WORKING GROUP REPORT

P2/5 Working Group

Prepared by the P2/5 Working Group
for submission to the Amendments Panel

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b Distribution

Name	Organisation
The Gas and Electricity Markets Authority	Ofgem
Panel Members	Various
National Grid Industry Information Website	

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1.0 SUMMARY AND RECOMMENDATIONS

Executive Summary

1.1 Ofgem has raised concerns following a formal investigation into EDF Energy's compliance with their distribution licence that there does not appear to be clarity in relation to P2/5 and GB SQSS compliance across the network interface between National Grid and DNOs.

1.2 At a DNO/National Grid workshop it was the unanimous view of all the network licensees that this issue was best dealt with by improving the clarity of information transferred as part of the annual exchange of planning data between DNOs and National Grid. In particular the Grid Code drafting should be modified to ensure clarity and sufficiency of data exchange between parties.

1.3 The P2/5 Working Group was established by the Grid Code Review Panel (GCRP) to investigate such clarification. It has identified a series of Grid Code changes, which will improve the clarity and scope of data, transfer across the planning interface and thus alleviate Ofgem concerns regarding GB SQSS and P2/5 compliance across the network interface between National Grid and DNOs.

Working Group Recommendation

1.4 The Working Group believes it has satisfied its Terms of Reference and recommends that the Grid Code Review Panel (GCRP) consider the proposed changes contained with this Working Group Report at the February GCRP meeting.

1.5 Though the Working Group has agreed a practical way forward on a number of issues, namely Demand Transfer, Maintenance Period Demand, Interconnected Networks and Information Exchange, the detailed legal changes to give effect to these proposals have yet to be finalised and agreed.

1.6 For information only the first working draft of legal changes developed by National Grid is included in this report at Annex 2. However it should be noted that Working Group members have raised a number of issues and as such the text is likely to evolve further.

1.7 It is proposed that the legal text provided at Annex 2 will be further refined by National Grid and the Working Group and should be agreement be reached on the final form of Grid Code changes through the Working Group before the next GCRP, National Grid would intend to consult with AEO's on such agreed changes. Should agreement not be reached the Working Group will report back progress to the May GCRP. The GCRP are invited to approve this way forward.

1.8 In addition during the Working Group discussions, members identified areas, which would benefit from further discussion. Due to the fact that the discussion focused on the key issues (as established in the group's Terms of Reference) and associated the time constraints, the Working Group is seeking GCRP approval to consider these longer-term issues.

2.0 INTRODUCTION

2.1 In Autumn 2004, Ofgem launched a formal investigation into EDF Energy's compliance with their licence, and also formally sought information from National Grid under the terms of their licence. The investigation covered four separate issues, one of which was Engineering Recommendation (ER) P2/5 compliance.

2.2 Ofgem concluded that there had been no licence infringement, but nevertheless they had some concerns that there does not appear to be clarity in relation to P2/5 and GB SQSS compliance across the network interface between National Grid and DNOs.

2.3 To resolve this issue on an enduring basis Ofgem indicated its preference for a mechanism by which it could be assured that companies are P2/5 and/or GB SQSS compliant at the interface.

2.4 At a DNO/National Grid workshop it was the unanimous view of all the network licensees that this issue was best dealt with by improving the clarity of information transferred as part of the annual exchange of planning data between DNOs and National Grid. In particular the Grid Code drafting should be modified to ensure clarity and sufficiency of data exchange between parties.

2.5 At the November 2005 GCRP meeting, it was agreed that a GCRP Working Group should be formed to review the data exchange processes and remove the scope for confusion. The Working Group was to report back to the GCRP in February 2006.

3.0 PURPOSE AND SCOPE OF WORKING GROUP

3.1 The paper presented to the GCRP recommending that the Working Group be formed with a remit to review the following areas:

i. Review scope of existing data exchange requirements of the Grid Code for determining the investment needs to meet their planning requirements e.g. assessment against security standards, P2/5 and GB SQSS

ii. Consider adequacy of existing requirements of the Grid Code, in particular, but not necessarily limited to, the treatment of the following areas:
   - summer and seasonal peak load levels, and the appropriate statistical factors governing the forecasting of these quantities
   - treatment of interconnected GSPs and format of data provision
   - maintenance demand
   - maintenance windows
   - transfer capacity

iii. Determine what additional data exchange or process clarification is necessary to meet the Objectives.

3.2 The Terms of Reference (Annex 1) were formally agreed at the first P2/5 Working Group meeting.

4.0 SUMMARY OF WORKING GROUP DISCUSSIONS

4.1 The Working Group noted that National Grid and DNO had to meet different compliance standards in order to fulfil their licence obligations i.e. DNO - P2/5 compliance, National Grid – GB SQSS compliance. Despite both standards being broadly similar, it was highlighted that the two compliance standards could be interpreted as placing differing obligations on the licensees in certain instances (e.g. thermal capacity and voltage security) which are not always compatible and can cause planning and operational issues at the DNO - National Grid interface.

4.2 It was acknowledged by the group that existing Grid Code definitions could be improved or new definitions introduced which would assist in the clarification of the process and why the information was required. The Working Group agreed that it would be beneficial for the DNOs to have a clear understanding of why the Week 24 data was required. National Grid agreed to provide such guidance/explanatory notes.

4.3 The Working Group discussions focused on four main areas:

i. Maintenance Period Demand
ii. Demand Transfer Capability
iii. Interconnected Networks
iv. Data Exchange

4.4 The group discussed each area in more detail, highlighting areas of concern and possible amendments to the Grid Code and associated documents.

Maintenance Period and Maintenance Period Demand

4.5 Currently the Winter Peak Demand supplied through Week 24 data submission forms the basis for National Grid's assessment of P2/5 compliance. However it is been acknowledged that this process is no longer adequate due to the complex and changing dynamics of the system. To resolve this matter on an enduring basis and to ensure P2/5 compliance it will be necessary to set up an additional data stream relating specifically to the maintenance period and the associated demand levels.

4.6 National Grid confirmed to the Working Group that for planning purposes, it assumes that the maintenance season will be British Summer Time (BST) (i.e. engineering weeks 13 to 43) although it was conceded that this was not defined in any formal documentation. It was acknowledged that National Grid circuit maintenance might not be possible at certain sites for the full maintenance season due to demand levels exceeding the firm capacity of the remaining National Grid circuits. In these cases the period for which maintenance may be permitted will need to be identified on a case-by-case basis.

4.7 The Maintenance Period Demand required would normally be that maximum demand level over an 8-week window, which is a sufficient period to carry out maintenance. Maintenance on each National Grid circuit is anticipated on a frequency of once every 3 years and as such the number of circuits at a site would determine the annual maintenance access requirement for planning purposes. For example, for demand groups with four or more National Grid circuits, at least two maintenance periods of 8 weeks will need to be identified to enable adequate access to the National Grid circuits for maintenance.

4.8 Although not formally agreed by all parties at the Working Group, National Grid made the following suggestion for the provision of Week 24 data. The DNOs were requested to provide either of the following:

i. % of peak demand that forms the maximum demand level during the maintenance season (BST).

ii. At the DNOs discretion, where the demand groups consists of 3 or less National Grid circuits, the DNO may identify a period of not less than 8 weeks in duration together with % of peak demand that forms the maximum demand level during that period.

iii. At the DNOs discretion, where the demand groups consists of 4, 5 or 6 National Grid circuits[1], the DNO may identify two separate periods of not less than 8 weeks in duration together with % of peak demand that forms the maximum demand level during each period.

The DNO would provide the information against one or the other of the above and National Grid would then use this as its "first pass" when undertaking the security assessment. The capacity requirement would then further be discussed as currently under JTPL dialogue to determine appropriate investment timing.

4.9 The Working Group agreed that the initial, high level data currently provided as part of their Week 24 data submission would be sufficient for National Grid's operational and investment plans.

4.10 The Working Group further agreed that at DNOs discretion, the DNO could identify those access windows in the maintenance season i.e. between Weeks 13 and 43 (no smaller than the 8 weeks required by National Grid per circuit every 3 years) that could be utilised. This would enable a DNO (where known access issues existed), to detail them in its Week 24 data submission and as such minimise associated data production (e.g. demand transfer capacity at that time). In such ways Data Exchange could be restricted to purely that which is pertinent, and so short-cut unnecessary data exchange dialogue at sites where the issues were jointly well understood.

4.11 The Working Group agreed on the following process for the submission of Week 24 data:

Year One

- Week 17 – National Grid writes to all Users requesting Week 24 data.
- Users will have the discretion to either provide percentage of annual peak demand over weeks 13 to 43 or provide maintenance period demand data for the agreed access window identified in the previous year. The percentage of annual peak demand over weeks 13 to 43 figure would be that which would normally be submitted.
    - National Grid will utilise this demand level to verify that security standards will not be infringed during any planned outage of any National Grid circuit.
    - Where this verification is not possible the Users will be given the opportunity to identify and agree with National Grid adequate periods (access windows) to allow for maintenance of each National Grid circuit. The percentage of annual peak demand will be provided for this access window.

[1] Where more than six circuits connect, option i) prevails

- If insufficient capacity is identified then investment opportunities should be explored.

Year Two and subsequent years

- Week 17 – National Grid writes to all Users requesting Week 24 data. Where specific access windows have been previously identified at particular Connection Sites, National Grid to highlight these sites to Users in week 17 submissions.
- Users will have the discretion to either provide percentage of annual peak demand over weeks 13 to 43 or provide maintenance period demand data for the agreed access window identified in the previous year or provide maintenance period demand data for an alternative access window (which would need to be agreed).
    - National Grid will utilise this demand level to verify that security standards will not be infringed during any planned outage of any National Grid circuit.
    - Where this verification in not possible the Users will be given the opportunity to identify and agree with National Grid adequate periods (access windows) to allow for maintenance of each National Grid circuit. The percentage of annual peak demand will be provided for this access window.
    - If insufficient capacity is identified then investment opportunities should be explored.

4.12 The Working Group noted that the Grid Code currently has existing provisions which cover this data exchange mechanism, but does not currently stipulate the provision of maintenance period demand data and that this would need inclusion. The Working Group also acknowledged that the current provisions may need to reviewed/amended and supplementary documentation provided to assist the data submission for the DRC Table 11(b) – Data Registration Code.

4.13 The Working Group also noted that a process would have to be agreed which would stipulate what would happen where any invalid or contradictory data was submitted i.e. what would be the default position. (This issue is explored further in Section 4.26 – Data Exchange)

Demand Transfer Capability

4.14 The Working Group noted that DNO is not required to provide Demand Transfer Capability if there is sufficient capacity at the Connection site.

4.15 The GB SQSS and P2/5 allow the use of Demand Transfer to ensure security compliance at National Grid/DNO interface substations. Both require the transfer to be practically available. The Working Group acknowledged the requirement of National Grid to feel confident that the Demand Transfer would be available when stated. Further the proposed changes to PC.A.4.5 enable the DNO to specify a period where that Demand Transfer would not be available as such both National Grid and the DNO will have greater clarity over the periods where Demand Transfer can be relied upon to provide capacity at the National Grid/DNO interface. It was noted by the Working Group that the DNOs would ensure that the Demand Transfer would be available as specified if their system was functioning under normal operating conditions during the period it was required. It was also recognised that the transfer capacity may not be available during the period as a result of unplanned outages of the DNO system.

4.16 It was also noted that National Grid would need to be informed of the following:

i. whether the Demand Transfer would be automatic or manual,
ii. what the transfer involved (i.e. moving demand or switching in interconnections),
iii. where specific demand was transferred,
iv. whether the demand transfer formed part of a sequence of transfers,
v. and any circumstances that precluded its use.

4.17 The Working Group agreed that the initial, high level Demand Transfer data currently provided as part of the Week 24 data would be sufficient albeit with minor modifications to reflect the above. However, if National Grid had queries with the data provided, it would be possible for National Grid, upon written request, to ask for further information through the Detailed Planning Data. If, after the Detailed Planning Data had been submitted, National Grid still had queries, a review meeting would be arranged between the DNO and National Grid to discuss the matter and agree on what additional data would be required. It was agreed that this data would remain a discretionary area of data submission; that a DNO could choose not to declare any demand transfer over which it had some uncertainty regarding the validity of that transfer being used to off-set SGT capacity for planning purposes.

4.18 The Working Group acknowledged that there will also be some uncertainty regarding the practical availability of transfer capacity. It was recognised that a party relying on transfer capacity would have to make a decision as to whether to rely on the transfer for compliance with its security standard.

4.19 The issue of the levels of security required at the Connection Point(s) to which demand would be transferred was discussed. This the Working Group agreed highlighted the need for a common understanding over the definition of demand groups and the application of the concept of demand groups in both demand security assessment and data provision for that assessment.

4.20 National Grid confirmed that demand data for Connection Points that are interconnected is difficult to interpret if the time and date of peaks occur at different times. In such circumstances National Grid would like Users to submit the demand data for only one date and time. This date and time should be determined by the DNO based upon the aggregated demand for all Connection Points within the Interconnected Network. The Demand at each Connection Point at the time of aggregate demand is required to be submitted.

4.21 Alternatively, Users may provide a single submission covering the aggregated demand for all Connection Points within the Interconnected Network as stated in PC.A.4.3.3. Where a User takes this option it is essential that it is fully supported by a Single Line Diagram and associated parameters for seven successive years including any forecast demand and topology changes occurring on the sub transmission network. This level of data would be essential to enable accurate forecast modelling of the interconnected network. Instead of providing demand transfers the DNO will need to identify post-fault actions required to alleviate any forecast overload.

Seasonal Peak Information

4.22 It was acknowledged that Seasonal Demand Peak information was ideally required from certain Connection Points under Week 24 data submissions.

National Grid would receive planning data for Winter Peak and Maintenance Period Demand. However the most onerous First Circuit Outage (FCO) conditions may occur at other times of the year where the demand is lower than the winter peak but where the seasonal rating of equipment installed at the site means that available capacity above demand is at its most constrained when compared against the rest of the year.

4.23 Though noted as an issue, the Working Group considered this to be a complex issue, which was unlikely to be resolved before the February GCRP meeting. This is therefore an area the P2/5 Working Group could reconvene to discuss further should it be agreed by the GCRP. However National Grid has provided legal drafting within its first working draft through an amendment to PC.A.4.3.1 to explicitly codify the option for Users to provide seasonal peak information where that User deems it appropriate. This is one area where further Working Group discussions will be required to finalise the legal text however.

Interconnected Networks

4.24 The Working Group discussed the obligation on National Grid to provide Network Data to the DNOs (Planning Code Appendix Part 3). The present obligation is limited to short circuit level data at the connection point interface. Some DNOs would like a Grid Code obligation on National Grid to provide sufficient data to enable the DNOs model the transmission system local to their connection points.

4.25 National Grid is sympathetic to the DNOs requirements and is to investigate the possibility of making available an equivalent network model for DNOs that would assist the DNOs in their load flow and short circuit assessment. Again sample first working draft legal text to give effect to this process is included at Annex 2 (PC.A.8 – Network Data). Again further Working Group discussions will be required before this can be finalised however.

Data Exchange

4.26 The Working Group discussed data exchange generally, however in order to focus on the issues it was discussed more specifically in the context of the submission of Reactive Demand data. The Reactive Demand data provided by the DNO's at the LV level was acknowledged as being estimated for some Connection Points due to a lack of suitable metering equipment. This could lead to inaccuracies in the submitted data. It was agreed that if the information was estimated, the DNO would confirm so to National Grid. National Grid obtains data at the GSP through its own meters and where relevant National Grid could substitute such data. In other words a process would be required that would allow for:

- The submission of data by a DNO
- The verification of such data by National Grid
- The discussion between National Grid and the User of any anomalies
- The agreement of parties to the appropriate data for substitution

4.27 Building on these observations and extending the process to more general exchange of data, National Grid proposed that the remit of DRC5.4 of the Grid Code should be extended. In effect where data is not provided or where National Grid reasonably believes the submitted data to be erroneous, as per Grid Code D.R.C.5.4.2, National Grid would write to the DNO suggesting alternative data and its reasons for doing so. National Grid and the DNO

would then agree on the revised data that would form the basis of any Week 24/28 data resubmitted by the DNO.

5.0 WORKING GROUP SUMMARY AND RECOMMENDATIONS5

5.1 To improve the clarity and scope of data transfer across the planning interface, the Working Group has identified a number of Grid Code changes.

5.2 The Working Group would like to reiterate that the associated legal is a working draft only, which is likely to change between the Working Group Report stage and any future industry consultation.

5.3 It is proposed to introduce a new Grid Code definition for 'Maintenance Period Demand', which will clarify the Maintenance Period Window, and what data submission was required for the Maintenance Period Demand (reference to DRC Table 11(b) – Data Registration Code).

5.4 It is recommended that a new Grid Code definition for 'Demand Group' be introduced. This will regularise the format of data submitted for P2/5 consideration and allow all information to be reviewed in appropriate context to the security assessment both DNOs and National Grid undertake e.g. removes ambiguity that can lead to differing dates and levels for connection peak demand being quoted at different Grid Supply Points when they are part of an interconnected group.

5.5 The existing Demand Transfer provisions (PC.A.4.5) will be amended to clarify the process, which should be followed when submitting Demand Transfer data to National Grid.

5.6 Existing Grid Code provision (DCR5.4) to be amended to clarify the process for the non-submission of data.

5.7 Although there is no explicit Grid Code change required, given that a number of the above recommendations require an enhanced level of discussion between National Grid and the DNO this will inevitably place greater, although appropriate, burden on the regular JTPL meetings held between National Grid and the DNO.

5.8 The mechanism by which National Grid may provide a detailed network model to DNOs to be incorporated within the Grid Code. Annex 3 provides draft legal text for this proposed change and is subject to further refinement by National Grid and the P2/5 Working Group.

5.9 During Working Group discussions, members identified areas, which would benefit from further discussion. Due to the fact that the discussion focused on the key issues (as established in the group's Terms of Reference) and associated the time constraints, the Working Group is seeking a view from the GCRP as to whether it is worthwhile for additional time to be allocated to discuss these matters in greater detail with a view of making further recommendations where appropriate. These areas include:

- If the changes as currently proposed be implemented then it has been suggested that a one off timetable for the year 1 submissions may have to be incorporated due to the fact there will be a greater volume of work that will need to be completed with which DNOs will not be familiar. It is suggested that the Week 24 submissions for the "new" data be provided

by DNOs in Week 32, rather than week 28, in the first year following any implementation of the suggested changes. This would only apply to the "new" data; all existing week 24 submissions would still be made by week 28. In subsequent years all data would be provided by week 28.

- The context in which Detailed Planning Data is used within the Grid Code to be reviewed. Currently this aspect focuses on voltage harmonic studies, Transient Overvoltage and protection data rather than 'demand type' data to assist /clarify P2/5 compliance issues.

- The week 24 demands are currently submitted on an Average Cold Spell basis, further discussion/clarification required regarding the basis for submitting maintenance demands e.g. introduction of Average Hot Spell.

- The Working Group acknowledged that the data required for Demand Transfer might need to be codified within the relevant sections of the Grid Code.

- The criteria on which Demand Transfer data is submitted on would also benefit from further discussion/agreement between National Grid and the DNOs.

- The Working Group acknowledge that the existing Grid Code provision for Seasonal Peak information requires further reconsideration/discussion to identify appropriate Grid Code changes.

- The Working Group acknowledged the lack of clarity regarding the boundary point (embedded within the National Grid system) for data items. Existing Grid Code provisions to be reviewed, with the aim of identifying appropriate Grid Code changes.

- The issues of 3rd party data transfer to be reviewed to ensure that there is adequate provision with the Grid Code to allow the transfer of such data amongst parties without breaching any confidentiality provisions.

6.0 INITIAL VIEW OF NATIONAL GRID

6.1 National Grid believes that the proposals developed by the Working Group will provide the additional clarification required regarding P2/5 and GB SQSS compliance across the network interface between National Grid and DNOs. Once the Working Group can agree legal text, National Grid intends on consulting with AEO's on making changes to the Grid Code in accordance with the agreed legal drafting.

6.2 National Grid believes that the proposals will facilitate the development, maintenance and operation of an efficient, co-ordinated and economical system for the transmission electricity by reducing in so far as is currently achievable the ambiguity at the National Grid/DNO interface regarding their respective roles and responsibilities.

7.0 IMPACT ON THE GRID CODE

7.1 The proposed changes require amendments to the following Grid Code Sections:

i. Glossary & Definition
ii. Planning Code
iii. Data Registration Code.

7.2 First working draft legal text is attached for information only in Annex 2 to this document. However it should be noted that a bumber of issues have been raised by Working Group members and as such the text is likely to evolve further.

8.0 IMPACT ON INDUSTRY DOCUMENTS

Impact on Core Industry Documents

8.1 The Working Group did not identify any impact on Core Industry Documents.

Impact on other Industry Documents

8.2 The Working Group did not identify any impact on other Industry Documents.

ANNEX 1 – ORIGINAL GRID CODE REVIEW PANEL PAPER

Grid Code Review Panel

Proposals to Improve the Clarity of the Planning Code and Data Registration Code for the DNO/NEC/NGET Planning Interface

1. Background

In Autumn 2004, Ofgem launched a formal investigation into EDF Energy's compliance with their licence, and also formally sought information from NGET under the terms of their licence. The investigation covered on four issues, but only compliance with ER P2/5 is relevant here.

Ofgem concluded that there had been no licence infringement, but nevertheless they had some concerns that there were issues of differing interpretation between NGET and DNOs in the capacity of the interface and hence P2/5 compliance.

2. Issues for GCRP

Ofgem have written to the Chairman of the DCRP expressing its wish to seek a mechanism by which Ofgem can assure itself that companies are P2/5 and/or SQSS compliant at the interface. It is expected that Ofgem will follow up by writing along the same lines to all licensees.

A joint DNO/NGET workshop was held at the ENA on 14 September to consider these issues. The unanimous view of all the network licensees is that this issue is best dealt with by improving the clarity of information transferred as part of the annual DNO submission of planning data to NGET. In particular the Grid Code drafting should be modified to ensure clarity and sufficiency of data exchange between parties.

3. Proposed Way Forward

Given Ofgem's wish for improved clarity in relation to the capability and security of networks at the interface between NGET and DNOs, it appears that the practical way to achieve this is via improving the clarity and scope of the data transferred across the planning interface. Consideration should be given to the production of guidance to cover the data to be provided under the data submission, the process of data exchange and the usage of the data provided.

As the Grid Code's Planning Code and Data Registration Code provide the formal requirements for data interchange, it is therefore appropriate to review these provisions and update them to address the consistency and interpretation issues above.

It is recommended that a GCRP Working Group is convened to deliver proposed revisions to the Grid Code in accordance with the attached draft terms of reference.

4. Recommendation

It is recommended that GCRP

- Agree the Terms of Reference attached
- Form a WG to undertake the review.

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Grid Code Working Group

Determination of investment needs at NGET/NEC/DNO interface

Terms of Reference

Objectives

The objective of the Group is to recommend the modifications to the Planning Code and the Data Registration Code required to ensure both DNO and NGET planning obligations are met at the interface by the data exchange requirements within the Grid Code.

Membership

The Group will comprise;

Chairman (NGET)

Secretary (NGET)

DNO representatives

NGET representatives

NEC representatives

Scope of work

1. Review scope of existing data exchange requirements of the Grid Code for determining the investment needs to meet their planning requirements e.g. assessment against security standards, P2/5 and SQSS

2. Consider adequacy of existing requirements of the Grid Code, in particular, but not necessarily limited to, the treatment of the following areas;
   - summer and seasonal peak load levels, and the appropriate statistical factors governing the forecasting of these quantities
   - treatment of interconnected GSPs and format of data provision
   - maintenance demand,
   - maintenance windows,
   -transfer capacity.

3. Determine what additional data exchange or process clarification is necessary to meet the Objectives

4. Recommend the changes that are required to the Grid Code

Deliverables

The Group will produce:

- a report on the development and resolution of the issues in the scope of work,
- draft legal text of the necessary Grid Code changes
- consider what guidance associated with the DRC Wk24 submissions should be produced and its appropriate format

all of the above to be ready for wider industry consultation.

Timescales

The Group will complete its work for the 23 February 2006 GCRP.

ANNEX 2 – WORKING DRAFT LEGAL TEXT TO MODIFY THE GRID CODE

DEFINITIONS

"Maintenance Period"	on a frequency of once every three years a continuous period of not less than eight weeks when the **User** will enable **NGET** to gain access to each **NGET** circuit which connects a **Demand Group** to a **Transmission Site(s).**
"Maintenance Period Demand"	subject to the following paragraph either- (a) the maximum level of **Apparent Power** at a **Connection Site** as a percentage of the maximum **Connection Point Apparent Power** during the period between calendar weeks 13 to 43; or at the **User's** discretion; (b) the maximum level of **Apparent Power** at a **Connection Site** as a percentage of the maximum **Connection Point Apparent Power** during the **Maintenance Period(s)**. If there is more than one **Network Operator** in any **Demand Group** then each such **Network Operator** shall either use option (a) above, or if all such **Network Operators** in any **Demand Group** wish to use option (b) above, all such **Network Operators** must choose (and notify **NGET** of the dates forming the **Maintenance Period(s)**) the same **Maintenance Period(s).**
"Demand Group"	subject to the following paragraph, any part or parts of a **User's User System, User Site** or **User Sites** as notified by **NGET** to the **User** pursuant to P.C.A.4.2.2(c), following discussion with the relevant **User(s).** The **Demand Group** notified by **NGET** shall normally be drawn no wider than the **Single Line Diagram(s)** provided by the **User** (or **Users** in the case where two or more **Users** are connected to the **GB Transmission System** at the same **Transmission Site**, or where two or more **Users** have interconnected circuits) as required by P.C.A.2.2.

PC.A.1.3 Submissions by **NGET**

Network Data release by **NGET** shall be:

~~(a) with respect to the current **Financial Year**;~~

(a) subject to (b) below provided by **NGET** on a routine annual basis in calendar week 42 of each year~~,~~ with respect to the current **Financial Year**. 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 released~~,~~ and where the **User** has not notified **NGET** of any changes to its **Network Data** requirements referred to in PC.A.8.3(f) instead of repeating the data, **NGET** may release a written statement that there has been no change from the data (or some of the data) released the previous time~~.~~;

(b) with respect to any, or each, of the seven succeeding **Financial Years** where **NGET** receives a written request from the **User** for such **Network Data** as part of the **User's** notification to **NGET** of its **Network Data** requirements referred to in PCA.8.3(f).

PC.A.4.2 **Demand** (**Active Power** and **Apparent Power**) and **Active Energy** Data

PC.A.4.2.1 Forecast daily **Demand** (**Active Power** and **Apparent Power**) profiles, as specified in (a), (b) and (c) below, in respect of each ~~of the **User's User Systems** (each summated over all **Grid Supply Points** in each **User System**)~~**Demand Group** notified by **NGET** pursuant to P.C.A.4.2.2(c) for the current **Financial Year** are required from the **User** for:

(a) peak day on each of the ~~**User's User Systems** (as determined by the **User**)~~**Demand Groups** giving the numerical value of the maximum **Demand** (**Active Power** and **Apparent Power**) that in the **Users'** opinion could reasonably be imposed on the **GB Transmission System**~~;~~ (taking into account the maximum **Demand** recorded for such **Demand Group** in the current **Financial Year**). In addition, such forecast daily **Demand** profiles shall be on a weather corrected basis;

(b) day of peak **GB Transmission System Demand** (**Active Power**) as notified by **NGET** pursuant to PC.A.4.2.2;

(c) day of minimum **GB Transmission System Demand** (**Active Power**) as notified by **NGET** pursuant to PC.A.4.2.2.

~~In addition, the total **Demand** (**Active Power**) in respect of the time of peak **GB Transmission System Demand** in the preceding **Financial Year** in respect of each of the **User's User Systems**~~

~~(each summated over all **Grid Supply Points** in each **User System**) both outturn and weather corrected shall be supplied.~~

PC.A.4.2.2 No later than calendar week 17 each year **NGET** shall notify each **Network Operator** and **Non-Embedded Customer** in writing of the following, for the current **Financial Year** and for each of the following seven **Financial Years,** which will, until replaced by the following year's notification, be regarded as the relevant specified days and times under PC.A.4.2.1:

a) the date and time of the annual peak of the **GB Transmission System Demand;**

b) the date and time of the annual minimum of the **GB Transmission System Demand**~~.~~;

c) the **Demand Groups** in respect of which **NGET** requires the data referred to in PC.A.4.2.1.

PC.A.4.3.1 Forecast **Demand (Active Power)** and **Power Factor** (values of the **Power Factor** at maximum and minimum continuous excitation may be given instead where more than 95% of the total **Demand** at a **Demand Group,** as appearing at each **Connection Point** within that **Demand Group** is taken by synchronous motors) to be met at each are required for:

(a) the time of the maximum **Demand (Apparent~~ctive~~ Power)** at the **Connection Point** (as determined by the **User**) that in the **User's** opinion could reasonably be imposed on the **GB Transmission System**;

(b) the time of peak **GB Transmission System Demand** as provided by **NGET** under PC.A.4.2.2;

(c) the time of minimum **GB Transmission System Demand** as provided by **NGET** under PC.A.4.2.2.

In addition, the **Maintenance Period Demand** associated with the peak day on each of the **Demand Groups** notified by **NGET** pursuant to P.C.A.4.2.2(c) are required from the **User**. In addition, such forecast daily **Demand** profiles shall be on a weather corrected basis.

Further, at the **User's** absolute discretion the **User** may provide the seasonal peak day on any of the **Demand Groups** notified by **NGET** pursuant to P.C.A.4.2.2 (c) giving the numerical value of the maximum **Demand** (**Active Power** and **Apparent Power**) that in the **User's** opinion could reasonably be imposed on the **GB Transmission System.**

PC.A.4.3.3 Where two or more **Connection Points** normally run in parallel with the **GB Transmission System** under intact network conditions, and a **Single Line Diagram** of the interconnection has been provided under PC.A.2.2.2, the **User** may provide a single submission covering the aggregate **Demand** for all such **Connection Points**~~.~~ that relate to a **Demand Group** specified in P.C.A.4.2.1.

PC.A.4.4 **NGET** will assemble and derive in a reasonable manner, the forecast information supplied to it under PC.A.4.2.1, PC.A.4.3.1. and PC.A.4.3.4 above or derived pursuant to DRC 5.4 into a cohesive forecast and will use this in preparing **Forecast Demand** information in the **Seven Year Statement** and for use in **NGET's Operational Planning**. If any **User** believes that the cohesive forecast **Demand** information in the **Seven Year Statement** does not reflect its assumptions on **Demand**, it should contact **NGET** to explain its concerns and may require **NGET**, on reasonable request, to discuss these forecasts. In the absence of such expressions, **NGET** will assume that **Users** concur with **NGET's** cohesive forecast.

Demand Transfer Capability

PC.A.4.5 Where a **User's Demand** or group of **Demands (Active and Reactive Power)** may be offered by the **User** to be supplied from alternative **Connection Point(s)**, in accordance with Engineering Recommendation P2/5 (October 1978) Section 3.2(b) (either through non-**Transmission** interconnections or through **Demand** transfer facilities) and the **User** reasonably considers it appropriate that this should be taken into account (by **NGET**) in designing the **Connection Site** the following information is required for each **Demand** transfer:

(a) First Circuit (Fault) Outage Conditions

(i) the alternative **Connection Point(s)**;

(ii) the **Demand (Active and Reactive Power)** which may be transferred under the loss of the most critical circuit from or to each alternative **Connection Point** (rounded down to the nearest 5MW/5Mvar) that will be transferred during typical operating conditions within the **User's System** (having given due regard to the typical access requirement of both **NGET** and such **User** and availability of the **User's System** at those times and having taken into account any restrictions on the timescales in which the transfer capacity applies;

(iii) the arrangements (~~eg~~e.g. manual or automatic) for transfer and whether the **Demand** transfer results in the **Connection Point(s)** running interconnected with another **Connection Point(s)** through non-**Transmission** interconnections or whether following completion of the arrangement the

Connection Point(s) remain run split) together with the time required to effect the transfer;

(iv) any conditions that preclude the use of any non-**Transmission** interconnections.

(b) Second Circuit (Planned) Outage Conditions

(i) the alternative **Connection Point(s)**;

(ii) the **Demand (Active and Reactive Power)** which may be transferred under the loss of the most critical circuit from or to each alternative **Connection Point** (rounded down to the nearest 5MW/5Mvar) that may be transferred during typical operating conditions within the **User's System** (having given due regard to the typical access requirement of both **NGET** and such **User** and availability of the **User's System** at those times and having taken into account any restrictions on the timescales in which the transfer capacity applies;

(iii) ~~(iii)~~ the arrangements (~~eg~~e.g. manual or automatic) and whether the **Demand** ~~for~~ transfer results in the **Connection Point(s)** running interconnected with another **Connection Point(s)** through non-**Transmission** interconnections or whether following completion of the arrangement the **Connection Point(s)** remain run split) together with the time required to effect the transfer;~~.~~

(iv) any conditions that preclude the use of any non-**Transmission** interconnections

In addition, where in the above cases (a) and (b) new **Demand** transfer capability is quoted in future **Financial Year(s)** details must be provided to **NGET** of the **User's System Data** as referred to in P.C.A.6.1 in such future **Financial Year(s)** such that **NGET** can establish the viability of such **Demand** transfer capability.

DRC.5.4 **Substituted Data ~~not Supplied~~**

DRC.5.4.1 **Users** and **NGET** are obliged to supply data as set out in the individual sections of the **Grid Code** and repeated in the **DRC.** If a **User** fails to supply data when required by any section of the **Grid Code,** or if the data supplied does not reflect the relevant metered data recorded by **NGET, NGET** will estimate such data if and when, in the **NGET's** view, it is necessary to do so. If **NGET** fails to supply data when required by any section of the **Grid Code,** the **User** to whom that data ought to have been supplied, will estimate such data if and when, in that **User's** view, it is necessary to do so. Such estimates will, in each case, be based upon

data supplied previously for the same **Plant** or **Apparatus** or upon corresponding data for similar **Plant** or **Apparatus** or upon such other information as **NGET** or that **User,** as the case may be, deems appropriate.

DRC.5.4.2 **NGET** will advise a **User** in writing of any estimated data it intends to use pursuant to DRC.5.4.1 relating directly to that **User's Plant** or **Apparatus** in the event of data not being supplied or not reflecting the relevant metered data. Such estimated data shall be deemed to have been submitted by that User pursuant to this Planning Code.

DRC.5.4.3 A **User** will advise **NGET** in writing of any estimated data it intends to use pursuant to DRC.5.4.1 in the event of data not being supplied.

DEMAND PROFILES AND **ACTIVE ENERGY** DATA

The following information is required from each **Network Operator** and from each **Non-Embedded Customer**. The data should be provided in calendar week 24 each year (although **Network Operators** may delay the submission until calendar week 28).

DATA DESCRIPTION	F. Yr. 0	F. Yr. 1	F. Yr. 2	F. Yr. 3	F. Yr. 4	F. Yr. 5	F. Yr. 6	F. Yr. 7	UPDATE TIME	DATA CAT
Demand Profiles										
Total User's system profile by demand group (please delete as applicable)	Day of **User's** annual Maximum demand at **Annual ACS Conditions** (MW, MVA Day of annual peak of **GB Transmission System Demand** at **Annual ACS Conditions** (MW, MVA) Day of annual minimum **GB Transmission System Demand** at average conditions (MW, MVA)									
0000 : 0030									Wk.24	**SPD**
0030 : 0100									:	
0100 : 0130									:	
0130 : 0200									:	:
0200 : 0230									:	:
0230 : 0300									:	:
0300 : 0330									:	:
0330 : 0400									:	:
0400 : 0430									:	:
0430 : 0500									:	:
0500 : 0530									:	:
0530 : 0600									:	:
0600 : 0630									:	:
0630 : 0700									:	:
0700 : 0730									:	:
0730 : 0800									:	:
0800 : 0830									:	:
0830 : 0900									:	:
0900 : 0930									:	:
0930 : 1000									:	:
1000 : 1030									:	:
1030 : 1100									:	:
1100 : 1130									:	:
1130 : 1200									:	:
1200 : 1230									:	:
1230 : 1300									:	:
1300 : 1330									:	:
1330 : 1400									:	:
1400 : 1430									:	:
1430 : 1500									:	:
1500 : 1530									:	:
1530 : 1600									:	:
1600 : 1630									:	:
1630 : 1700									:	:
1700 : 1730									:	:
1730 : 1800									:	:
1800 : 1830									:	:
1830 : 1900									:	:
1900 : 1930									:	:
1930 : 2000									:	:
2000 : 2030									:	:
2030 : 2100									:	:
2100 : 2130									:	:
2130 : 2200									:	:
2200 : 2230									:	:
2230 : 2300									:	:
2300 : 2330									:	:
2330 : 0000									:	:

DATA DESCRIPTION	Out-turn Actual	Out-turn Weath corr.	F.Yr. 0	Update Time	Data Cat
Active Energy Data Total annual **Active Energy** requirements under average conditions of each **Network Operator** and each **Non-Embedded Customer** in the following categories of **Customer** Tariff:- LV1 LV2 LV3 EHV HV Traction Lighting User System Losses **Active Energy** from **Embedded Small Power Stations** and **Embedded Medium Power Stations**				Week 24	**SPD**

NOTES:

1. 'F. yr.' means '**Financial Year**'

2. **Demand** and **Active Energy** Data (General)

   Demand and **Active Energy** data should relate to the point of connection to the **GB Transmission System** and should be net of the output (as reasonably considered appropriate by the **User**) of all **Embedded Small Power Stations, Medium Power Stations** and **Customer Generating Plant**. Auxiliary demand of **Embedded Power Stations** should be included in the demand data submitted by the **User** at the **Connection Point**. **Users** should refer to the **PC** for a full definition of the **Demand** to be included.

3. **Demand** profiles and **Active Energy** data should be for the total **System** of the **Network Operator**, including all **Connection Points**, and for each **Non-Embedded Customer**. **Demand Profiles** should give the numerical maximum demand that in the **User**'s opinion could reasonably be imposed on the **GB Transmission System**.

4. In addition the demand profile is to be supplied for such days as **NGET** may specify, but such a request is not to be made more than once per calendar year.

CONNECTION POINT DATA

The following information is required from each **Network Operator** and from each **Non-Embedded Customer**. The data should be provided in calendar week 24 each year (although **Network Operators** may delay the submission until calendar week 28).

DATA DESCRIPTION		F.Yr 0	F.Yr 1	F.Yr 2	F.Yr. 3	F.Yr. 4	F.Yr. 5	F.Yr 6	F.Yr 7	UPDATE TIME	DATA CAT
SPECIFIC HALF HOUR **DEMANDS** AND **POWER FACTORS** (see Notes 2, 3 and 5)											
Demand Group against which information below is to be supplied (name of **Demand Group**)										Wk17	**SPD**
Individual **Connection Point Demands** and **Power Factor** at : (name of GSP)											
		-	-	-	-	-	-	-	-		
The annual peak half Hour at the	MW	-	-	-	-	-	-	-	-	Wk.24	**SPD**
Demand Group at **Annual ACS Conditions**	p.f.	-	-	-	-	-	-	-	-	Wk.24	**SPD**
		-	-	-	-	-	-	-	-		
For the Season(s) specified as:- (the information below to be supplied in this context at the **Users** absolute discretion)											
		-	-	-	-	-	-	-	-		
The Seasonal peak half Hour at the	MW	-	-	-	-	-	-	-	-	Wk.24	**SPD**
Demand Group at **Annual ACS Conditions**	p.f.	-	-	-	-	-	-	-	-	Wk.24	**SPD**
		-	-	-	-	-	-	-	-		
Lumped Susceptance (See Note 6. This data item is not required if a **Single Line Diagram** associated with the **Connection Point** has been provided)		-	-	-	-	-	-	-	-	Wk.24	**SPD**
		-	-	-	-	-	-	-	-		
		-	-	-	-	-	-	-	-		
		-	-	-	-	-	-	-	-		
Deduction made for **Small Power Stations, Medium Power Stations** and **Customer Generating Plant** (MW)		-	-	-	-	-	-	-	-	Wk.24	**SPD**
		-	-	-	-	-	-	-	-		
		-	-	-	-	-	-	-	-		
The specified time of the annual peak half hour of **GB Transmission System Demand** at **Annual ACS Conditions**	MW	-	-	-	-	-	-	-	-	Wk.24	**SPD**
	p.f.	-	-	-	-	-	-	-	-	Wk.24	**SPD**
		-	-	-	-	-	-	-	-		
The **Maintenance Period Demand (**as a % of the Annual Peak half hour above)											
		-	-	-	-	-	-	-	-		
Deduction made for **Small Power Stations, Medium Power Stations** and **Customer Generating Plant** (MW)		-	-	-	-	-	-	-	-	Wk.24	**SPD**
		-	-	-	-	-	-	-	-		
		-	-	-	-	-	-	-	-		
The specified time of the annual minimum half hour of the **GB Transmission System Demand**	MW	-	-	-	-	-	-	-	-	Wk.24	**SPD**
	p.f.	-	-	-	-	-	-	-	-	Wk.24	**SPD**
		-	-	-	-	-	-	-	-		
Deduction made for **Small Power Stations, Medium Power Stations** and **Customer Generating** Plant		-	-	-	-	-	-	-	-	Wk.24	**SPD**
		-	-	-	-	-	-	-	-		
		-	-	-	-	-	-	-	-	Once p.a. max.	
For such other times as **NGET** may specify	MW	-	-	-	-	-	-	-	-		**SPD**
		-	-	-	-	-	-	-	-		
	p.f.	-	-	-	-	-	-	-	-		**SPD**

Deduction made for **Small Power Stations, Medium Power Stations** and **Customer Generating Plant**	- -	- -	- -	- -	- -	- -	- -	- -	Once p.a. Max.	 **SPD**

DATA DESCRIPTION	F.Yr 1	F.Yr 2	F.Yr 3	F.Yr 4	F.Yr 5	F.Yr 6	F.Yr 7	UPDATE TIME	DATA CAT
DEMAND TRANSFER CAPABILITY (PRIMARY SYSTEM)									
Where a **User's Demand**, or group of **Demands**, may be fed from alternative **Connection Point(s)** the following information should be provided per demand transfer.									
First circuit outage (fault outage) condition									
Name of the alternative **Connection Point(s)**								Wk.24	**SPD**
Demand transferred (MW)								Wk.24	**SPD**
(Mvar)								Wk.24	**SPD**
Transfer arrangement								Wk.24	**SPD**
i.e Manual (M) Interconnection (I) Automatic (A)									
Transfer type i.e post fault interconnection with another **Demand Group** i.e. transfer of an element of **Demand** contained within this **Demand Group** to an alternative **Demand Group**								Wk.24	**SPD**
Time to effect transfer (hrs)								Wk.24	**SPD**
Periods for which this transfer does not apply.								Wk 24	**SPD**
Second Circuit outage (planned outage) condition									
Name of the alternative **Connection Point(s)**								Wk.24	**SPD**
Demand transferred (MW)								Wk.24	**SPD**
(Mvar)								Wk.24	**SPD**
Transfer arrangement								Wk.24	**SPD**
i.e Manual (M) Interconnection (I) Automatic (A)									
Time to effect transfer (hrs)								Wk.24	**SPD**
Transfer type i.e post fault interconnection with another **Demand Group** i.e. transfer of an element of **Demand** contained within this **Demand Group** to an alternative **Demand Group**								Wk.24	**SPD**
Periods for which this transfer does not apply.								Wk 24	**SPD**

The above demand transfer capability information for specific **Grid Supply Points** is to be updated during the current year - see Schedule 6.

DATA DESCRIPTION	F.Yr 0	F.Yr 1	F.Yr. 2	F.Yr. 3	F.Yr 4	F.Yr. 5	F.Yr. 6	F.Yr 7	UPDATE TIME	DATA CAT
SMALL POWER STATION, MEDIUM POWER STATION AND **CUSTOMER** GENERATION SUMMARY For each **Connection Point** where there are **Embedded Small Power Stations, Medium Power Stations** or **Customer Generating Stations** the following information is required:										
No. of **Small Power Stations, Medium Power Stations** or **Customer Power Stations**									Wk.24	**SPD**
Number of **Generating Units** within these stations									Wk.24	**SPD**
Summated Capacity of all these **Generating Units**									Wk.24	**SPD**
Where the **Network Operator's System** places a constraint on the capacity of an **Embedded Large Power Station**										
Station Name **Generating Unit**									Wk.24 Wk.24	**SPD** **SPD**
System Constrained Capacity									Wk.24	**SPD**

For each **Single Line Diagram** provided under Schedule 5, nodal **Demands, Power Factors** and lumped susceptances are to be provided for the specified time of the annual peak half hour of **GB Transmission System Demand** at **Annual ACS Conditions:**

Connection Point		Year		Wk.24	**SPD**
Node	**Demand**	**Power Factor**	Lumped Susceptance		

NOTES:

1. 'F.Yr.' means '**Financial Year**'. F.Yr. 1 refers to the current financial year.

2. **Demand** Data (General)

   All **Demand** data should be net of the output (as reasonably considered appropriate by the **User**) of all **Embedded Small Power Stations, Medium Power Stations** and **Customer Generating Plant**. **Demand** met by **Suppliers** supplying **Customers** within the **User System** should be included. Auxiliary demand of **Embedded Power Stations** should not be included in the demand data submitted by the **User**. **Users** should refer to the **PC** for a full definition of the **Demand** to be included.

3. Peak **Demands** should relate to each **Connection Point** individually and should give the maximum demand that in the **User's** opinion could reasonably be imposed on the **GB Transmission System**. Where the busbars on a **Connection Point** are expected to be run in separate sections separate **Demand** data should be supplied for each such section of busbar.

   In deriving **Demands** any deduction made by the **User** (as detailed in note 2 above) to allow for **Embedded Small Power Stations, Medium Power Stations** and **Customer Generating Plant** is to be specifically stated as indicated on the Schedule.

4. **NGET** may at its discretion require details of any **Embedded Small Power Stations** or **Embedded Medium Power Stations** whose output can be expected to vary in a random manner (eg. wind power) or according to some other pattern (eg. tidal power)

5. Where more than 95% of the total **Demand** at a **Connection Point** is taken by synchronous motors, values of the **Power Factor** at maximum and minimum continuous excitation may be given instead.

6. **Power Factor** data should allow for series reactive losses on the **User's System** but exclude reactive compensation specified separately in Schedule 5, and any network susceptance provided under Schedule 11.

PART 3

NETWORK DATA

PC.A.8 To allow a **User** to model the **GB Transmission System**, **NGC** will provide the following **Network Data** to **Users**, calculated in accordance with **Good Industry Practice**:-

PC.A.8.1 **Single Point of Connection**

For a **Single Point of Connection** to a **User's System**, as an equivalent 400kV or 275kV source and also in Scotland as an equivalent 132kV source, the data (as at the HV side of the **Point of Connection** reflecting data given to **NGC** by **Users**) will be given to a **User** as follows:-

The data items listed under the following parts of PC.A.8.3:-

(a) (i), (ii), (iii), (iv), (v) and (vi)

and the data items shall be provided in accordance with the detailed provisions of PC.A.8.3 (b) - (e).

PC.A.8.2 **Multiple Point of Connection**

For a **Multiple Point of Connection** to a **User's System**, equivalents suitable for use in loadflow and fault level analysis will be provided. ~~the~~ These equivalents will normally be in the form of a π model or extension with a source (or demand for a loadflow equivalent) at each node and a linking impedance. The boundary nodes for the equivalent shall be agreed with the **User** and may either be at the **Connection Point** or at suitable nodes within the **GB Transmission System**. The data ~~at the **Connection Point**~~ will be given to a **User** as follows:-

The data items listed under the following parts of PC.A.8.3:-

(a) (i), (ii), (iv), (v), (vi), (vii)~~and,~~ (viii),(ix), (x) and (xi)

and the data items shall be provided in accordance with the detailed provisions of PC.A.8.3 (b) - (e).

When an equivalent of this form is not required **NGC** will not provide the data items listed under the following parts of PC.A.8.3:-

(a) (vii) ~~and,~~ (viii), (ix), (x) and (xi)

PC.A.8.3 Data Items

(a) The following is a list of data utilised in this part of the **PC**. It also contains rules on the data which generally apply.

(i) symmetrical three-phase short circuit current infeed at the instant of fault from the **GB Transmission System**, (I_1");

(ii) symmetrical three-phase short circuit current from the **GB Transmission System** after the subtransient fault current contribution has substantially decayed, (I_1');

(iii) the zero sequence source resistance and reactance values at the **Point of Connection**, consistent with the maximum infeed below;

(iv) the pre-fault voltage magnitude at which the maximum fault currents were calculated;

(v) the positive sequence X/R ratio at the instant of fault;

(vi) the negative sequence resistance and reactance values of the **GB Transmission System** seen from the **Point of Connection**, if substantially different from the values of positive sequence resistance and reactance which would be derived from the data provided above;

(vii) the initial positive sequence resistance and reactance values of the two (or more) sources and the linking impedance(s) derived from a fault study constituting the (π) equivalent and evaluated without the **User** network and load, and where appropriate without elements of the **GB Transmission System** between the **User** network and agreed boundary nodes, and;

(viii) the positive sequence resistance and reactance values of the two (or more) sources and the linking impedance(s) derived from a fault study, considering the short circuit current conditions after the subtransient fault current contribution has substantially decayed, constituting the (π) equivalent and evaluated without the **User** network and load, and where appropriate without elements of the **GB Transmission System** between the **User** network and agreed boundary nodes, and;

(~~viii~~ ix) the corresponding zero sequence impedance values of the (π) equivalents produced for use in fault level analysis.

(x) the demand and voltage at the boundary nodes and the positive sequence resistance and reactance values of the linking impedance(s) derived from a loadflow study, considering **GB Transmission System** peak, constituting the (π) loadflow equivalent,

(xi) where the agreed boundary nodes are not at the **Connection Point,** the positive sequence and zero sequence impedances of all elements of the **GB Transmission System** between the **User** network and agreed boundary nodes that are not included in the equivalent.

(b) To enable the model to be constructed, **NGC** will provide data based on the following conditions.

(c) The initial symmetrical three phase short circuit current and the transient period three phase short circuit current will normally be derived from the fixed impedance studies. The latter value should be taken as applying at times of 120ms and longer. Shorter values may be interpolated using a value for the subtransient time constant of 40ms. These fault currents will be obtained from a full **System** study based on load flow analysis that takes into account any existing flow across the point of connection being considered.

(d) Since the equivalent will be produced for the 400kV or 275kV and also in Scotland 132kV parts of the **GB Transmission System** **NGC** will provide the appropriate supergrid transformer data.

(e) The positive sequence X/R ratio and the zero sequence impedance value will correspond to the **NGC** source network only, that is with the section of network if any with which the equivalent is to be used excluded. These impedance values will be derived from the condition when all **Generating Units** are **Synchronised** to the **GB Transmission System** or a **User's System** and will take account of active sources only including any contribution from the load to the fault current. The passive component of the load itself or other system shunt impedances should not be included.

(f) A **User** may at any time, in writing, specifically request for an equivalent to be prepared for an alternative **System** condition, for example where the **User's System** peak does not correspond to the **GB Transmission System** peak, and **NGC** will, insofar as such request is reasonable, provide the information as soon as reasonably practicable following the request.