Licence Exempt Generation Agreement.
4	CUSC to Supplier to Generator	CUSC places an obligation on Suppliers to ensure the Supplier only contracts with Generators that are 'Grid Code compliant'.
5	Distribution Code to Generator	All generator requirements identified under the D Code Panel and implemented through the D Code.
6	Review Licence Exemption criteria	Change the Generator Licence such that 50 – 100 MW Power Stations are required to comply by licence with certain Grid Code obligations.
7	Grid Code to Supplier to Generator	As option 4, but the obligation on the Supplier is in the Grid Code rather than the CUSC.
8	Market Solution	There is no Grid Code requirement and NGC contracts with individual Generators for compliance.
9	Do nothing	NGC seek life time derogations / GC change to allow NGC not to apply the GC to licence exempt plant.
10	Commercial Buyout	Developers chose to pay for non-compliance or be paid for compliance.

11. The LEEMPS Working Group considered all of the above proposals and ultimately decided that option 2 in the above table was the most appropriate mechanism to take forward and develop further. A summary of the groups views on each Option is as follows (a more complete record of the groups views can be found in the LEEMPS Working Group Report:

http://www.nationalgridinfo.co.uk/grid_code/pdfs/LEEMPS%20report%20v0.7%20-%20Final.pdf):

	Option / mechanism	Groups Views
1	CUSC to DNO to Generator	<p>The group felt that this option was less feasible than others for the following reasons:</p> <ul style="list-style-type: none"> • May need change to DNO's connection agreement with the licence exempt generator going forward. DNOs do not have standard connection agreements and so the DNO representatives thought the D Code route was more transparent. • Technical requirements reside in Grid Code • Mixes Code and Licence governance • Potentially requires changes to both G Code & D Code • CUSC provides different route for dealing with breach and disputes for NGC • DNO concern regarding lack of resources and expertise available to deal with compliance process • NGC or its agent could do compliance testing; but would need a mechanism to allow this
2	Grid Code to DNO to Generator	<p>The favoured option of the group. Changes to the codes were focussed on the Grid Code and the Distribution Code (although it was noted by members of the group that further indemnity provisions may be required in the CUSC should a DNO be required to de-energise a LEEMPS for reasons of non-compliance). These Codes were also considered the most appropriate location for the proposed code obligations. I.e. that it would not be appropriate for technical obligations to reside in the CUSC as with option 1 for instance.</p>
3	National Grid to Generator	<p>This option whereby National Grid would contract directly with the Generator failed on the basis that it was not transparent and is unlikely to be acceptable to the majority of industry participants and the DTI. Being outside the normal Industry Framework it was considered to be less enforceable. As well as the general transparency issues it also fails on wider governance. However, it could work if the Generator signed up to the CUSC and hence was bound to the technical requirements, although this was seen as counter to the 'one stop shop' philosophy so was not taken forward.</p>
4	CUSC to Supplier to Generator	<p>The obligation being passed through the Supplier, through either the CUSC (option 4) or the Grid Code (option 7), failed on a number of criteria, but mainly that obligations should be placed on the party who has a direct interest.</p>

	Option / mechanism	Groups Views
5	Distribution Code to Generator	It was felt by the group that if the obligation sat in the D Code then it would suggest that the DNO would be responsible for testing, compliance. It was felt that this responsibility would be impracticable from both a technical and resource point of view for the DNO to discharge. It would also mean that there would be no locus for National Grid for an issue that is its responsibility under the Transmission Licence.
6	Review Licence Exemption criteria	A review of the Licence criteria requires changes to statutes and laws and is outside the governance of the Grid Code. It would also not directly remove the requirement for a derogation and so was rejected
7	Grid Code to Supplier to Generator	See option 4 above.
8	Market Solution	No Grid Code requirement. This option failed on practicality, but may provide a solution for certain requirements in the longer-term if and when markets have developed.
9	Do nothing	This option was felt to be unsustainable in the long-term and also failed on the issue of transparency. The current LEGA arrangements have always only ever been envisaged as a temporary arrangement. A LEGA is not transparent and there is no real governance associated with it. A change is required in order to allow the DTI to consider further automatic exemption of Medium Power Stations in the future. Also the existing derogations expire in April 2006 and this solution does not address that issue.
10	Commercial Buyout	This option was seen as quite a radical solution that was not reasonably practicable. The solution also ranged beyond the influence of the Grid Code and D Code

12. The Working Group ultimately decided to develop the second option further. The proposals that have been developed and recommended by the Working Group are now being taken forward by National Grid and described below. A full record of the discussions of the LEEMPS Working Group may be found on the LEEMPS Working Group section of the National Grid Industry Information Microsite

http://www.nationalgridinfo.co.uk/grid_code/mn_LEEMPS.html

D. DESCRIPTION OF THE PROPOSED AMENDMENTS AND THEIR EFFECTS

Background

13. Following the introduction of Licence exemption arrangements for Medium Power Stations, it has become apparent that the existing contractual framework does

not allow for Grid Code requirements to be enforced by National Grid without a direct relationship with the Generator. This is considered to be neither robust nor transparent.

14. The DTI, Ofgem and National Grid have recognised the need to consider and take forward more robust measures. In the interim period until these more robust measures have been identified and implemented arrangements have been agreed such that the Generator would enter into an agreement with National Grid to fulfill the main requirements of the Grid Code. In addition National Grid would seek derogations from enforcing the remaining requirements of the Grid Code. These interim arrangements are known as Licence Exempt Generator Agreements (LEGA's) and are now in place as a temporary measure.
15. In parallel the joint GCRP/DCRP working group referenced in paragraph 9 above has been considering proposals to pass current relevant Grid Code obligations through to the host Distribution Network Operator (DNO). These obligations would then be placed on the Generator via the Distribution Code. If implemented the proposed Grid Code changes would supercede any existing interim arrangements. It should be noted that the scope of the working group was to consider only the processes by which obligations could be passed through to the DNO and not the need for the obligations themselves.
16. It was also recognised that there may need to be consequential changes to other industry documents such as the CUSC. Where necessary these will be the subject of separate consultations in due course.

Proposed Changes

Planning Code

17. It is proposed that the obligation for the Generator to supply information to National Grid in respect of Embedded Medium Power Stations is placed on the host DNO, reflecting that National Grid has no direct agreement with the Generator. The DNO would be expected to pass information to National Grid or require the Generator to pass the information directly to National Grid on the DNO's behalf.
18. It is proposed to include new sections (PC.4.4.3, PC.4.4.4 and PC.4.5.3) which would describe the timeline for data exchange. It is further proposed to change PC.5.2, PC.5.4 and PC.5.5, which specify whether the data would be connected planning data, preliminary project data or committed project planning data. Proposed changes to PC.4.3.1 deal with confidentiality of data.

Connection Conditions

19. It is proposed that the Connection Conditions are amended such that DNO's are required to ensure that Embedded Medium Power Stations within the host network (other than those that have a direct relationship with National Grid) are compliant with the relevant Grid Code obligations. This relates to information exchange under CC.5 and technical requirements under CC.6. To this end it is proposed to include a new section CC.5.2.2 related to information requirements and a new section CC.3.4 summarising technical requirements. It is also proposed to clarify requirements of other sections under CC.6.

20. In addition it is proposed to amend CC.8.1 to clarify that Medium Power Stations will not be required to provide frequency response on a mandatory basis and directly connected Medium Power Stations will be obliged to provide reactive power only on a mandatory basis. However the requirement to have the capability to provide frequency response remains under CC.6.3 and the Generator or National Grid may seek to enter into commercial arrangements to provide frequency response.

Operating Codes

21. It is proposed to amend OC1 (Demand Forecasts) to clarify that National Grid interfaces with the DNO rather than the Generator. It is expected that the DNO would comply by passing through obligations and requiring the generator to submit data directly to National Grid.
22. It is proposed to amend OC2 (Operational Planning and Data provision) such that the DNO interfaces with National Grid in respect of Medium Power Stations embedded in the DNO's Distribution system.
23. It is proposed to amend OC5 (Testing and Monitoring) to clarify that performance would be validated at a level other than BM Unit level e.g. at CCGT or generating unit level. In addition a new section OC5.8 is proposed to clarify and describe the relationship between the DNO, National Grid and the Generator in order to facilitate any compliance assurance that may be required.
24. It is proposed to amend OC12 (System Tests) to clarify that the DNO would be responsible for liaison with the Generator.

Glossary and Definitions

25. To support the proposed changes outlined above it is proposed to amend the Glossary and Definitions to include three new definitions:
- Embedded Development Agreement
 - Embedded Person
 - Embedded Development.
26. In addition it is proposed to amend the definition of Completion Date to clarify the definition in respect of Embedded Medium Power Stations and Embedded DC Converter Stations.

Data Registration Code

27. It is proposed to amend the Data Registration Code (DRC) to clarify that it is the Network Operator within whose network an Embedded Exemptable Medium Power Station is situated is responsible for the provision of the required data.
28. The DRC is also amended to clarify that in the case of a Medium Power Station or Medium DC Converter Station data need only be provided in respect of Standard Planning Data under the Planning Code.
29. The proposed Grid Code changes are attached as Appendix 1.

E. OTHER ISSUES

Future Changes

30. The mechanism proposed by this consultation paper would if approved by the Authority have the effect that individuals who are not party to the Grid Code (i.e. owners of Licence Exempt Embedded Medium Power Stations) may be affected by future Grid Code Modifications. Such parties are represented on the Grid Code Review Panel through the person representing Generators with Small and Medium Power Stations and also the person representing Generators with Novel Units and such Grid Code changes would be reflected back through these representatives. Alongside this method of communication to relevant parties any changes to the Grid Code relating to the DNO obligations in respect of Licence Exempt Embedded Medium Power Stations would also have to be mirrored through a corresponding Distribution Code change and therefore any LEEMPS would also be made aware of Grid Code changes through corresponding Distribution Code changes. Therefore upon such change National Grid would undertake to consult closely with the Distribution Code Panel to ensure that changes are taken forward in a co-ordinated manner.

Derogations

31. There are a number of issues relating to derogations raised by the LEEMPS proposals contained within this consultation.
32. Currently there are a number of LEEMPS in Scotland that have never been subject to the existing LEGA based arrangements and as such have not necessarily been subject to the obligations put forward as part of the LEEMPS proposals. This may also be true for some of the LEEMPS in England and Wales that are subject to the earlier forms of LEGAs. These early LEGAs may not contain all of the obligations that are to be found in the most recent form of the LEGA and it is this most recent form of LEGA on which the LEEMPS proposals have been developed. In both cases this may mean that a number of LEEMPS may not be able to comply with the LEEMPS proposals should they be approved, and so derogations may be required in these specific cases.
33. In order to mitigate this impact it is proposed firstly that both NGC and the relevant DNO would liaise closely to ensure that any required derogations are brought into effect simultaneously with any implementation of the LEEMPS proposals. In tandem with this approach, it is also proposed to extend the remit of the existing GC15 clause in the Grid Code. Currently this is restricted to Embedded Exemptable Large Power Stations and Embedded Exemptable Medium Power Stations in Scotland and allows NGC to disapply certain provisions of the Grid Code from applying to a specific Power Station. GC15 is currently time-limited to expire on 31st March 2006, although it is the subject of Grid Code Consultation G/05 that proposes to extend its applicability until 31st March 2007.
34. By simultaneously extending the remit of GC15 to cover Medium Power Stations across GB upon any introduction of the LEEMPS provisions, this would allow a finite time period in which any shortfall against Grid Code requirements by a LEEMPS anywhere in Great Britain could be identified (where this had not previously occurred) and then either the shortfall rectified or appropriate derogations sought. Therefore though National Grid and the DNOs would use their best endeavours to identify those LEEMPS where derogations are required prior to any future implementation of these LEEMPS proposals, the additional ability to use GC15 to disapply certain Grid Code provisions would ease any transition.

35. Notwithstanding the above issue, the LEEMPS proposals separately interact with GC15. It has been noted that there may be existing LEEMPS that have had parts of the Grid Code that now form part of the LEEMPS proposals disapplied through GC15. Should the LEEMPS Proposals be implemented it will be important to ensure that any part of them that has been disapplied through GC15 for a particular LEEMPS continue to be, even though the obligations have been passed through to the Distribution Code. In respect of this point National Grid proposes to amend GC15 to permit National Grid and Distribution Network Operators to dis-apply certain sections of the Grid Code in force between them in respect of a specific LEEMPS. It is understood by National Grid that the corresponding disapplication of the relevant terms in the Distribution Code is easier as the basis upon which a LEEMPS must comply with the Distribution Code is a contractual one. Therefore the elements that are not to apply can be specified as part of the contract that brings the Distribution Code into application for a LEEMPS.

F. COMMENTS

36. National Grid would be grateful to receive your comments on, or any suggestions you may have in relation to, these proposed amendments to the Grid Code. Comments would be welcomed and should be sent to National Grid by **7 October 2005**. The comments will be reviewed and responded to and National Grid will then prepare its report to the Authority.

37. Unless otherwise marked as confidential any responses containing objections to the proposals which are maintained will be published on our website in the copy of the Report to the Authority referred to in paragraphs 3 and 4.

36. Your formal responses may be:-

Posted to: **David Payne**
Commercial, Commercial Frameworks
National Grid Electricity Transmission plc
NGT House
Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA

Emailed to: david.payne@ngtuk.com

38. In parallel with this Grid Code Consultation a Distribution Code consultation on the subject of LEEMPS is also being taken forward. Interested parties may find a copy of the Distribution Code Consultation at the following website:

www.dcode.org.uk

Consultation D/05 – Appendix 1

LEEMPS DRAFTING CHANGES SHOWN IN TRACK CHANGES FROM ISSUE 3 REVISION 11 TEXT

*Note: If the Authority approves the Grid Code changes proposed in Consultation paper F/05 prior to a decision to implement the following change proposals, all references to **NGC** below will change to **NGET**.*

GLOSSARY AND DEFINITIONS REVISIONS

Embedded Development Agreement An agreement entered into between a Network Operator and an Embedded Person, identifying the relevant site of connection to the Network Operator's System and setting out other site specific details in relation to that use of the Network Operator's System.

Embedded Person The party responsible for a Medium Power Station or DC Converter Station connected to or proposed to be connected to a Network Operator's System not subject to a Bilateral Agreement.

Embedded Development Has the meaning set out in PC.4.4.3(a)

Completion Date Has the meaning set out in the **Bilateral Agreement** with each **User** to that term or in the absence of that term to such other term reflecting the date when a **User** is expected to connect to or start using the **GB Transmission System**. In the case of an Embedded Medium Power Station or Embedded DC Converter Station having a similar meaning in relation to the Network Operator's System as set out in the Embedded Development Agreement.

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PLANNING CODE REVISIONS

PC.3.2 In the case of **Embedded Power Stations** and **Embedded DC Converters**, unless provided otherwise, the following provisions apply with regard to the provision of data under this **PC**:

- (a) each **Generator** shall provide the data direct to **NGC** in respect of (i) **Embedded Large Power Stations**, (ii) **Embedded Medium Power Stations** subject to a **Bilateral Agreement** and (iii) **Embedded Small Power Stations** which form part of a **Cascade Hydro Scheme**;

- (b) each **DC Converter** owner shall provide the data directly to **NGC** in respect of **Embedded DC Converter Stations**;
- (c) each **Network Operator** shall provide the data to **NGC** in respect of each **Embedded Person** within its **System**;
- (de) although data is not normally required specifically on **Embedded Small Power Stations** or on **Embedded** installations of direct current converters which do not form a **DC Converter Station** under this **PC**, each **Network Operator** in whose **System** they are **Embedded** should provide the data (contained in the Appendix) to **NATIONAL GRID** in respect of **Embedded Small Power Stations** or **Embedded** installations of direct current converters which do not form a **DC Converter Station** if:
 - (i) it falls to be supplied pursuant to the application for a **CUSC Contract** or in the **Statement of Readiness** to be supplied in connection with a **Bilateral Agreement** and/or **Construction Agreement**, by the **Network Operator**; or
 - (ii) it is specifically requested by **NGC** in the circumstances provided for under this **PC**.

PC3.3 Certain data does not normally need to be provided in respect of certain **Embedded Power Stations** or **Embedded DC Converter Stations**, as provided in PC.A.1.12.

In summary, **Network Operators** are required to supply the following data in respect of **Embedded Medium Power Stations** or **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** connected, or is proposed to be connected, within such **Network Operator's System**:

- PC.A.2.5.6
- PC.A.3.1.5
- PC.A.3.2.2
- PC.A.3.3.1
- PC.A.3.4.1
- PC.A.3.4.2
- PC.A.5.2.2
- PC.A.5.3.2
- PC.A.5.4.
- PC.A.5.5.1
- PC.A.5.6.

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PC.4.1 Pursuant to Condition C11 of **NGC's Transmission Licence**, the means by which **Users** and proposed **Users** of the **GB Transmission System** are able to assess opportunities for

connecting to, and using, the **GB Transmission System** comprise two distinct parts, namely:

- (a) a statement, prepared by **NGC** under its **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 (the "**Seven Year Statement**"); and
- (b) an offer, in accordance with its **Transmission Licence**, by **NGC** to enter into a **CUSC Contract** for connection to (or, in the case of **Embedded Large Power Stations**, **Embedded Medium Power Stations**, ~~and~~ **Embedded DC Converter Stations** and Embedded Small Power Stations, use of) the **GB Transmission System**. A **Bilateral Agreement** is to be entered into for every **Connection Site** (and for certain **Embedded Power Stations** and for **Embedded DC Converter Stations**, as explained above) within the first two of the following categories and the existing **Bilateral Agreement** may be required to be varied in the case of the third category:
 - (i) existing **Connection Sites** (and for certain **Embedded Power Stations**, as detailed above) as at the **Transfer Date**;
 - (ii) new **Connection Sites** (and for certain **Embedded Power Stations** and for **Embedded DC Converter Stations**, as detailed above) with effect from the **Transfer Date**;
 - (iii) a **Modification** at a **Connection Site** (or in relation to the connection of certain **Embedded Power Stations** and for **Embedded DC Converter Stations**, ~~as detailed above whether or not the subject of a **Bilateral Agreement**~~) (whether such **Connection Site** or connection exists on the **Transfer Date** or are-is new thereafter) with effect from the **Transfer Date**.

In this **PC**, unless the context otherwise requires, "connection" means any of these 3 categories.

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PC.4.3.1

Seven Year Statement

To enable the **Seven Year Statement** to be prepared, each **User** is required to submit to **NGC** (subject to the provisions relating to **Embedded Power Stations** and **Embedded DC Converter Stations** in PC.3.2) both the **Standard Planning Data** and the **Detailed Planning Data** as listed in parts 1 and 2 of the Appendix.

This data should be submitted in calendar week 24 of each year (although **Network Operators** may delay the submission of data (other than that to be submitted pursuant to PC.3.2(c) and PC.3.2(d)) until calendar week 28) and should cover each of the seven succeeding **Financial Years** (and in certain instances, the current year). Where, from the date of one submission to another, there is no change in the data (or in some of the data) to be submitted, instead of re-submitting the data, a **User** may submit a written statement that there has been no change from the data (or in some of the data) submitted the previous time. In addition, **NGC** will also use the **Transmission Entry Capacity** and **Connection Entry Capacity** data from the **CUSC Contract**, and any data submitted by Network Operators in relation to an Embedded Medium Power Stations or Embedded DC Converter Stations not subject to a Bilateral Agreement, in the preparation of the **Seven Year Statement** and to that extent the data will not be treated as confidential.

PC.4.4 Offer of Terms for connection

PC.4.4.1 **CUSC Contract – Data Requirements/Offer Timing**

The completed application form for a **CUSC Contract** to be submitted by a **User** when making an application for a **CUSC Contract** will include:

- (a) a description of the **Plant** and/or **Apparatus** to be connected to the **GB Transmission System** or of the **Modification** relating to the **User's Plant** and/or **Apparatus** already connected to the **GB Transmission System** or, as the case may be, of the proposed new connection or **Modification** to the connection within the **User System** of the **User**, each of which shall be termed a "**User Development**" in the **PC**;
- (b) the relevant **Standard Planning Data** as listed in Part 1 of the Appendix; and
- (c) the desired **Completion Date** of the proposed **User Development**.
- (d) the desired **Connection Entry Capacity** and **Transmission Entry Capacity**.

The completed application form for a **CUSC Contract** will be sent to **NGC** as more particularly provided in the application form.

PC.4.4.2 Any offer of a **CUSC Contract** will provide that it must be accepted by the applicant **User** within the period stated in the offer, after which the offer automatically lapses. Acceptance of the offer renders the **GB Transmission System** works relating to that **User Development**, reflected in the offer, committed and binds both parties to the terms of the offer. Within 28 days (or such longer period as **NGC** may agree in any particular case) of acceptance of the offer the **User** shall supply the **Detailed Planning Data**

pertaining to the **User Development** as listed in Part 2 of the Appendix.

PC.4.4.3 **Embedded Development Agreement – Data Requirements**

The **Network Operator** shall submit the following data in relation to an **Embedded Medium Power Station** or **Embedded DC Converter Station** not subject to, or proposed to be subject to, a **Bilateral Agreement** as soon as reasonably practicable after receipt of an application from an **Embedded Person** to connect to its **System**:

- (a) details of the proposed new connection or variation (having a similar effect on the **Network Operator’s System** as a **Modification** would have on the **GB Transmission System**) to the connection within the **Network Operator’s System**, each of which shall be termed an “**Embedded Development**” in the **PC** (where a **User Development** has an impact on the **Network Operator’s System** details shall be supplied in accordance with PC.4.4 and PC.4.5);
- (b) the relevant **Standard Planning Data** as listed in Part 1 of the Appendix;
- (c) the proposed completion date (having a similar meaning in relation to the **Network Operator’s System** as **Completion Date** would have in relation to the **GB Transmission System**) of the **Embedded Development**; and
- (d) upon the request of **NGC**, the relevant **Detailed Planning Data** as listed in Part 2 of the Appendix.

PC.4.4.4 Within 28 days (or such longer period as **NGC** may agree in any particular case) of entry into the **Embedded Development Agreement** the **Network Operator** shall supply the **Detailed Planning Data** pertaining to the **Embedded Development** as listed in Part 2 of the Appendix.

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PC.4.5.3 To enable **NGC** to carry out any necessary detailed system studies, the relevant **Network Operator** may, at the request of **NGC**, be required to provide some or all of the **Detailed Planning Data** listed in Part 2 of the Appendix in advance of the normal timescale referred in PC.4.4.4 provided that **NGC** can reasonably demonstrate that it is relevant and necessary.

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PC.5.2 At the time the **User** applies for a **CUSC Contract** but before an offer is made and accepted by the applicant **User**, the data relating to the proposed **User Development** will be considered as **Preliminary Project Planning Data**. Data relating to an

Embedded Development provided by a Network Operator in accordance with PC.4.4.3, and PC.4.4.4 if requested, will be considered as Preliminary Project Planning Data. All such data
~~This data~~ will be treated as confidential within the scope of the provisions relating to confidentiality in the **CUSC**.

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PC.5.4 Once the offer for a **CUSC Contract** is accepted, the data relating to the **User Development** already submitted as **Preliminary Project Planning Data**, and subsequent data required by **NGC** under this **PC**, will become **Committed Project Planning Data**. Once an Embedded Person has entered into an Embedded Development Agreement, as notified to NGC by the Network Operator, the data relating to the Embedded Development already submitted as Preliminary Project Planning Data, and subsequent data required by NGC under the PC, will become Committed Project Planning Data. Such ~~This~~ data, together with **Connection Entry Capacity** and **Transmission Entry Capacity** data from the **CUSC Contract** and other data held by **NGC** relating to the **GB Transmission System** will form the background against which new applications by any **User** will be considered and against which planning of the **GB Transmission System** will be undertaken. Accordingly, **Committed Project Planning Data**, **Connection Entry Capacity** and **Transmission Entry Capacity** data will not be treated as confidential to the extent that **NGC**:

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PC.5.5 The **PC** requires that, at the time that a **Statement of Readiness** is submitted under the **Bilateral Agreement** and/or **Construction Agreement**, any estimated values assumed for planning purposes are confirmed or, where practical, replaced by validated actual values and by updated estimates for the future and by updated forecasts for forecast data items such as **Demand**. In the case of an Embedded Development the relevant Network Operator will update any estimated values assumed for planning purposes with validated actual values as soon as soon as reasonably practicable after energisation. This data is then termed **Connected Planning Data**.

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- PC.A.1.2 (a) Planning data submissions by **Users** shall be:
- (i) with respect to each of the seven succeeding **Financial Years** (other than in the case of **Registered Data** which will reflect the current position and data relating to **Demand** forecasts which relates also to the current year);

(ii) provided by **Users** in connection with a **CUSC Contract** (PC.4.1, PC.4.4 and PC.4.5 refer); **and**

(iii) provided by **Users** on a routine annual basis in calendar week 24 of each year to maintain an up-to-date data bank (although **Network Operators** may delay the submission until calendar week 28). Where from the date of one annual submission to another there is no change in the data (or in some of the data) to be submitted, instead of re-submitting the data, a **User** may submit a written statement that there has been no change from the data (or some of the data) submitted the previous time; **and**:-

(iv) provided by **Network Operators** in connection with **Embedded Developments** (PC.4.4 refers).

- (b) Where there is any change (or anticipated change) in **Committed Project Planning Data** or a significant change in **Connected Planning Data** in the category of **Forecast Data** or any change (or anticipated change) in **Connected Planning Data** in the categories of **Registered Data** or **Estimated Registered Data** supplied to **NGC** under the **PC**, notwithstanding that the change may subsequently be notified to **NGC** under the **PC** as part of the routine annual update of data (or that the change may be a **Modification** under the **CUSC**), the **User** shall, subject to PC.A.3.2.3 and PC.A.3.2.4, notify **NGC** in writing without delay.
- (c) The notification of the change will be in the form required under this **PC** in relation to the supply of that data and will also contain the following information:
- (i) the time and date at which the change became, or is expected to become, effective;
 - (ii) if the change is only temporary, an estimate of the time and date at which the data will revert to the previous registered form.
- (d) The routine annual update of data, referred to in (a)(iii) above, need not be submitted in respect of **Small Power Stations** or **Embedded** installations of direct current converters which do not form a **DC Converter Station** (except as provided in PC.3.2(ed)), or unless specifically requested by **NGC**, or unless otherwise specifically provided.

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PC.A.1.4 The data requirements listed in this Appendix are subdivided into the following three parts:

- (a) **Standard Planning Data**

This data (as listed in Part 1 of the Appendix) is first to be provided by a **User** at the time of an application for a **CUSC Contract** or in accordance with PC.4.4.3. It comprises data which is expected normally to be sufficient for **NGC** to investigate the impact on the **GB Transmission System** of any **User Development** or Embedded Development. **Users** should note that the term **Standard Planning Data** also includes the information referred to in PC.4.4.1.(a) and PC.4.4.3.(a).

(b) **Detailed Planning Data**

This data (as listed in Part 2 of the Appendix) is usually first to be provided by the **User** within 28 days (or such longer period as **NGC** may agree in any particular case) of the offer for a **CUSC Contract**, being accepted by the **User**. In the case of an Embedded Development this data (as listed in Part 2 of the Appendix) is usually first to be provided by the relevant Network Operator within 28 days (or such longer period as NGC may agree in any particular case) of entry into the Embedded Development Agreement. It comprises additional, more detailed, data not normally expected to be required by **NGC** to investigate the impact on the **GB Transmission System** of any **User Development** associated with an application by the **User** for a **CUSC Contract** or Embedded Development Agreement. **Users, and Network Operators** in respect of **Embedded Developments,** should note that, although not needed within 28 days of the offer or entry into the Embedded Development Agreement, as the case may be, the term **Detailed Planning Data** also includes **Operation Diagrams** and **Site Common Drawings** produced in accordance with the **CC**.

The **User** may, however, be required by **NGC** to provide the **Detailed Planning Data** in advance of the normal timescale before **NGC** can make an offer for a **CUSC Contract**, as explained in PC.4.5.

(c) **Network Data**

The data requirements for **NGC** in this Appendix are in Part 3.

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PC.A.1.8 The data supplied under PC.A.3.3.1, although in the nature of **Registered Data**, is only supplied either upon application for a **CUSC Contract**, or in accordance with PC.4.4.3, and therefore does not fall to be **Registered Data**, but is **Estimated Registered Data**.

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PC.A.2.1.1 Each **User**, whether connected directly via an existing **Connection Point** to the **GB Transmission System**, or seeking such a direct connection, shall provide **NGC** with data on its **User System** which relates to the **Connection Site** and/or which may have a system effect on the performance of the **GB Transmission System**. Such data, current and forecast, is specified in PC.A.2.2 to PC.A.2.5. In addition each **Generator** in respect of its with Embedded Large Power Stations ~~or~~ and its Embedded Medium Power Stations subject to a Bilateral Agreement and each Network Operator in respect of Embedded Medium Power Stations within its System not subject to a Bilateral Agreement, connected to the **Subtransmission System**, shall provide **NGC** with fault infeed data as specified in PC.A.2.5.5, and each **DC Converter** owner with **Embedded DC Converter Stations** subject to a Bilateral Agreement, or Network Operator in the case of Embedded DC Converter Stations without a Bilateral Agreement, connected to the **Subtransmission System** shall provide **NGC** with fault infeed data specified in PC.A.2.5.6.

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PC.A.2.1.3 Although not itemised here, each **User** with an existing or proposed **Embedded Small Power Station** or **Embedded DC Converter Station** with a **Registered Capacity** of less than 100MW or an **Embedded** installation of direct current converters which does not form a **DC Converter Station** or **Embedded Medium Power Station** in its **User System** may, at **NGC's** reasonable discretion, be required to provide additional details relating to the **User's System** between the **Connection Site** and the existing or proposed **Embedded Small Power Station** ~~or~~, **Embedded Medium Power Station** or **Embedded DC Converter Station** or **Embedded** installation of direct current converters which does not form a **DC Converter Station**.

.....

PC.A.2.5.2 **Network Operators** and **Non-Embedded Customers** are required to submit data in accordance with PC.A.2.5.4. **Generators** ~~and~~, **DC Converter Station owners** and Network Operators, in respect of Embedded Medium Power Stations and Embedded DC Converter Stations within their Systems not subject to a Bilateral Agreement, are required to submit data in accordance with PC.A.2.5.5.

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PC.A.2.5.5 Data from **Generators** ~~and~~, **DC Converter Station owners** and from Network Operators in respect of Embedded Medium Power Stations within their Systems not subject to a Bilateral Agreement

PC.A.2.5.5.1 For each **Generating Unit** with one or more associated **Unit Transformers**, the **Generator**, or the **Network Operator** in respect of **Embedded Medium Power Stations** and **DC Converter Stations** within its System not subject to a **Bilateral Agreement**, is required to provide values for the contribution of the **Power Station Auxiliaries** (including **Auxiliary Gas Turbines** or **Auxiliary Diesel Engines**) to the fault current flowing through the **Unit Transformer(s)**.

The data items listed under the following parts of PC.A.2.5.6(a) should be provided:-

- (i), (ii) and (v);
- (iii) if the associated **Generating Unit** step-up transformer can supply zero phase sequence current from the **Generating Unit** side to the **GB Transmission System**;
- (iv) if the value is not 1.0 p.u;

and the data items shall be provided in accordance with the detailed provisions of PC.A.2.5.6(c) - (f), and with the following parts of this PC.A.2.5.5.

PC.A.3.1.2 (a) Each **Generator** and **DC Converter Station** owner ~~with an~~ in respect of its existing, or proposed, **Embedded Large Power Stations** or **Embedded DC Converter Station** and ~~or an **Embedded Medium Power Station** its **Embedded Medium Power Stations** subject to a **Bilateral Agreement** and each **Network Operator** in respect of **Embedded Medium Power Stations** or **Embedded DC Converter Station** within its System not subject to a **Bilateral Agreement**, in each case connected to the **Subtransmission** connected to the **Sub Transmission** ~~System~~, shall provide **NGC** with data relating to that **Power Station** or **DC Converter Station**, both current and forecast, as specified in PC.A.3.2 to PC.A.3.4.~~

PC.A.3.1.4 (a) PC.A.4.2.4(b) and PC.A.4.3.2(a) explain that the forecast **Demand** submitted by each **Network Operator** must be net of the output of all **Small Power Stations** and **Medium Power Stations** and **Customer Generating Plant** and all installations of direct current converters which do not form a **DC Converter Station**, Embedded within that **Network Operator's System**. The **Network**

Operator must inform **NGC** of the number of such **Embedded Power Stations** and such **Embedded** installations of direct current converters (including the number of **Generating Units** or **Power Park Modules** or **DC Converters**) together with their summated capacity.

- (b) On receipt of this data, the **Network Operator** or **Generator** ~~(if the data relates to **Power Stations** referred to in PC.A.3.1.2)~~ may be further required, at **NGC's** reasonable discretion, to provide details of **Embedded Small Power Stations** and **Embedded Medium Power Stations** and **Customer Generating Plant** and **Embedded** installations of direct current converters which do not form a **DC Converter Station**, both current and forecast, as specified in PC.A.3.2 to PC.A.3.4. Such requirement would arise where **NGC** reasonably considers that the collective effect of a number of such **Embedded Power Stations** and **Customer Generating Plants** and **Embedded** installations of direct current converters may have a significant system effect on the **GB Transmission System**.

CCGT Units and DC Converters

PC.A.3.1.5 Where **Generating Units**, which term includes **CCGT Units** and **Power Park Modules**, and **DC Converters** are connected to the **GB Transmission System** via a busbar arrangement which is or is expected to be operated in separate sections, the section of busbar to which each **Generating Unit**, **DC Converter** or **Power Park Module** is connected is to be identified in the submission.

PC.A.3.3.1 The following information is required to facilitate an early assessment, by **NGC**, of the need for more detailed studies;

- (a) for all **Generating Units (excluding Power Park Units) and Power Park Modules**:

Rated MVA
Rated MW;

- (b) for each **Synchronous Generating Unit**:

Short circuit ratio
Inertia constant (for whole machine), MWsecs/MVA;

- (c) for each **Synchronous Generating Unit** step-up transformer:

Rated MVA

Positive sequence reactance (at max, min and nominal tap).

- (d) for each **DC Converter** at a **DC Converter Station** or **DC Converter** connecting a **Power Park Module**

DC Converter type (e.g. current/voltage sourced)
Rated MW per pole for import and export
Number of poles and pole arrangement
Rated DC voltage/pole (kV)
Return path arrangement
Remote AC connection arrangement

- (e) for each type of **Power Park Unit** in a **Power Park Module** not connected to the **Total System** by a **DC Converter**:

Rated MVA
Rated MW
Rated terminal voltage
Inertia constant, (MWsec/MVA)
Additionally, for **Power Park Units** that are squirrel-cage or doubly-fed induction generators driven by wind turbines:
Stator reactance.
Magnetising reactance.
Rotor resistance (at rated running)
Rotor reactance (at rated running)
The generator rotor speed range (minimum and maximum speeds in RPM) (for doubly-fed induction generators only)
Converter MVA rating (for doubly-fed induction generators only)

For a **Power Park Unit** consisting of a synchronous machine in combination with a back-to-back **DC Converter**, or for a **Power Park Unit** not driven by a wind turbine, the data to be supplied shall be agreed with **NGC** in accordance with PC.A.7.

This information should only be given in the data supplied ~~with the application for a CUSC Contract (if appropriate for any variation), as the case may be~~ in accordance with PC.4.4 and PC.4.5.

PC.A.5.1.2

Each **Generator**, ~~with-in respect of its~~ existing, or proposed, **Embedded Large Power Stations** and ~~its~~ **Embedded Medium Power Stations** subject to a Bilateral Agreement and each Network Operator in respect of Embedded Medium Power Stations within its System not subject to a Bilateral Agreement shall provide **NGC** with data relating to each of those **Large Power Stations** and ~~for~~ **Medium Power Stations**, both current and forecast, as specified in PC.A.5.2, PC.A.5.3 and PC.A.5.4 as

applicable. Each **DC Converter Station** owner or **Network Operator in the case of an Embedded DC Converter Station within its system not subject to a Bilateral Agreement**, with existing or proposed **DC Converter Stations** shall provide **NGC** with data relating to each of those **DC Converter Stations**, both current and forecast, as specified in PC.A.5.2 and PC.A.5.4. However, no data need be supplied in relation to those **Embedded Medium Power Stations** or **Embedded DC Converter Stations** if they are connected at a voltage level below the voltage level of the **Subtransmission System** except in connection with an application for, or under a, **CUSC Contract** or unless specifically requested by **NGC** under PC.A.5.1.4.

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PC.A.5.1.4

PC.A.4.2.4(b) and PC.A.4.3.2(a) explained that the forecast **Demand** submitted by each **Network Operator** must be net of the output of all **Medium Power Stations** and **Small Power Stations** and **Customer Generating Plant Embedded** within that User's System. In such cases (PC.A.3.1.4 also refers), the **Network Operator** must inform **NGC** of the number of such **Power Stations** (including the number of **Generating Units**) together with their summated capacity. On receipt of this data, ~~the Network Operator or Generator (if the data relates to Power Stations referred to in PC.A.5.1.2) may be~~ further details may be required at **NGC's** discretion as follows:

- (i) ~~in the case of to provide~~ details required from the **Network Operator** for **Embedded Small Power Stations** and **Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** and **Embedded Small Power Stations** and **Embedded DC Converters**, in each case, within its **System**, and **Customer Generating Plant**; and
- (ii) ~~in the case of~~ details required from the **Generator of Embedded Large Power Stations** and **Embedded Medium Power Stations** subject to a **Bilateral Agreement**, and
- (iii) ~~in the case of~~ details required from the **DC Converter Station** owner of an **Embedded DC Converter** or **DC Converter Station** subject to a **Bilateral Agreement**.

both current and forecast, as specified in PC.A.5.2 and PC.A.5.3. Such requirement would arise when **NGC** reasonably considers that the collective effect of a number of such **Embedded Small Power Stations** ~~and~~ **Embedded Medium Power Stations**, **Embedded DC Converter Stations**, **DC Converter** and **Customer Generating Plants** may have a significant system effect on the **GB Transmission System**.

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PC.A.5.2.2

Where the **Power Station** or **DC Converter Station** has associated **Demand** additional to the unit-supplied **Demand** of PC.A.5.2.1 which is supplied from either the **GB Transmission System** or the **Generator's User System** the **Generator** ~~or~~, **DC Converter Station** owner or the **Network Operator** (in the case of **Embedded Medium Power Stations** within its **System** not subject to a **Bilateral Agreement**), as the case may be, shall supply forecasts for each **Power Station** or **DC Converter Station** of:

- a) the maximum **Demand** that, in the **User's** opinion, could reasonably be imposed on the **GB Transmission System** or the **Generator's User System** as appropriate;
- b) the **Demand** at the time of the peak **GB Transmission System Demand**;
- c) the **Demand** at the time of minimum **GB Transmission System Demand**.

PC.A.5.2.3

No later than calendar week 17 each year **NGC** shall notify each **Generator** with in respect of its **Large Power Stations** and ~~or its~~ **Medium Power Stations** and **DC Converter** owner in respect of its **DC Converter Stations** subject to a **Bilateral Agreement**, and each **Network Operator** in respect of each **Embedded Medium Power Station** and **Embedded DC Converter Stations** within its **System** not subject to a **Bilateral Agreement**, in writing of the following, for the current **Financial Year** and for each of the following seven **Financial Years**, which will be regarded as the relevant specified days and times under PC.A.5.2.2:

- a) the date and time of the annual peak of the **GB Transmission System Demand** at **Annual ACS Conditions**;
- b) the date and time of the annual minimum of the **GB Transmission System Demand** at **Average Conditions**.

PC.A.5.3.2

The following **Synchronous Generating Unit** and **Power Station** data should be supplied:

(a) **Synchronous Generating Unit Parameters**

- Rated terminal volts (kV)
- * Rated MVA
- * **Rated MW**
- * Minimum Generation MW

- * Short circuit ratio
- Direct axis synchronous reactance
- * Direct axis transient reactance
- Direct axis sub-transient reactance
- Direct axis short-circuit transient time constant.
- Direct axis short-circuit sub-transient time constant.
- Quadrature axis synchronous reactance
- Quadrature axis sub-transient reactance
- Quadrature axis short-circuit sub-transient time constant.
- Stator time constant
- Stator leakage reactance
- Armature winding direct-current resistance.

Note: The above data item relating to armature winding direct-current resistance need only be supplied ~~by Generators~~ with respect to **Generating Units** commissioned after 1st March 1996 and in cases where, for whatever reason, the **Generator or the Network Operator, as the case may be,** is aware of the value of the relevant parameter.

- * Turbogenerator inertia constant (MWsec/MVA)
- Rated field current (amps) at **Rated MW** and Mvar output and at rated terminal voltage.

Field current (amps) open circuit saturation curve for **Generating Unit** terminal voltages ranging from 50% to 120% of rated value in 10% steps as derived from appropriate manufacturers test certificates.

(b) Parameters for **Generating Unit** Step-up Transformers

- * Rated MVA
- Voltage ratio
- * Positive sequence reactance
(at max, min, & nominal tap)
- Positive sequence resistance
(at max, min, & nominal tap)
- Zero phase sequence reactance
- Tap changer range
- Tap changer step size
- Tap changer type: on load or off circuit

(c) Excitation Control System parameters

Note: The data items requested under Option 1 below may continue to be provided ~~by Generators~~ in relation to **Generating Units** on the **System** at 09 January 1995 (in this paragraph, the "relevant date") or ~~they may provide~~ the new data items set out under Option 2 may be provided. **Generators or Network Operators, as the case may be,** must supply the data as set out under Option 2 (and not those under Option 1) for **Generating Unit** excitation control

systems commissioned after the relevant date, those **Generating Unit** excitation control systems recommissioned for any reason such as refurbishment after the relevant date and **Generating Unit** excitation control systems where, as a result of testing or other process, the **Generator or the Network Operator, as the case may be.** is aware of the data items listed under Option 2 in relation to that **Generating Unit**.

Option 1

DC gain of **Excitation Loop**
Rated field voltage
Maximum field voltage
Minimum field voltage
Maximum rate of change of field voltage (rising)
Maximum rate of change of field voltage (falling)
Details of **Excitation Loop** described in block diagram form showing transfer functions of individual elements.
Dynamic characteristics of **Over-excitation Limiter**.
Dynamic characteristics of **Under-excitation Limiter**

Option 2

Excitation System Nominal Response
Rated Field Voltage
No-Load Field Voltage
Excitation System On-Load Positive Ceiling Voltage
Excitation System No-Load Positive Ceiling Voltage
Excitation System No-Load Negative Ceiling Voltage

Details of **Excitation System** (including **PSS** if fitted) described in block diagram form showing transfer functions of individual elements.

Details of **Over-excitation Limiter** described in block diagram form showing transfer functions of individual elements.

Details of **Under-excitation Limiter** described in block diagram form showing transfer functions of individual elements.

PC.A.5.4 **Non-Synchronous Generating Unit and Associated Control System Data**

PC.A.5.4.1 The data submitted below are not intended to constrain any **Ancillary Services Agreement**

The following **Power Park Unit**, **Power Park Module** and **Power Station** data should be supplied in the case of a **Power Park Module** not connected to the **Total System** by a **DC Converter**:

(a) **Power Park Unit** model

A mathematical model of each type of **Power Park Unit** capable of representing its transient and dynamic behaviour under both small and large disturbance conditions. The model shall include non-linear effects and represent all equipment relevant to the dynamic performance of the **Power Park Unit** as agreed with **NGC**. The model shall be suitable for the study of balanced, root mean square, positive phase sequence time-domain behaviour, excluding the effects of electromagnetic transients, harmonic and sub-harmonic frequencies.

The model shall accurately represent the overall performance of the **Power Park Unit** over its entire operating range including that which is inherent to the **Power Park Unit** and that which is achieved by use of supplementary control systems providing either continuous or stepwise control. Model resolution should be sufficient to accurately represent **Power Park Unit** behaviour both in response to operation of transmission system protection and in the context of longer-term simulations.

The overall structure of the model shall include:

- (i) any supplementary control signal modules not covered by (c), (d) and (e) below.
- (ii) any blocking, deblocking and protective trip features that are part of the **Power Park Unit** (e.g. "crowbar").
- (iii) any other information required to model the **Power Park Unit** behaviour to meet the model functional requirement described above.

The model shall be submitted in the form of a transfer function block diagram and may be accompanied by dynamic and algebraic equations.

This model shall display all the transfer functions and their parameter values, any non wind-up logic, signal limits and non-linearities.

The submitted **Power Park Unit** model shall have been validated and this shall be confirmed by the **Generator**. The validation shall be based on comparing the submitted model simulation results against measured test results. Validation evidence shall also be submitted and this shall include the simulation and measured test results. The latter shall include appropriate short-circuit tests. In the case of an **Embedded Medium Power Station** not subject to a **Bilateral Agreement** the **Network Operator** will provide **NGC** with the validation evidence if requested by **NGC**.

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(h) Harmonic and flicker parameters

When connecting a **Power Park Module**, it is necessary for **NGC** to evaluate the production of flicker and harmonics on **NGC** and **User's Systems**. At **NGC's** reasonable request, the **User** ([a Network Operator in the case of an Embedded Power Park Module not subject to a Bilateral Agreement](#)) is required to submit the following data (as defined in IEC 61400-21 (2001)) for each **Power Park Unit**:-

Flicker coefficient for continuous operation.
Flicker step factor.
Number of switching operations in a 10 minute window.
Number of switching operations in a 2 hour window.
Voltage change factor.
Current Injection at each harmonic for each **Power Park Unit** and for each **Power Park Module**

* Data items marked with an asterisk are already requested under part 1, PC.A.3.3.1, to facilitate an early assessment by **NGC** as to whether detailed stability studies will be required before an offer of terms for a **CUSC Contract** can be made. Such data items have been repeated here merely for completeness and need not, of course, be resubmitted unless their values, known or estimated, have changed.

PC.A.5.5

Response data for **Frequency** changes

The information detailed below is required to describe the actual frequency response capability profile as illustrated in Figure CC.A.3.1 of the **Connection Conditions**, and need only be provided for each ~~**Genset; at a Large Power Stations.**~~

(i) **Genset at Large Power Stations; and**

(ii) **Generating Unit, Power Park Module or CCGT Module at a Medium Power Station or DC Converter Station that has agreed to provide Frequency response in accordance with a CUSC Contract.**

In the case of (ii) above for the rest of this PC.5.4 where reference is made to **Gensets**, it shall include such **Generating Units, CCGT Modules, Power Park Modules and DC Converters** as appropriate.

In this **PC.A.5.5**, for a **CCGT Module** with more than one **Generating Unit**, the phrase **Minimum Generation** applies to the entire **CCGT Module** operating with all **Generating Units Synchronised** to the **System**. Similarly for a **Power Park Module** with more than one **Power Park Unit**, the phrase **Minimum Generation** applies to the entire **Power Park Module** operating with all **Power Park Units Synchronised** to the **System**.

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Add at end of PC.A 5. 6

In the case of **Embedded Medium Power Stations** and **DC Converter Stations** not subject to a **Bilateral Agreement**, upon request from **NGC** each **Network Operator** such provide the information required in PC.A.5.6.1, PCA.5.6.2, PC.A.5.6.3 and PC.A.5.6.4 in respect of such **Embedded Medium Power Stations** and **DC Converter Stations** within their **System**.

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.....

CONNECTION CONDITIONS REVISIONS

CC.3.2 The above categories of **User** will become bound by the **CC** prior to them generating, distributing, supplying or consuming, as the case may be, and references to the various categories should, therefore, be taken as referring to them in that prospective role as well as to **Users** actually connected.

CC.3.3 The obligations within the **CC** that are expressed to be applicable to **Generators** in respect of **Embedded Medium Power Stations** and **Embedded DC Converter Stations** not subject to a **Bilateral Agreement** (which are listed in CC3.4) shall be read and construed as obligations that the **Network Operator** within whose **System** any such **Medium Power Station** or **Embedded DC Converter Station** is **Embedded** must ensure are performed and discharged by the **Generator** or the **DC Converter Station** owner.

CC3.4 The **Network Operator** within whose **System** a **Medium Power Station** or **Embedded DC Converter Station** is **Embedded** must ensure that the following obligations in the **CC** are performed and discharged by the **Generator** in respect of each such **Embedded Medium Power Station** or the **DC Converter Station** owner in the case of an **Embedded DC Converter Station**:

CC.5.1

CC.5.2.2

CC.5.3

CC.6.1.3

CC.6.1.5 (b)

CC.6.3.2, CC.6.3.3, CC.6.3.4, CC.6.3.6, CC.6.3.7, CC.6.3.8,

CC.6.3.9, CC.6.3.10, CC.6.3.12, CC.6.3.13, CC.6.3.15, CC.6.3.16

CC.6.4.4

In respect of CC.6.2.2.2, CC.6.2.2.3, CC.6.2.2.5, CC.6.1.5(a), CC.6.1.5(b) and CC6.3.11 equivalent provisions as co-ordinated and agreed with the **Network Operator** and **Generator** or **DC Converter Station** owner may be required. Details or any such

requirements will be notified to the Network Operator in accordance with CC.3.5.

CC3.5 In the case of **Embedded Medium Power Stations, Embedded DC Converters** not subject to a **Bilateral Agreement** the requirements in:

List of clauses where we specify requirements in BA

that would otherwise have been specified in a **Bilateral Agreement** will be notified to the relevant **Network Operator** in writing in accordance with the provisions of the **CUSC** and the **Network Operator** must ensure such requirements are performed and discharged by the **Generator** or the **DC Converter Station** owner.

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CC.5.1 The provisions relating to connecting to the **GB Transmission System** (or to a **User's System** in the case of a connection of an **Embedded Large Power Station** or **Embedded Medium Power Station** or **Embedded DC Converter Station**) are contained in:

(a) the **CUSC** and/or **CUSC Contract** (or in the relevant application form or offer for a **CUSC Contract**);

(b) or, in the case of an **Embedded Development**, the relevant **Distribution Code** and/or the **Embedded Development Agreement** for the connection (or in the relevant application form or offer for a **Embedded Development Agreement**).

and include provisions relating to both the submission of information and reports relating to compliance with the relevant **Connection Conditions** for that **User**, **Safety Rules**, commissioning programmes, **Operation Diagrams** and approval to connect (and their equivalents in the case of **Embedded Medium Power Stations** or **Embedded DC Converter Station** not subject to a **Bilateral Agreement**). References in the **CC** to the "**Bilateral Agreement**" and/or "**Construction Agreement**" and/or "**Embedded Development Agreement**" shall be deemed to include references to the application form or offer therefor.

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CC.5.2 Items for submission:

CC.5.2.1 pPrior to the **Completion Date** under the **Bilateral Agreement** and/or **Construction Agreement**, the following is submitted pursuant to the terms of the **Bilateral Agreement** and/or **Construction Agreement**:

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

forecasts for **Forecast Data** items such as **Demand**, pursuant to the requirements of the **Planning Code**;

- (b) details of the **Protection** arrangements and settings referred to in CC.6;
- (c) copies of all **Safety Rules** and **Local Safety Instructions** applicable at **Users' Sites** which will be used at the **NGC/User** interface (which, for the purpose of **OC8**, must be to **NGC's** satisfaction regarding the procedures for **Isolation** and **Earthing**. For **User Sites** in Scotland **NGC** will consult the **Relevant Transmission Licensee** when determining whether the procedures for **Isolation** and **Earthing** are satisfactory);
- (d) information to enable **NGC** to prepare **Site Responsibility Schedules** on the basis of the provisions set out in Appendix 1;
- (e) an **Operation Diagram** for all **HV Apparatus** on the **User** side of the **Connection Point** as described in CC.7;
- (f) the proposed name of the **User Site** (which shall not be the same as, or confusingly similar to, the name of any **Transmission Site** or of any other **User Site**);
- (g) written confirmation that **Safety Coordinators** acting on behalf of the **User** are authorised and competent pursuant to the requirements of **OC8**;
- (h) **RISSP** prefixes pursuant to the requirements of **OC8**. **NGC** is required to circulate prefixes utilising a proforma in accordance with **OC8**;
- (i) a list of the telephone numbers for **Joint System Incidents** at which senior management representatives nominated for the purpose can be contacted and confirmation that they are fully authorised to make binding decisions on behalf of the **User**, pursuant to **OC9**;
- (j) a list of managers who have been duly authorised to sign **Site Responsibility Schedules** on behalf of the **User**;
- (k) information to enable **NGC** to prepare **Site Common Drawings** as described in CC.7;
- (l) a list of the telephone numbers for the **Users** facsimile machines referred to in CC.6.5.9; and
- (m) for **Sites** in Scotland a list of persons appointed by the **User** to undertake operational duties on the **User's System** and to issue and receive operational messages and instructions in relation to the **User's System**; and an

appointed person or persons responsible for the maintenance and testing of **User's Plant and Apparatus**.

CC.5.2.2 prior to the **Completion Date** the following must be submitted to **NGC** by the **Network Operator** in respect of an **Embedded Development**:

- (a) **updated Planning Code data (both **Standard Planning Data** and **Detailed Planning Data**), with any estimated values assumed for planning purposes confirmed or, where practical, replaced by validated actual values and by updated estimates for the future and by updated forecasts for **Forecast Data** items such as **Demand**, pursuant to the requirements of the **Planning Code**:**
- (b) **details of the **Protection** arrangements and settings referred to in CC.6:**
- (c) **the proposed name of the **Embedded Medium Power Station** or **Embedded DC Converter Station Site** (which shall be agreed with **NGC** unless it is the same as, or confusingly similar to, the name of other **Transmission Site** or **User Site**):**

.....

CC.5.3 ~~As explained in the **Bilateral Agreement** and/or **Construction Agreement**, of the list:~~

- (a) Of the items CC5.2.1(c), (e), (g), (h), (k) and (m) need not be supplied in respect of **Embedded Power Stations** or **Embedded DC Converter Stations**,
- (b) item CC5.2.1(i) need not be supplied in respect of **Embedded Small Power Stations** and **Embedded Medium Power Stations** or **Embedded DC Converter Stations** with a **Registered Capacity** of less than 100MW, and
- (c) items CC5.2.1(d) and (j) are only needed in the case where the **Embedded Power Station** or **Embedded DC Converter Station** is within a **Connection Site** with another **User**.

.....

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 in a **Power Station** in Scotland with a **Registered Capacity** less than 30MW) 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;

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 **NGC** as: **by the Generator or DC Converter Station owner or, in the case of an Embedded Medium Power Station or Embedded DC Converter Station not subject to a Bilateral Agreement, the relevant Network Operator, as:**

- (i) part of the application for a **Bilateral Agreement;** or
- (ii) 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 NGC); or**
- (iv)** soon as possible prior to any modification or alteration to the **Frequency** control device (or governor); and

.....

.....

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

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CC.6.4.4 Where**n** **NGC** can reasonably demonstrate that an **Embedded Person** has a significant effect on the **GB Transmission System**, it may require the **Network Operator** within whose **System** the

Embedded Person is situated to ensure that the operational metering equipment described in CC6.5.6 is installed such that NGC can receive the data referred to in CC6.5.6. NGC shall notify such Network Operator of the details of such installation in writing within 3 months of being notified of the application to connect under CUSC and the Network Operator shall ensure that the data referred to in CC.6.5.6 is provided to NGC.

.....

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; and
- (b) DC Converter Station owners are obliged to have the capability to supply; and
- (c) Generators in respect of Medium Power Stations (except Embedded Medium Power Stations) are obliged to provide in respect of Reactive Power only;

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

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.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 **NGC** 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 (ie 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 or DC Converter Station not subject to a Bilateral Agreement, NGC may require the Network Operator within whose System the Embedded Medium Power Station or DC Converter is situated, to ensure that the Embedded Person performs the dynamic response tests reasonably required by NGC in order to demonstrate compliance with the relevant requirements in the CCs.

The **Primary Response** capability (P) of a **Generating Unit** or a **CCGT Module** or a **Power Park Module** or a **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 a **Power Park Module** or a **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 a **Power Park Module** or a **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.

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OPERATING CODE 1 REVISIONS

OC1.1.2 In the **Operational Planning Phase**, **Demand** forecasting shall be conducted by **NGC** taking account of **Demand** forecasts furnished by **Network Operators** ~~and in certain circumstances, **Generators**~~, who shall provide **NGC** with information in the form set out in this **OC1**. The data supplied under the **PC** is also taken into account.

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OC1.1.3 In the **Programming Phase** and **Control Phase**, **NGC** will conduct its own **Demand** forecasting taking into account information to be

furnished by ~~Suppliers, and Network Operators~~ and by ~~Generators~~ and the other factors referred to in OC1.6.1.

OC1.3 SCOPE

OC1 applies to **NGC** and to **Users** which in this **OC1** means:-

- ~~(a) Generators,~~
- ~~(b)(a) Network Operators,~~ and
- ~~(c)(b) Suppliers.~~

OC1.4.1 (a) Each **User**, as specified in (b) below, shall provide **NGC** with the data requested in OC1.4.2 below.

- (b) The data will need to be supplied by:-
- ~~(i) each Network Operator~~ directly connected to the **GB Transmission System** in relation to **Demand Control**; and in relation and
 - ~~(ii) each Generator with respect~~ to the output of **Embedded Medium Power Stations** within its System.

OC1.5.1 Programming Phase

For the period of 2 to 8 weeks ahead the following will be supplied to **NGC** in writing by 1000 hours each Monday:

- (a) **Demand Control:**
Each **Network Operator** will supply MW profiles of the amount and duration of their proposed use of **Demand Control** which may result in a **Demand** change equal to or greater than the **Demand Control Notification Level** (averaged over any half hour on any **Grid Supply Point**) on a half hourly and **Grid Supply Point** basis;
- (b) **Medium Power Station Operation:**
Each ~~Generator~~ **Network Operator** will, if reasonably required by **NGC**, supply MW schedules for the operation of **Embedded Medium Power Stations** within its System on a half hourly and **Grid Supply Point** basis.

OC1.5.2 For the period 2 to 12 days ahead the following will be supplied to **NGC** in writing by 1200 hours each Wednesday:

- (a) **Demand Control:**
Each **Network Operator** will supply MW profiles of the amount and duration of their proposed use of **Demand Control** which may result in a **Demand** change equal to or greater than the **Demand Control Notification Level** (averaged over any half hour on any **Grid Supply Point**) on a half hourly and **Grid Supply Point** basis;
- (b) **Medium Power Station Operation:**
Each ~~Generator~~ **Network Operator** will, if reasonably required by **NGC**, supply MW schedules for the operation of **Embedded Medium Power Stations** within its System on a half hourly and **Grid Supply Point** basis.

.....

OC1.5.3 **Medium Power Station Output:**
Each ~~Generator~~ **Network Operator** will, if reasonably required by **NGC**, supply **NGC** with MW schedules for the operation of **Embedded Medium Power Stations** within its System on a half hourly and **Grid Supply Point** basis in writing by 1000 hours each day (or such other time specified by **NGC** from time to time) for the next day (except that it will be for the next 3 days on Fridays and 2 days on Saturdays and may be longer (as specified by **NGC** at least one week in advance) to cover holiday periods);

.....

.....

OPERATING CODE 2 REVISIONS

- OC2.2.1 (a) The objective of **OC2** is to seek to enable **NGC** to harmonise outages of **Gensets** in order that such outages are co-ordinated (taking account of **Embedded Medium Power Stations**) between **Generators** and **Network Operators**, and that such outages are co-ordinated taking into account **GB Transmission System** outages and other **System** outages, so far as possible to minimise the number and effect of constraints on the **GB Transmission System** or any other **System**.
- (b) In the case of **Network Operator' User Systems** directly connected to the **GB Transmission System** this means in particular that there will also need to be harmonisation of outages of **Embedded Gensets**, and **GB Transmission System** outages, with **Network Operators** in respect of their outages on those **Systems**.

In the event that the Authority approves the Grid Code changes proposed in Consultation B/05 prior to a decision to approve the changes proposed in this consultation paper, OC2.2.1 would read as follows:

- OC2.2.1 (a) The objective of **OC2** is to seek to enable **NGC** to harmonise outages of **Generating Units** in order that such outages are

co-ordinated (taking account of **Embedded Medium Power Stations**) between **Generators** and **Network Operators**, and that such outages are co-ordinated taking into account **GB Transmission System** outages and other **System** outages, so far as possible to minimise the number and effect of constraints on the **GB Transmission System** or any other **System**.

- (b) In the case of **Network Operator' User Systems** directly connected to the **GB Transmission System** this means in particular that there will also need to be harmonisation of outages of **Embedded Generating Units**, and **GB Transmission System** outages, with **Network Operators** in respect of their outages on those **Systems**.

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OC2.4.1.1 Under **OC2** the interaction between **NGC** and **Users** will be as follows:

.....

- (c) **NGC and each Network Operator** in respect of outages of all **Embedded Large Power Stations and Embedded Medium Power Stations** and in respect of outages of other **Plant** and/or **Apparatus** relating to such **Embedded Large Power Stations and Embedded Medium Power Stations**;
- (d) **NGC and each Network Operator and each Non-Embedded Customer** in respect of **GB Transmission System** outages relevant to the particular **Network Operator** or **Non-Embedded Customers**;
- (e) **Each Network Operator and each Non-Embedded Customer and NGC** in respect of **User System** and outages relevant to **NGC**.

.....

OPERATING CODE 5 REVISIONS

OC5.1 INTRODUCTION

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

- (a) monitoring
 - (i) of **BM Units** against their expected input or output;
 - (ii) of compliance by **Users** with the **CC** and in the case of response to **Frequency, BC3**; and
 - (iii) of the provision by **Users** of **Ancillary Services** which they are required or have agreed to provide; and
- (b) the following tests (which are subject to **System** conditions prevailing on the day):
 - (i) tests on **Gensets, CCGT Modules, Power Park Modules, and DC Converters and Generating Units (excluding Power Park Units)** to test that they have the capability to comply with the **CC** and, in the case of response to **Frequency, BC3** and to provide the **Ancillary Services** that they are either required or have agreed to provide;
 - (ii) tests on **BM Units**, to ensure that the **BM Units** are available in accordance with their submitted **Export and Import Limits, QPNs, Joint BM Unit Data** and **Dynamic Parameters**.

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

OC5 also specifies in OC5.8 the procedures which apply to the monitoring and testing of Embedded Medium Power Stations and Embedded DC Converters not subject to a Bilateral Agreement.

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

Parameter to be Tested	Grid Code Reference	Pass Criteria (to be read in conjunction with the full text under the Grid Code reference)
Harmonic Content	CC.6.1.5(a)	Measured harmonic emissions do not exceed the limits specified in the Bilateral Agreement or where no such limits are specified, the relevant planning level specified in G5/4.
Phase Unbalance	CC.6.1.5(b)	The measured maximum Phase (Voltage) Unbalance on the GB Transmission System should remain, in England and Wales, below 1% and, in Scotland, below 2%.
Phase Unbalance	CC.6.1.6	In England and Wales, measured infrequent short duration peaks in Phase (Voltage) Unbalance should not exceed the maximum value stated in the Bilateral Agreement .
Voltage Fluctuations	CC.6.1.7(a)	In England and Wales, measured voltage fluctuations at the Point of Common Coupling shall not exceed 1% of the voltage level for step changes. Measured voltage excursions other than step changes may be allowed up to a level of 3%. In Scotland, measured voltage fluctuations at a Point of Common Coupling shall not exceed the limits set out in Engineering Recommendation P28 .
Flicker	CC.6.1.7(b)	Measured voltage fluctuations at a Point of Common Coupling shall not exceed, for voltages above 132kV, Flicker Severity (Short Term) of 0.8 Unit and Flicker Severity (Long Term) of 0.6 Unit, and, for voltages at 132kV and below, shall not exceed Flicker Severity (Short Term) of 1.0 Unit and Flicker Severity (Long Term) of 0.8 Unit, as set out in Engineering Recommendation P28 as current at the Transfer Date .
Voltage Quality		

Parameter to be Tested	Grid Reference	Code	Pass Criteria (to be read in conjunction with the full text under the Grid Code reference)
Fault Clearance Times	CC.6.2.2.2.2(a) CC.6.2.3.1.1(a)		The fault clearance times shall be in accordance with the Bilateral Agreement .
Back-Up Protection	CC.6.2.2.2.2(b) CC.6.2.3.1.1(b)		The Back-Up Protection system provided by Generators operates in the times specified in CC.6.2.2.2.2(b). The Back-Up Protection system provided by Network Operators and Non-Embedded Customers operates in the times specified in CC.6.2.3.1.1(b) and with Discrimination as specified in the Bilateral Agreement .
Circuit Breaker fail Protection	CC.6.2.2.2.2(c) CC.6.2.3.1.1(c)		The circuit breaker fail Protection shall initiate tripping so as to interrupt the fault current within 200ms.
Reactive Capability	CC.6.3.2 CC.6.3.4		The Generating Unit, DC Converter or Power Park Module will pass the test if it is within $\pm 5\%$ of the reactive capability registered with NGC under OC2 which shall meet the requirements set out in CC.6.3.2. The duration of the test will be for a period of up to 60 minutes during which period the System voltage at the Grid Entry Point for the relevant Generating Unit, DC Converter or Power Park Module will be maintained by the Generator at the voltage specified pursuant to BC2.8 by adjustment of Reactive Power on the remaining Generating Units, DC Converter or Power Park Module , if necessary. <u>Any test performed in respect of an Embedded Medium Power Station or Embedded DC Converter not subject to a Bilateral Agreement shall be as confirmed pursuant to OC5.8.3.</u> Measurements of the Reactive Power output under steady state conditions should be consistent with Grid Code requirements i.e. fully available within the voltage range $\pm 5\%$ at 400kV, 275kV and 132kV and lower voltages.
		Fault Clearance	
		Reactive Capability	

Parameter to be Tested	Grid Code Reference	Pass Criteria (to be read in conjunction with the full text under the Grid Code reference)
Fast Start		The Fast Start Capability requirements of the Ancillary Services Agreement for that Genset are met.
Black Start	OC.5.7.1	The relevant Generating Unit or Power Park Module is Synchronised to the System within two hours of the Auxiliary Gas Turbine(s) or Auxiliary Diesel Engine(s) being required to start.
Excitation System/ Voltage Control	CC.6.3.8(a) & BC2.11.2	Measurements of the continuously acting automatic excitation control system are required to demonstrate the provision of: (i) constant terminal voltage control; or (ii) zero MVAR transfer; or, (iii) voltage control with a Slope of the Generating Unit, DC Converter or Power Park Module as applicable without instability over the entire operating range of the Generating Unit, DC Converter or Power Park Module . The measured performance of the automatic excitation control system should also meet the requirements (including Power System Stabiliser performance) specified in the Bilateral Agreement <u>and any requirements specified in an Embedded Development Agreement</u> .

OC5.5.4 Test Failure/Re-test

If the **BM Unit, CCGT Module, Power Park Module or Generating Unit (excluding Power Park Units)** concerned fails to pass the test the **User** must provide **NGC** with a written report specifying in reasonable detail the reasons for any failure of the test so far as they are then known to the **User** after due and careful enquiry. This must be provided within five **Business Days** of the test. If a dispute arises relating to the failure, **NGC** and the relevant **User** shall seek to resolve the dispute by discussion, and, if they fail to reach agreement, the **User** may by notice require **NGC** to carry out a re-test on 48 hours' notice which shall be carried out following the procedure set out in OC5.5.2 and OC5.5.3 and subject as provided in OC5.5.1.3, as if **NGC** had issued an instruction at the time of notice from the **User**.

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OC5.5.5 Dispute following Re-test

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

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

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OC5.6.3 Once the **User** has indicated to **NGC** the date and time that the **BM Unit, CCGT Module, Power Park Module or Generating Unit (excluding Power Park Units)** can achieve the parameters previously registered or submitted, **NGC** shall either accept this information or require the **User** to demonstrate the restoration of the capability by means of a repetition of the test referred to in OC5.5.2 by an

instruction requiring the **User** on 48 hours notice to carry out such a test. The provisions of this OC5.6 will apply to such further test.

OC5.8 Procedures applying to **Embedded Medium Power Stations and DC Converters** not subject to a **Bilateral Agreement**

OC5.8.1 Compliance Statement

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

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

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

OC5.8.2 **Network Operator's** obligations to facilitate tests

if:

- (a) the **Network Operator** fails to procure the confirmation referred to at OC5.8.1(a); or
- (b) the evidence of compliance is not to **NGC's** reasonable satisfaction.

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

OC5.8.3 Testing of **Embedded Medium Power Stations or DC Converter Stations** not subject to a **Bilateral Agreement**

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

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

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

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

- (a) confirmed to the relevant **Network Operator** the manner in which the test will be conducted, which shall be consistent with the principles established in **OC5.5.2**; and
- (b) received confirmation from the relevant **Network Operator** that the relevant **Generating Unit, Power Park Module** or **DC Converter** would not then be unavailable by reason of forced outage or **Planned Outage** expected prior to the instruction.

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

OC5.8.4 Test Failures/Re-tests and Disputes

The relevant **Network Operator** shall:

- (a) ensure that provisions equivalent to **OC5.5.4, OC5.5.5** and **OC5.6** apply to **Embedded Medium Power Stations** or **DC Converter Stations** not the subject of a **Bilateral Agreement** within its **System** in respect of test failures, re-tests and disputes as to test failures and re-tests;
- (b) ensure that the provisions equivalent to **OC5.5.4, OC5.5.5** and **OC5.6** referred to in **OC5.8.4(a)** are effective so that **NGC** may require, if it so wishes, the provision to it of any reports or other information equivalent to those or that to which **NGC** would be entitled in relation to test failures, re-tests and disputes as to test failures and re-tests under the provisions of **OC5.5.4, OC5.5.5** and **OC5.6**; and
- (c) the provisions equivalent to **OC5.5.4, OC5.5.5** and **OC5.6** referred to in **OC5.8.4(a)** are effective to permit **NGC** to conduct itself and take decisions in such a manner in relation to test failures, re-tests and disputes as to test failures and re-tests in

respect of Embedded Medium Power Stations or DC Converter Stations not the subject of a Bilateral Agreement as it is able to conduct itself and take decisions in relation to test failures, re-tests and disputes as to test failures and re-tests under OC5.5.4, OC5.5.5 and OC5.6.

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OPERATING CODE 12 REVISIONS

OC12.2.1 to ensure, so far as possible, that **System Tests** proposed to be carried out either by:

- (a) a **User** (or certain persons in respect of Systems Embedded within a Network Operator's System) which may have an effect on the **Total System** or any part of the **Total System** (in addition to that **User's System**) including the **GB Transmission System**; or
- (b) by **NGC** which may have an effect on the **Total System** or any part of the **Total System** (in addition to the **GB Transmission System**)

do not threaten the safety of either their personnel or the general public, cause minimum threat to the security of supplies and to the integrity of **Plant** and/or **Apparatus**, and cause minimum detriment to **NGC** and **Users**;

OC12.3 SCOPE

OC12.3.1 **OC12** applies to **NGC** and to **Users**, which in **OC12** means:-

- (a) Generators other than in respect of Embedded Medium Power Stations and Embedded Small Power Stations (and the term Generator in OC12 shall be construed accordingly);;
- (b) **Network Operators**; and
- (c) **Non-Embedded Customers**.
- (d) DC Converter Station owners other than in respect of Embedded DC Converter Stations

The procedure for the establishment of **System Tests** on the **GB Transmission System**, with **Externally Interconnected System Operators** which do not affect any **User**, is set out in the **Interconnection Agreement** with each **Externally Interconnected System Operator**. The position of **Externally**

Interconnected System Operators and **Interconnector Users** is also referred to in OC12.4.2.

OC12.3.2 Each **Network Operator** will liaise with **NGC** as necessary in those instances where an **Embedded Person** intends to perform a **System Test** which may have an effect on the **Total System** or any part of the **Total System** (in addition to that **Generator's** or other **User's System**) including the **GB Transmission System**. **NGC** is not required to deal with such persons.

OC12.3.3 Each **Network Operator** shall be responsible for coordinating with the **Embedded Person** or such other person and assessing the effect of any **System Tests** upon:

(a) any **Embedded Medium Power Station**, **Embedded Small Power Station** or **Embedded DC Converter Station** within the **Network Operator's System**; or

(b) any other **User** connected to or within the **Network Operator's System**.

NGC is not required to deal with such persons.

.....

OC12.4.1.1 Where a **User** (or in the case of a **Network Operator**, a person in respect of **Systems Embedded** within its **System**, as the case may be) would like to undertake a **System Test** it shall submit a notice (a "**Proposal Notice**") to **NGC** at least twelve months in advance of the date it would like to undertake the proposed **System Test**.

.....

OC12.4.4.1 Within two months of first meeting the **Test Panel** will submit a report (a "**Proposal Report**"), which will contain:

- (a) proposals for carrying out the **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 **Proposal Report** may include requirements for indemnities (including an indemnity from the relevant **Network Operator** to **NGC** and other **Users** in relation to its **Embedded Persons**) to be given in respect of claims and losses arising from the **System**

Test. All **System Test** procedures must comply with all applicable legislation.

DATA REGISTRATION CODE REVISIONS

DRC.6.2	The Schedules applicable to each class of User are as follows:	
	Generators with Large Power Stations	Sched 1, 2, 3, 4, 9, 14, 15
	Generators with Medium Power Stations (See notes <u>2</u> , <u>3</u> , <u>4</u>)	Sched 1, <u>2(part)</u> , 9, 14, 15
	Generators with Small Power Stations directly connected to the GB Transmission System	Sched 1, 6, 14, 15
	All Users connected directly to GB Transmission System	Sched 5, 6, 9
	All Users connected directly to the GB Transmission System other than Generators	Sched 10,11,13
	All Users connected directly to GB Transmission System with Demand	Sched 7, 9
	A Pumped Storage Generator , Externally Interconnected System Operator and Interconnector Users	Sched 12 (as marked)
	All Suppliers	Sched 12
	All Network Operators	Sched 12
	All BM Participants	Sched 8

Notes:

1. **Network Operators** must provide data relating to **Small Power Stations** and/or **Customer Generating Plant Embedded** in their **Systems** when such data is requested by **NGC** pursuant to PC.A.3.1.4 or PC.A.5.1.4.
2. The data in schedules 1, 2(part) 14 and 15 need not be supplied in relation to **Medium Power Stations** connected at a voltage level below the voltage level of the **Subtransmission System** except in connection with a **CUSC Contract** or unless specifically requested by **NGC**
3. Each Network Operator within whose System an Embedded Medium Power Station or DC Converter

Station not subject to a Bilateral Agreement is situated shall provide the data to NGC in respect of each such Embedded Medium Power Station or DC Converter Station.

4. In the case of Schedule 2, Generators, DC Converter Station owners or Network Operators in the case of Embedded Medium Power Stations or Embedded DC Converter Stations not subject to a Bilateral Agreement, would only be expected to submit data in relation to Standard Planning Data as required by the Planning Code.

.....

GENERAL CONDITIONS REVISIONS

GC.15 *Embedded Exemptable Large and Medium Power Stations*

GC.15.1 This GC.15.1 shall have an effect until and including 31st March 2006.

(i) CC.6.3.2, CC.6.3.7, CC.8.1 and BC3.5.1; and

(ii) Planning Code obligations and other Connection Conditions;

shall apply to a **User** who owns or operates

an **Embedded Exemptable Large Power Station**, ~~or~~

~~(b) an Embedded Exemptable Medium Power Station in Scotland~~

or a Network Operator in respect of an Embedded Exemptable Medium Power Station except where and to the extent that, in respect of that Embedded Exemptable Large Power Station or Embedded Exemptable Medium Power Station, NGC agrees or where the relevant User or Network Operator, and NGC fail to agree, where and to the extent that the Authority consents.

~~except where and to the extent that, in respect of that Embedded Exemptable Large Power Station or Embedded Exemptable Medium Power Station, NGC agrees or where the relevant User and NGC fail to agree, where and to the extent that the Authority consents.~~

In the event the Authority approves the Grid Code changes proposed in Consultation Paper G/05 prior to a decision to approve the changes proposed in this consultation paper, GC.15 would read as follows:

GC.15 *Embedded Exemptable Large and Medium Power Stations*

GC.15.1 This GC.15.1 shall have an effect until and including 31st March 2007.

(i) CC.6.3.2, CC.6.3.7, CC.8.1 and BC3.5.1; and

(ii) Planning Code obligations and other Connection Conditions;

shall apply to a **User** who owns or operates

~~a an~~ **Embedded Exemptable Large Power Station**, or

(b) ~~an Embedded Exemptable Medium Power Station in Scotland~~
of a Network Operator in respect of an Embedded Exemptable
Medium Power Station in Scotland.

eeexcept where and to the extent that, in respect of that **Embedded Exemptable Large Power Station** or **Embedded Exemptable Medium Power Station**, **NGC** agrees or where the relevant **User** or Network Operator. and **NGC** fail to agree, where and to the extent that the **Authority** consents.

<End of changes>