

WORKING GROUP REPORT

P2/5 Working Group

**Prepared by the P2/5 Working Group
for submission to the Grid Code Review Panel**

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Name	Organisation
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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 Engineering Recommendation P2/5 and Great Britain Security and Quality of Supply Standard (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 the Working Group believe, alleviate Ofgem concerns regarding compliance with the relevant Licence Standards across the network interface between National Grid and DNOs.

Working Group Recommendation

- 1.4 The Working Group believes that it has largely satisfied its Terms of Reference and recommends that the Grid Code Review Panel (GCRP) consider the proposed changes contained within this Working Group Report at the February 2007 GCRP meeting.
- 1.5 The Working Group recommends a number of Grid Code changes which may be summarised as follows:
 - i) Introduction of new Grid Code terms (Access Group, Maintenance Period and Transmission Interface Circuit) and associated provisions such that more robust data can be provided by DNOs to National Grid that can then be used to demonstrate that assets are maintainable in accordance with the GB SQSS.
 - ii) Reinforce the principle that the fundamental principle behind the assessment of Transmission Interface Circuits against the Licence Standards is that the respective networks need to be coherently modelled. To facilitate this, the existing Single Line Diagram provisions within the Grid Code have been strengthened to ensure that National Grid is able to assess compliance using a Single Line Diagram that accurately represents the planned network configuration during each assessment period.
 - iii) Replace the existing Grid Code provisions that concern Demand Transfers (PC.A.4.5) with a process based around the Single Line Diagram that describes actions that would be taken by a Network Operator post fault to reconfigure their network.

- iv) Insert a new PC.7 clause which will recognise that data exchanged through the Planning Code is not only used to establish whether Connections Sites can meet the demand normally supplied from them but also to establish whether they can be maintained in accordance with various security standards and that this process is necessarily an iterative one that relies on a significant dialogue between the parties involved in the process.
 - v) Introduce new obligations in PC.A.8 to expand the data set National Grid will provide to a Network Operator should the Network Operator request such data in order to model the impact of the GB Transmission System upon its distribution system.
 - vi) New Grid Code provisions (DRC5.5) are proposed to be introduced to clarify the process following the submission of erroneous data.
 - vii) To amend existing Grid Code Schedules and introduce further Grid Code Schedules within the Data Registration Code which reflect the amended/new Grid Code provisions.
- 1.6 Since the commencement of the Working Group in January 2006, the compliance standard against which DNOs must plan, develop and operate their networks (P2/5) has been amended to include a revised treatment of Embedded Generation when considering compliance (P2/6). The Working Group noted the introduction of the new standard P2/6 and acknowledged that the treatment of Embedded Generation in establishing compliance against the P2/6 and GB SQSS was an important and significant issue. However it was beyond the terms of reference of this working group. The Working Group did agree that such issues surrounding Embedded Generation were worthy of a thorough review by the appropriate party, which is likely to be the owners of and parties affected by P2/6 and the GB SQSS and it recommends that such a review be undertaken.
- 1.7 The Working Group further noted that the new processes require significantly more data to be provided particularly in connection with the summer Maintenance Period. Historically most data has been provided over the winter period and over the years thorough forecasting methodologies and benchmarks have been developed (e.g. the adoption of forecasts based upon ACS conditions). However equivalently thorough methodologies have not yet been developed for summer forecasting (based upon Average Conditions). The Working Group felt that though such a body of work was again beyond its terms of reference it would recommend that this is another area where further analysis and development should be commissioned. The wording of the grid Code should reflect that weather corrected or average maintenance period data submitted in the interim may be derived using non-standard methodologies and hence are on a best endeavours basis.
- 1.8 Though not formally a recommendation the Working Group would like to highlight that the proposals in this Working Group Report, should they ultimately be implemented within the Grid Code would cause a significant increase in workload for DNOs and National Grid both in terms of the compliance process and in the generation of the data to feed into that process. However all parties agree that the process as detailed in this report is best able to meet the objectives of the Working Group and that the additional resource required to effectively implement these proposals will need to be identified and provided moving forward.

2.0 BACKGROUND

- 2.1 In Autumn 2004, Ofgem launched a formal investigation into EDF Energy's compliance with their Distribution Licence, and also formally sought information from National Grid under the terms of their Transmission Licence. The investigation covered four separate issues, one of which was 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 more robustly assured that companies are P2/5 or GB SQSS compliant at the interface.
- 2.4 At a subsequent 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, a paper was presented (Annex 2) outlining the requirement for a formal review of the issues identified by Ofgem investigation. The GCRP agreed that a 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.
- 2.6 At the February 2006 GCRP, the Panel agreed with the Working Group's initial recommendations and noted a number of outstanding issues which would need to be addressed prior to industry consultation. To facilitate the resolution of these outstanding issues National Grid further developed the proposals and the P2/5 Working Group was reconvened in October 2006 to discuss these revised proposals in greater detail. Since October 2006 there have been three further meetings of the Working Group together with a number of Bilateral Meetings between National Grid and DNOs. The outcome of these discussions is the agreed proposals contained within this Working Group Report that is being presented to the February 2007 GCRP.

3.0 PURPOSE AND SCOPE OF WORKING GROUP

- 3.1 The terms of reference for the P2/5 Working Group were to discuss the following areas where possible improvements may be required to be incorporated within the Grid Code:
 - a) 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
 - b) Consider adequacy of existing requirements of the Grid Code, in particular, but not necessarily limited to, the treatment of the following areas:
 - i) summer and seasonal peak load levels, and the appropriate statistical factors governing the forecasting of these quantities

- ii) treatment of interconnected GSPs and format of data provision
- iii) maintenance demand
- iv) maintenance windows
- v) transfer capacity

- c) 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.

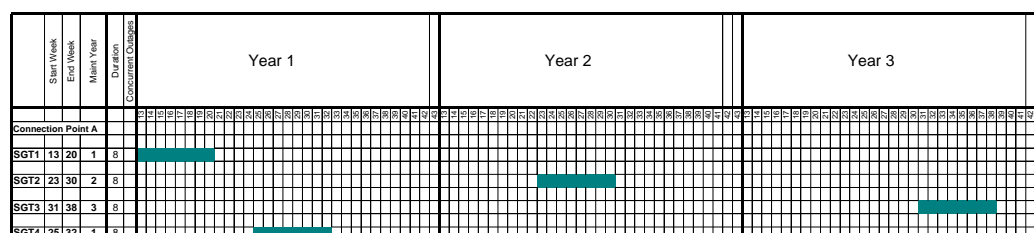
4.0 WORKING GROUP DISCUSSIONS

- 4.1 The Working Group noted that National Grid and DNOs are required to meet different compliance standards in order to fulfil their licence obligations i.e. DNO - P2/6 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, voltage security and the treatment of embedded generation) 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 within the guidance notes for DNOs for completing the DRC Schedules it produces that are complementary to the Grid Code provisions.
- 4.3 The Working Group debate focused on following the areas:
 - Maintenance Period
 - Interconnected Networks
 - Maintenance Period Demand and Single Line Diagrams
 - Demand Transfer Capability
 - 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.
- 4.5 Maintenance Period

- 4.5.1 Currently the Winter Peak Demand supplied through Week 24 data submission forms the basis for National Grid's assessment of compliance during the summer maintenance period, with Maintenance Period Demand being assumed to be 67% of Winter Peak Demand unless better data is available. However it is been acknowledged that this assumption and the wider process is no longer adequate due to the complex and changing dynamics of the Total System. To resolve this matter on an enduring basis and to ensure compliance with the Licence Standards¹ it will be necessary to set up an additional data stream relating specifically to the maintenance period and its associated demand levels.
- 4.5.2 The objective would be to use the data gathered through the Grid Code to assess if the circuits connecting the GB Transmission System to a DNO System at a Connection Point (known as "Transmission Interface Circuits") are ***maintainable*** in accordance with the GB SQSS. That is to say the data would enable National Grid planning department to assess if it were theoretically possible to place maintenance outages for each Transmission Interface Circuit such that each one could be placed on a maintenance outage without prejudicing the overall security of the Connection Point. Note here that the process does not aim to operationally plan outages. This activity will still be one for the operational teams at both National Grid and DNOs and will continue to take place nearer to real time following the processes set out in the Operating Codes of the Grid Code. The planning process concentrates solely on the theoretical maintainability of the assets. If operational teams find that in practice maintenance is proving extremely difficult at a site this will need to be fed into the planning discussions in the same manner as it is currently.
- 4.5.3 As a starting point for these discussions, 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. However 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.
- 4.5.4 National Grid confirmed however that for planning purposes a compliant system could be maintained provided it could be demonstrated that each Transmission Interface Circuit could be maintained in a period of eight continuous weeks. The eight continuous week period being a sufficient period to carry out routine maintenance of the Transmission Interface Circuit.

¹ "Licence Standards" is used in this Working Group Report to mean collectively the GB SQSS and Engineering Recommendation P2/5 (now ER P2/6)

- 4.5.5 As a result the first proposal is to incorporate within the Grid Code a process that will allow DNOs to identify to National Grid a discrete maintenance period for each Transmission Interface Circuit. Such Maintenance Periods would need to be of a minimum of eight weeks in length and identified over a rolling 3 year cycle. 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 each of a minimum of 8 weeks duration in one of the three years will need to be identified to enable adequate access to the National Grid circuits for maintenance. This is shown diagrammatically below:



- 4.5.6 It can be seen from the above diagram that because there are 4 Transmission Interface Circuits at the Connection Point within the Access Group, Year 1 has two Maintenance Periods (in blue) within it but in each of Years 2 and 3 there is only a single Maintenance Period.
- 4.5.7 To enshrine this principle within the Grid Code the definition of the Maintenance Period and a process by which DNOs are able to identify it is recommended by the Working Group to be placed within the Grid Code.
- 4.5.8 The process itself will rely on discussions taking place between National Grid and the User throughout the planning process. The process is formally initiated by a DNO submitting its proposed Maintenance Periods for its Transmission Interface Circuits in Week 6 (this may be preceded by informal discussions between National Grid and the DNO on the Maintenance Periods that would be appropriate). As noted above, these Maintenance Periods may be of eight or more weeks in length.
- 4.5.9 Where a DNO submits a Maintenance Period of a period greater than 8 weeks in length National Grid will then as it only requires an eight week slot to demonstrate maintainability will assess which eight week "slot" within the declared Maintenance Period it will use for the purposes of the compliance assessment. The aim to this process will be to ensure that each Transmission Interface Circuit is maintainable in isolation, that is to say that no two Transmission Interface Circuits have to be considered to be assessed for maintainability concurrently – i.e. as theoretically being on maintenance outage at the same time.

- 4.5.10 Once National Grid has identified these maintenance slots and any issues surrounding concurrent outages it will notify the DNO of these assumptions to be used in future GB SQSS compliance assessments by week 10. Again further discussions between National Grid and the DNO are envisaged before finally in Week 17 National Grid will be able to confirm the Maintenance Periods and any issues surrounding concurrent outages. Where a DNO can submit eight week non-overlapping maintenance periods in week 6 then clearly the submissions in week 10 and 17 by National Grid should be merely confirming the previous submission.
- 4.5.11 The detailed legal text drafting to codify these proposals developed by National Grid and incorporating the views of the Working Group can be found in Annex 3.
- 4.5.12 A further view has been put forward by some members late in the drafting stage of the Working Group report which would place the onus on National Grid to instigate the initial placement of Maintenance Periods for Transmission Interface Circuits – i.e. the roles in the week 6 submission would be reversed with National Grid submitting proposed Maintenance Periods to DNOs. Views in support of this include:
- That as the exchange of data is concerned with establishing GB SQSS compliance, a matter primarily for National Grid then it would be more appropriate for National Grid to start the process by providing the initial theoretical plan to the DNO and then for both parties to agree it.
 - That for Access Groups that contain Connection Points owned by multiple Users, National Grid would be best placed to oversee the initial scheduling of Maintenance Periods given that the DNOs would not have information available to assess the impact of a neighbouring DNOs system on its schedule of Maintenance Periods.
- 4.5.13 National Grid has not yet had sufficient time to assess this proposal, however National Grid will assess the merits of it prior to the issuing of any consultation on these changes and if it considers it to be an appropriate change will amend the legal text accordingly.

4.6 Interconnected Networks

- 4.6.1 Next the Working Group examined the issues surrounding the interconnectivity of distribution networks and the planning issues that this causes. Interconnected networks may be permanently interconnected or may be interconnected by means of a reconfiguration of the network following a fault allowing Demand to be redistributed around the distribution network. In either case a maintenance outage at one Transmission Interface Circuit (TIC) clearly influences the other Connection Points to which it is, or may be following a fault, interconnected via the distribution network. As such when assessing whether a TIC is maintainable, clearly the conditions at the other connection points need to be known.

- 4.6.2 As such the concept of an Access Group was developed through the Working Group. The aim of an Access Group is to identify those Connection Points (and the TICs at each) which need to be assessed simultaneously when considering whether each TIC is maintainable. An Access Group has since been taken by the Working Group to mean informally “a group of Connection Points, which are either permanently interconnected or where a post fault action will see them become temporarily (and as a consequence of this temporary interconnection a transfer of demand from one Connection Point to another occurs – a “Demand Transfer”)”.
- 4.6.3 The aim would be for all Connection Points to be considered as either an Access Group on their own (if they are not at any time interconnected through the DNO network to another Connection Point), or for a group of interconnected Connection Points to be considered as a larger Access Group. Each Connection Point on the GB Transmission System would then be in one, and only one Access Group as by definition if a Connection Point were to be in two Access Groups then both Access Groups should be merged into a single larger Access Groups as they would be interconnected through the shared Connection Point.
- 4.6.4 Once Access Groups had been identified then all compliance assessments would take place on the Access Group basis. That is to say all data would be required for each Connection Point within each Access Group and this data would need to be re-calculated for each Maintenance Period declared within each Access Group. This is recognised by all parties at the Working Group to be a significant increase in workload for DNOs and National Grid both in terms of the compliance process and in the generation of the data to feed into that process. However all parties agree that this process is best able to meet the objectives of the Working Group and that the additional resource required will need to be identified and provided moving forward.
- 4.6.5 Clearly the Access Group concept though necessary can complicate the requirements for data, for instance the maintainability of the much larger numbers of Transmission Interface Circuits that needs to be considered through the process means that concurrent outages of TICs may need to be considered as part of the planning process. For example where more than 9 TICs are in an Access Group then concurrent outages will become necessary due to there not being sufficient weeks in the outage season (weeks 13 to 43) over the three year cycle to allow discrete outages to be planned. This is shown diagrammatically below where it can be seen that SGT2 at Connection Point A and SGT2 at Connection Point C must be considered whether they are maintainable concurrently.

4.6.7 The detailed legal text drafting to codify these proposals developed by National Grid and incorporating the views of the Working Group can be found in Annex 3.

4.7 Forecast Demand Submissions and Single Line Diagrams

Forecast Demand Submissions

- GB Transmission System Peak
- Local Connection Point Peak
- GB Transmission System Minimum
- Other periods specified by National Grid (can only be used if reasonably justified)

4.7.2 Clearly now both the Access Group and the Maintenance Periods have been established comes the process of assessing the maintainability of the Transmission Interface Circuits. To perform this assessment, forecast demands together with a number of other parameters will need to be provided by DNOs to National Grid for the Maintenance Period in addition to the four existing periods for which data needs to be provided.

- 4.7.3 First to be considered by the Working Group was the forecast Maintenance Period Demand. The Working Group acknowledged that a Maintenance Period Demand needs to be provided for each Transmission Interface Circuit connecting the Transmission System to User System(s). It is anticipated that a Maintenance Period Demand would be submitted for each Transmission Interface Circuit and would represent the maximum forecast demand that would be seen at the Connection Point to which the Transmission Interface Circuit belongs during the identified Maintenance Period.
- 4.7.4 In addition where that Connection Point is part of an Access Group with two or more Connection Points, in order for robust security studies to be undertaken, the forecast Demand at all Connection Points within the Access Group must be declared during the Maintenance Period identified for each Transmission Interface Circuit in that Access Group. It is vital that such information is provided such that the distribution of Demand following a fault in an interconnected distribution network can be established, or where a distribution network is planned to be reconfigured post fault, that such reconfiguration does not overload another Transmission Interface Circuit.
- 4.7.5 The forecast demand submission can at the option of the User, take one of two forms. It may either be submitted as a single aggregated figure for the Connection Point, or should the User prefer it may be given at the nodal (Bulk Supply Point) level below the Connection Point level. Note that this option is to be applied to both to the new Maintenance Period Demand forecast submission **and** also to the forecast demand submissions for the four pre-existing assessment periods within the Grid Code.

Single Line Diagrams

- 4.7.6 The Working Group agreed that the basis upon which TICs feeding complex interconnected distribution networks are to be assessed is for National Grid to have at its disposal sufficient information to allow it to model the distribution network. At the heart of this principle is an accurate Single Line Diagram of the distribution system. Provisions currently exist within the Grid Code for a Single Line Diagram to be submitted that represents the User's distribution system at the time of GB Transmission System Peak. In future however it will be necessary for Single Line Diagrams to be generated for all the other periods for which an assessment of compliance is to occur.
- 4.7.7 In order to facilitate this but in order to minimise the volume of data that needs to be transferred between a DNO and National Grid, National Grid will assume that the User's distribution network will continue to be configured as per the GB Transmission System peak single line diagram during each Maintenance Period unless otherwise notified by the User. Should Users wish to notify a change they may do so either through the submission of a revised single line diagram and its associated (Schedule 5) data that is valid during the assessment period, or where it is easier for the DNO, for the DNO to submit a clear and unambiguous description of the changes that need to be made to the GB Transmission System peak Single Line Diagram such that it represents the distribution system in the relevant assessment period.
- 4.7.8 The five assessment periods for which an accurate Single Line Diagram would be needed are:
- GB Transmission System Peak
 - Connection Point Peak

- GB Transmission System Minimum
- Other periods specified by National Grid or the User (can only be used if reasonably justified)
- Maintenance Period for each Transmission Interface Circuit within an Access Group

It was noted that for a number of these periods a common Single Line Diagram may apply.

4.7.9 The Working Group noted that it would be explicit within the Grid Code that a revised Single Line Diagram would only be required when notifying National Grid of changes to their network during the above assessment periods. Should the configuration of a DNO's network change for operational reasons then clearly such a change need not be notified to National Grid (unless of course this were to become the planned background against which maintainability needed to be assessed in which case it should be notified through the following years week 24 submission).

4.7.10 The Working Group noted that again it is important to remember that the Maintenance Period identified through the Planning Code is a theoretical one used solely to verify the maintainability of Transmission Interface Circuits. It does not serve to provide for a mechanism to establish actual operational outage windows, which will continue to be established using the separate processes contained within the Operational Codes of the Grid Code.

4.7.11 The detailed legal text drafting to codify these proposals developed by National Grid and incorporating the views of the Working Group can be found in Annex 3.

4.8 Demand Transfer Capability

4.8.1 There currently exists within the Grid Code (PC.A.4.5) the concept of Demand Transfer Capability. This exists to allow a DNO to declare that it intends to transfer demand within its network such that it is fed from an alternative Connection Point to the GB Transmission System post fault, so allowing the Total System to be re-secured following the fault.

4.8.2 The existing arrangements within the Grid Code have the potential to be opaque and complex for Users to manage. For instance under the current system a DNO needs to model the impact of reconfiguring its network at lower voltages upon the demands being supplied through the Connection Points. This figure is then provided to National Grid and National Grid then has to back derive how the transfer is facilitated. The Working Group therefore believed that the existing process could be improved significantly.

4.8.3 Firstly the Working Group examined the circumstances where a Demand Transfer might need to be declared and noted that DNO is not required to provide Demand Transfer Capability if there is sufficient capacity in the Access Group. In fact the Working Group went further agreeing that due to the complexities that can occur when considering demand transfers it would be better if a DNO were to declare a demand transfer only where it was the only remaining option in order to demonstrate compliance with the Licence Standards short of additional network investment.

- 4.8.4 Next the Working Group examined the data submissions that would be required from DNOs to National Grid. National Grid noted that as the Single Line Diagram and associated data now formed the nucleus around which compliance would be assessed so demand transfers should also be based around the Single Line Diagram. The Working Group agreed that a better approach to the existing one in the Grid Code would be for the DNO to submit a description of the post fault actions it would intend to employ following a fault on its network (whether this be under intact (formally known as “First Circuit Outage”) or outage (formally known as “Second Circuit Outage”) conditions). From this description and by modelling the effects of this reconfiguration, National Grid and the relevant DNO will be able to come to a common position on the demand transfer that such a reconfiguration will achieve removing the potential ambiguities from the existing method.
- 4.8.5 It was therefore agreed that the existing Demand Transfer section within the Grid Code should be replaced by one entitled “Post Fault User System Layout” and that through this section the User would be able to describe, relative to its relevant Single Line Diagram the network topology changes that would occur which would lead to the Demand Transfer occurring.
- 4.8.6 Next the Working Group examined the circumstances under which a Demand Transfer would take place. It was agreed by the Working Group that as issues of compliance were being assessed, in order to rely on such network reconfigurations National Grid would need to feel confident that the network reconfiguration would be achievable when it was being relied upon. 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 planned to be utilised. It was also recognised that the transfer capability may not be available during the period as a result of unplanned outages of the DNO system.
- 4.8.7 It was recognised by the Working Group that the new provisions regarding the requirement to declare the characteristics (e.g. response time, whether manual or automatic, etc) of post fault actions may result in DNO's being reluctant to offer post fault actions if they resulted in increased operational risks. The decision as to whether to offer post fault actions may identify the need for network investment in order to maintain compliance with the GB SQSS.
- 4.8.8 Alongside this assumption about the characteristics of declared post fault actions, the Working Group agreed that National Grid would need to be informed of the following:
- The specified Connection Point Assessment Period that is being evaluated (e.g. GB Transmission System Peak, Maintenance Period etc)
 - An accurate and unambiguous description of the fault in response to which the network is being reconfigured
 - An appropriate revised Single Line Diagram and associated node and circuit data

- Where the planned post fault action consists of more than one action each component of the reconfiguration would need to be described against the Single Line diagram and associated data at each stage of the post fault action would need to be provided in sufficient detail² to allow the action to be modelled.
- The arrangements for undertaking the post fault action (e.g. the time taken, whether the action was automatic or manual, and any other appropriate information)

4.8.9 The detailed legal text drafting to codify these proposals developed by National Grid and incorporating the views of the Working Group can be found in Annex 3.

4.9 Provision of Network Model by National Grid to DNOs

4.9.1 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 noted that it would be beneficial to place a Grid Code obligation on National Grid to provide sufficient data to enable the DNOs to model the Transmission System local to their connection points.

4.9.2 It is proposed to introduce new obligations in PC.A.8 to expand the data set National Grid will provide to the Network Operator should the Network Operator request such data. The changes would provide greater clarity to Users regarding the nature of the Transmission System at the point of connection to the GB Transmission System of a User's System. Though the data is to be provided upon request National Grid would normally automatically provide the data to a DNO if it had been provided in the previous year.

4.9.3 The detailed legal text drafting to codify these proposals developed by National Grid and incorporating the views of the Working Group can be found in Annex 3.

4.10 Data Exchange

4.10.1 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 this 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 relating to the appropriate data for substitution

² More detailed guidance on the levels of detail needed here could be provided through the Guidance Notes if necessary.

- 4.10.2 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 'estimated' 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 data resubmitted by the DNO.
- 4.10.3 The detailed legal text drafting to codify these proposals developed by National Grid and incorporating the views of the Working Group can be found in Annex 3.

4.11 Other Changes

Basis of Forecast Demands

- 4.11.1 The Working Group noted that some of the periods for which forecast demands are required to be provided by DNOs under the Grid Code may occur in the spring, summer and autumn months (e.g. Maintenance Period Demand and Connection Point Peak Demand). As a result, the accuracy of using Average Cold Spell (ACS) conditions as a basis for these forecasts is likely to be inappropriate. Therefore the proposed Grid Code wording will specify that a more appropriate basis for submissions of forecast demand is used which is that forecast demands over weeks 13 to 43 (inclusive) should be based upon Average Conditions, whereas those for the period weeks 44 to 12 (inclusive) should be based upon ACS Conditions.
- 4.11.2 Given the assumption that Maintenance Period Demand be based upon weather corrected Average Conditions, the Working Group noted that as severe weather could significantly increase this demand level a "due allowance" figure would be added to the data submissions by National Grid following the User's submission to ensure that the Transmission System can be operated within the requirements of the GBSQSS. This "due allowance" figure would need to be carefully selected as higher demands in the summer are generally triggered by warmer weather and needs to take into account the level of confidence in the demand data and weather correction. The higher demands are then compounded as the warmer weather lowers the ratings of the assets in the Transmission Interface Circuits. This is the reverse situation to the winter where colder weather triggers increased demand but has the benefit of enhancing the ratings of the assets in the Transmission Interface Circuits.
- 4.11.3 Members of the Working Group were keen to see a more extensive evaluation of the basis upon which spring/summer/autumn and Maintenance Period forecast demands would need to be provided. However it was recognised that this work was again beyond the terms of reference for this group. As an interim solution agreement was reached that forecast summer and Maintenance Period demands be provided by DNOs based upon Average Conditions and that DNOs in the absence of thorough forecasting methodologies for establishing forecasts against Average Conditions would do so on a best endeavours basis. National Grid would then establish it's best view of the "due allowance" that needed to be added to this forecast demand in order to mitigate against adverse weather conditions. This view would likely need to be informed through discussions with the DNO on its chosen forecasting approach.

- 4.11.4 The Working group recommends that further evaluation of both the methodologies for forecasting against Average Conditions and the appropriate “due allowance” to be added to forecast summer demands be considered by a pan industry body. In the interim the “due allowance” figure will be arrived at through discussion with the DNO to establish the level of confidence in the demand data and the weather correction.

Planning Liaison

- 4.11.5 It is proposed that a new clause PC.7 will be added to the Planning Code. The purpose of this section is to recognise that one of the underlying purposes to the exchange of data through the Planning Code is to establish whether Connection Points are compliant with the Licence Standards. To establish this fact it may, in some cases, be necessary for there to be an ongoing dialogue between National Grid and Users such that data submissions may be discussed further and potentially modified as part of any agreements. The purpose behind PC.7 is to highlight this responsibility within the Grid Code.
- 4.11.6 The detailed legal text drafting to codify these proposals developed by National Grid and incorporating the views of the Working Group can be found in Annex 3.

Data Registration Code (DRC) Schedules

- 4.11.7 The Working Group agreed that the relevant DRC Schedules should be amended to reflect the new/changed Grid Code provisions. The group noted that the relevant DRC Schedules would be available in electronic format in order to in the submission.
- 4.11.8 The proposals retain the requirement for receipt of data at the date and time of forecast for:
- GB Transmission System Peak Demand
 - Maximum demand at each Connection Point
 - GB Transmission System minimum
 - Any other time period as notified to the relevant User by National Grid (where appropriate)

However they introduce the requirement for the receipt of data at the date and time of the maximum demand in an Access Group during each Maintenance Period for each Transmission Interface Circuit within that Access Group.

4.12 Further Working Group Discussions

- 4.12.1 The Working Group discussed a number of other principles that ultimately did not influence the recommended changes within this Working Group Report. They are included here however as a complete record of Working Group discussions.

Basis of Assessment

- 4.12.2 The Working Group acknowledged that the time of maximum demands at each Connection Point within an Access Group may not be the absolute worst point in time for assessing Transmission System compliance for at least some Transmission Assets.

- 4.12.3 It was suggested that the time of Access Group Peak Demand could be a more onerous time for these Transmission System Assets although it is clear that this time will not be the worst time for all Transmission System Assets. Where the Access Group Peak Demand coincides with the same date and time of Connection Point Peak Demand at one of the Connection Points within the Access Group then the data will be captured by the new proposal allowing for full compliance testing across the Access Group. In the event that the Access Group Peak Demand does not coincide with the same date and time of any Connection Point Peak Demand then the provision which allows National Grid or the User to request additional data could come into play to obtain the necessary data.

Connection Peak Demand

- 4.12.4 It was noted that not all Connection Point Peak Demand occurred at the same time therefore the Demand for each Connection Point within the Access Group would need to be provided to ensure that the data remains consistent across the Access Group. The Working Group noted that for shared sites National Grid will have to specify the date and time for peak demand as this information would not be available to the relevant Users.

4.13 Implementation Issues

- 4.13.1 The Working Group discussed how the proposals would be effectively implemented into the Grid Code, given that the changes would consequential implications for the entire planning calendar.
- 4.13.2 The Working Group noted if the changes where incorporated 'mid-planning year', this would lead to transitional issues and as such a mid-year introduction was considered by the Working Group to be inappropriate.
- 4.13.3 Instead Working Group members agreed with the proposal put forward by National Grid that should the proposals recommended in this report be approved by the Authority prior to 1 January 2008 then the proposals should be implemented within the Grid Code effective upon 1 January 2008. This would inevitably mean that the basis upon which Week 24 data is submitted by DNOs for 2007 would legally remain as per the existing Grid Code text. However parties agreed that the time between any Authority approval of the changes and their potential implementation on 1 January 2008 could be used to move the existing processes towards those that would required under the new arrangements. This could include submission of data items in the new format for week 24 2007 if this were to prove possible. To facilitate this the Working Group recommended that, should the Authority ultimately approve the changes put forward in this report, an implementation programme should be drawn up by the parties affected by the changes.

4.14 GB SQSS and P2/6 Compliance

- 4.14.1 The Working Group acknowledged that there were some differences between the compliance requirements of P2/6 and GB SQSS. It was noted that there would still be a requirement for the relevant parties to conduct their own compliance assessment i.e. GB SQSS compliance assessment could not verify P2/6 compliance.

4.14.2 Some Working Group members noted that it would be more efficient if National Grid and the DNO(s) could undertake a single assessment which would ensure compliance with the two separate provisions. However it was also noted that such a process was beyond the remit of the Working Group's Terms of Reference.

5.0 WORKING GROUP RECOMMENDATIONS

5.1 The Working Group believes that the changes contained in this report :

- will improve the clarity and scope of data transfer across the planning interface
- ensure that the relevant parties can access accurately their compliance against the applicable security standard

5.2 In summary the recommended changes are :

- i) Introduction of new Grid Code terms (Access Group, Maintenance Period and Transmission Interface Circuit) and associated provisions such that more robust data can be provided by DNOs to National Grid that can then be used to assess assets in accordance with the Licence Standards.
- ii) Reinforce the principle that at the fundamental principle behind the assessment of Transmission Interface Circuits against the Licence Standards is that the respective networks need to be coherently modelled. To facilitate this, the existing Single Line Diagram provisions within the Grid Code have been strengthened to ensure that National Grid is able to assess compliance using a Single Line Diagram that accurately represents the planned network configuration during each assessment period.
- iii) Amend the existing Grid Code provisions that concern Demand Transfers to clarify that the existing process should be replaced with a process that describes actions that are taken by a Network Operator post fault to relieve overloads.
- iv) Insert a new PC.7 clause which will recognise that the underlying purpose of the data exchanged through the Planning Code is not only used to establish whether the demand at Connections Sites can be met during normal operation, but also whether they can be maintained in accordance with various security standards and that this process is necessarily an iterative one that relies on a significant dialogue between the parties involved in the process.
- v) Introduce new obligations in PC.A.8 to expand the data set National Grid will provide to the Network Operator should the Network Operator request a network model.
- vi) The existing Grid Code provisions (DRC5.4) are proposed to be amended to clarify the process for the non-submission of data.
- vii) To amend existing Grid Code Schedules and introduce further Grid Code Schedules within the Data Registration Code to be reflective of the amended/new Grid Code provisions.

- 5.3 Since the commencement of the Working Group in January 2006, the compliance standard against which DNOs must plan, develop and operate their networks (P2/5) has been amended to include a revised treatment of Embedded Generation when considering compliance (P2/6). The Working Group noted the introduction of the new standard P2/6 and acknowledged that the treatment of Embedded Generation in establishing compliance against the P2/6 and GB SQSS was an important and significant issue. However it was beyond the terms of reference of this working group. The Working Group did agree that such issues surrounding Embedded Generation were worthy of a thorough review by the appropriate party, which is likely to be the owners and parties affected by both P2/6 and the GB SQSS.
- 5.4 The Working Group further noted that the new processes require significantly more data to be provided relating to the summer maintenance period. Historically most data has been provided over the winter period and over the years thorough forecasting methodologies and benchmarks have been developed (e.g. the adoption of forecasts based upon ACS conditions). However as of yet no such methodologies have been developed for summer forecasting. The Working Group felt that though such a body of work was again beyond its terms of reference it would again be another area where further analysis and development should be commissioned.
- 5.5 Though not formally a recommendation, the Working Group would like to highlight that the proposals in this Working Group Report, should they ultimately be implemented within the Grid Code would cause a significant increase in workload for DNOs and National Grid both in terms of the compliance process and in the generation of the data to feed into that process. However all parties agree that the process as detailed in this report is best able to meet the objectives of the Working Group and that the additional resource required will need to be identified and provided moving forward.
- 5.6 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 DNOs this will inevitably place greater, although appropriate, burden on the regular JTPL meetings held between National Grid and DNO.
- 5.7 Furthermore the Working Group noted that if the new proposals were implemented, it may highlight further issues of non compliance at the interface between DNOs and National Grid which would need to be addressed in the appropriate manner by the relevant parties. It was also accepted that the new provisions may result in DNO's reluctant to offer a demand transfer if they resulted in increased operational risks. The decision as to whether to offer post fault actions may identify the need for network investment in order to maintain compliance with the GB SQSS.

6.0 INITIAL VIEW OF NATIONAL GRID

- 6.1 National Grid agrees with the Working Group recommendations. Pending discussion at the Grid Code Review Panel of this Working Group Report, National Grid would intend to consult with Authorised Electricity Operators on making changes to the Grid Code in line with the Working Group recommendations contained in this report.

- 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 GRID CODE

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

- i. Glossary and Definitions
- ii. Planning Code
- iii. Data Registration Code
- iv. *General Conditions (to be confirmed – depends on preferred implementation date)*

- 7.2 The associated legal text for the Working Group recommendations is outlined in Annex 3.

8.0 IMPACT ON INDUSTRY DOCUMENTS

Impact on Core Industry Documents

- 8.1 None.

Impact on other Industry Documents

- 8.2 None.

Annex 1 – Working Group Terms of Reference and Membership

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

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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 – 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.

Annex 3 – Proposed Grid Code Changes

GLOSSARY AND DEFINITIONS - REVISIONS

“Access Group”	<p>A group of Connection Points within which a User declares under the Planning Code</p> <ul style="list-style-type: none">i) an interconnection and/or,ii) a revised post fault User System layout pursuant to PC.A.4.5 <p>Where a single Connection Point does not form part of an Access Group in accordance with the above, that single Connection Point shall be considered to be an Access Group in its own right.</p>
“Transmission Interface Circuit”	<p>A Transmission circuit which connects a User’s System to the GB Transmission System at a Connection Point.</p>
“Maintenance Period”	<p>A period of time in respect of which each Transmission Interface Circuit is capable of being maintained as derived in accordance with PC.A.4.1.4. The period shall commence and end on specified calendar weeks.</p>

PLANNING CODE - REVISIONS

PC.7 PLANNING LIAISON

PC.7.1 As described in PC.2.1 (b) an objective of the **PC** is to provide for the supply of information to **NGET** from **Users** in order that planning and development of the **GB Transmission System** can be undertaken in accordance with the relevant **Licence Standards**.

PC.7.2 Where, in **NGET's** reasonable opinion, the data submitted by the **User** pursuant to this **PC** identifies possible future non-compliance with the relevant **Licence Standards** **NGET** shall notify relevant **User(s)** of this fact as soon as reasonably practicable.

PC.7.3 Following any notification by **NGET** to a **User** pursuant to PC.7.2 and following any further discussions that the **User** may hold with **NGET**, the **User** shall as soon as reasonably practicable either:

- (i) submit further relevant data to **NGET** that is to **NGET's** reasonable satisfaction; or,
- (ii) modify data previously submitted pursuant to this **PC**, such modified data to be to **NGET's** reasonable satisfaction; or
- (iii) notify **NGET** that it is the intention of the **User** to leave the data as originally submitted to **NGET** to stand as its submission.

For the avoidance of doubt the use of such data may identify the need for additional **Plant** and/or **Apparatus** to be installed by **NGET** and/or the **User** in order that **NGET** may continue to plan and develop the **GB Transmission System** in accordance with the relevant **Licence Standards** and in such case the **Modification** process in the **CUSC** may apply.

PC.7.4 Where the **User** can demonstrate (to **NGET's** reasonable satisfaction) that the **User** requires further **GB Transmission System** network data in order to provide **NGET** with viable **User** network data (as required under this **PC**), **NGET** shall consider any such request (which shall be made in writing) from the **User** and where appropriate will provide such **GB Transmission System** data to such a **User**.

APPENDIX A

PLANNING DATA REQUIREMENTS

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PC.A.1.6

The following paragraphs in this Appendix relate to **Forecast Data**:

3.2.2(b), (h), (i) and (j)
4.2.1
4.3.1
4.3.2
4.3.3
4.3.4
4.3.5
4.5 ~~(a)(ii)~~ and ~~(b)(iiiv)~~
4.7.1
5.2.1
5.2.2
5.6.1

PC.A.2.2.2 The **Single Line Diagram** (three examples are shown in Appendix B) must include all parts of the **User System** operating at **Supergrid Voltage** throughout **Great Britain** and, in Scotland, also all parts of the **User System** operating at 132kV, and those parts of its **Subtransmission System** at any **Transmission Site**. In addition, the **Single Line Diagram** must include all parts of the **User's Subtransmission System** throughout **Great Britain** operating at a voltage greater than 50kV, and, in Scotland, also all parts of the **User's Subtransmission System** operating at a voltage greater than 30kV, which, under either intact network or **Planned Outage** conditions:-

- (a) normally interconnects separate **Connection Points**, or busbars at a **Connection Point** which are normally run in separate sections; or
- (b) connects **Embedded Large Power Stations**, or **Embedded Medium Power Stations**, or **Embedded DC Converter Stations** connected to the **User's Subtransmission System**, to a **Connection Point**.

At the **User's** discretion, the **Single Line Diagram** can also contain additional details of the **User's Subtransmission System** not already included above, and also details of the transformers connecting the **User's Subtransmission System** to a lower voltage. With **NGET's** agreement, the **Single Line Diagram** can also contain information about the **User's System** at a voltage below the voltage of the **Subtransmission System**.

The **Single Line Diagram** for a **Power Park Module** must include all parts of the System connecting generating equipment to the **Grid Entry Point** or (**User System Entry Point** if **Embedded**). As an alternative the **User** may choose to submit a **Single Line Diagram** of an electrically equivalent system connecting generating equipment to the **Grid Entry Point** (or **User System Entry Point** if **Embedded**). An example of a **Single Line Diagram** for a **Power Park Module** electrically equivalent system is shown in Appendix B.

The **Single Line Diagram** must include the points at which **Demand** data (provided under PC.A.4.3.4 and PC.A.4.3.5, or in the case of **Generators**, PC.A.5.2) and fault infeed data (provided under PC.A.2.5) are supplied.

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PC.A.4	<u>DEMAND AND ACTIVE ENERGY DATA</u>
PC.A.4.1	<u>Introduction</u>
PC.A.4.1.1	Each User directly connected to the GB Transmission System with Demand shall provide NGET with the Demand data, historic, current and forecast, as specified in PC.A.4.2, and PC.A.4.3 and PC.A.4.5. Paragraphs PC.A.4.1.2 and PC.A.4.1.3 apply equally to Active Energy requirements as to Demand unless the context otherwise requires.
PC.A.4.1.2	Data will need to be supplied by: <ul style="list-style-type: none"> (a) each Network Operator, in relation to Demand and Active Energy requirements on its User System; (b) each Non-Embedded Customer (including Pumped Storage Generators with respect to Pumping Demand) in relation to its Demand and Active Energy requirements. (c) each DC Converter Station owner, in relation to Demand and Active Energy transferred (imported) to its DC Converter Station. <p>Demand of Power Stations directly connected to the GB Transmission System is to be supplied by the Generator under PC.A.5.2.</p>
PC.A.4.1.3	References in this PC to data being supplied on a half hourly basis refer to it being supplied for each period of 30 minutes ending on the hour or half-hour in each hour.
PC.A.4.1.4	Maintenance Periods and Access Groups
PC.A.4.1.4.1	Each Connection Point must belong to one, and only one, Access Group .
PC.A.4.1.4.2	Each Transmission Interface Circuit must have a Maintenance Period .

- PC.A.4.1.4.3 The **Maintenance Period** shall be a minimum of 8 continuous weeks and can occur in any one of three maintenance years during the period from calendar week 13 to calendar week 43 (inclusive) in each year.
- PC.A.4.1.4.4 The **User** shall submit in writing no later than calendar week 6 in each year:
a) the calendar weeks defining its proposed start and finish of each **Maintenance Period** for each **Transmission Interface Circuit**; and
b) the **Connection Points** in each **Access Group**.
- PC.A.4.1.4.5 It is permitted for **Maintenance Periods** to overlap in the same **Access Group** and in the same maintenance year. However, within each **Maintenance Period** an 8 week maintenance slot will be identified where possible that does not overlap with any other maintenance slot within that **Access Group** for each maintenance year. Where it is not possible to avoid overlapping maintenance slots, **NGET** will indicate to **Users** by calendar week 10 its initial view of which **Transmission Interface Circuits** will need to be considered out of service concurrently for the purpose of assessing compliance to **Licence Standards**.
- PC.A.4.1.4.6 In exceptional circumstances, and with the agreement of all parties concerned, where a **Connection Point** is specified for the purpose of the **Planning Code** as electrically independent **Subtransmission Systems**, then data submissions can be on the basis of two (or more) individual **Connection Points**.
- PC.A.4.2 **User's User System Demand (Active Power) and Active Energy Data**
- PC.A.4.2.1 Forecast daily **Demand (Active 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**) are required for:
- (a) peak day on each of the **User's User Systems** (as determined by the **User**) giving the numerical value of the maximum **Demand (Active Power)** that in the **Users'** opinion could reasonably be imposed on the **GB Transmission System**;
 - (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 in respect of a), b) and c) below 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**; and
- b) the date and time of the annual minimum of the **GB Transmission System Demand**; and
- c) the relevant **Maintenance Period** for each **Transmission Interface Circuit**. (as submitted by the **User** pursuant to PC.A.4.1.4.4); and
- d) Concurrent maintenance outage of two or more **Transmission Interface Circuits** (if any).

PC.A.4.2.3 The total **Active Energy** used on each of the **Network Operators'** or **Non-Embedded Customers' User Systems** (each summated over all **Grid Supply Points** in each **User System**) in the preceding **Financial Year**, both outturn and weather corrected, together with a prediction for the current financial year, is required. Each **Active Energy** submission shall be subdivided into the following categories of **Customer** tariff:

LV1
LV2
LV3
HV
EHV
Traction
Lighting

In addition, the total **User System** losses and the **Active Energy** provided by **Embedded Small Power Stations** and **Embedded Medium Power Stations** shall be supplied.

PC.A.4.2.4 All forecast **Demand (Active Power)** and **Active Energy** specified in PC.A.4.2.1 and PC.A.4.2.3 shall:

- (a) in the case of PC.A.4.2.1(a), (b) and (c), be such that the profiles comprise average **Active Power** levels in 'MW' for each time marked half hour throughout the day;
- (b) in the case of PC.A.4.2.1(a), (b) and (c), be that remaining after any deductions reasonably considered appropriate by the **User** to take account of the output profile of all **Embedded Small Power Stations** and **Embedded Medium Power Stations** and **Customer Generating Plant** and imports across **Embedded External Interconnections** including imports across **Embedded** installations of direct current converters which do not form a **DC Converter Station** and **Embedded DC Converter Stations** with a **Registered Capacity** of less than 100MW;
- ~~(c) in the case of PC.A.4.2.1(a) and (b), be based on **Annual ACS Conditions** and in the case of PC.A.4.2.1(c) and the details of the annual **Active Energy** required under PC.A.4.2.3 be based on **Average Conditions**.~~
- (c) be based upon **Annual ACS Conditions** for times that occur during week 44 through to week 12 (inclusive) and based on **Average Conditions** for weeks 13 to week 43 (inclusive)

PC.A.4.3

Connection Point Demand (Active and Reactive Power)

PC.A.4.3.1

Forecast **Demand** (values of the **Power Factor** at maximum and minimum continuous excitation may be given instead of **Reactive Power** data where more than 95% of the total **Demand** at a **Connection Point** is taken by synchronous motors) to be met at each **Connection Point** within each **Access Group** is are required for:

- (a) the time of the maximum **Demand (Apparent Power)** at the **Connection Point** (as determined by the **User**);
- (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;-
- (d) the time of the maximum **Demand (Apparent Power)** at the **Connection Point** (as determined by the **User**) during the **Maintenance Period** of each Transmission Interface Circuit;
- (e) at a time specified by either **NGET** or a **User** insofar as such a request is reasonable.

Instead of such forecast **Demand** to be met at each **Connection Point** within each **Access Group** the **User** may (subject to PC.A.4.3.4) submit such **Demand** at each node on the **Single Line Diagram**.

In addition, the **Demand** in respect of each of the time periods referred to in PC.A.4.3.1 (a) to (e) in the preceding **Financial Year** in respect of each **Connection Point** within each **Access Group** both outturn and weather corrected shall be supplied. The "weather correction" shall normalise outturn figures to **Annual ACS Conditions** for times that occur during calendar week 44 through to calendar week 12 (inclusive) or **Average Conditions** for the period calendar weeks 13 to calendar week 43 (inclusive) and shall be performed by the relevant **User** on a best endeavours basis.

PC.A.4.3.2

All forecast **Demand** specified in PC.A.4.3.1 shall:

- (a) be that remaining after any deductions reasonably considered appropriate by the **User** to take account of the output of all **Embedded Small Power Stations** and **Embedded Medium Power Stations** and **Customer Generating Plant** and imports across **Embedded External Interconnections**, including **Embedded** installations of direct current converters which do not form a **DC Converter Station** and **Embedded DC Converter Stations** and such deductions should be separately stated;
- (b) include any **User's System** series reactive losses but exclude any reactive compensation equipment specified in PC.A.2.4 and exclude any network susceptance specified in PC.A.2.3;
- ~~(c) in the case of PC.A.4.3.1(a) and (b) be based on **Annual ACS Conditions** and in the case of PC.A.4.3.1(c) be based on **Average Conditions**.~~
- (c) be based upon **Annual ACS Conditions** for times that occur during calendar week 44 through to calendar week 12 (inclusive) and based on **Average Conditions** for calendar weeks 13 to calendar week 43 (inclusive), both corrections being made on a best endeavours basis;
- (d) reflect the **User's** opinion of what 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**. The date and time of the forecast maximum **Demand (Apparent Power)** at the **Connection Point** as specified in PC.A.4.3.1(a) and (d) is required.~~

PC.A.4.3.4 Each **Single Line Diagram** provided under PC.A.2.2.2 shall include the **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 **Demand** is taken by synchronous motors) at the time of the peak **GB Transmission System Demand** (as provided under PC.A.4.3.1(b)) at each node on the **Single Line Diagram**. These **Demands** shall be consistent with those provided under PC.A.4.3.1(b) above for the relevant year.

PC.A.4.3.5 ~~So that **NGET** is able to assess the impact on the **GB Transmission System** of the diversified **GB Transmission System Demand** at various periods throughout the year, each **User** shall provide additional forecast **Demand** data as specified in PC.A.4.3.1 and PC.A.4.3.2 but with respect to times to be specified by **NGET**. However, **NGET** shall not make such a request for additional data more than once in any calendar year.~~ **The Single Line Diagram must represent the User's User System layout under the period specified in PC.A.4.3.1(b) (at the time of peak GB Transmission System Demand). Should the User's User System layout during the other times specified in PC.A.4.3.1 be planned to be materially different from the Single Line Diagram submitted to NGET pursuant to PC.A.2.2.1 the User shall in respect of such other times submit:**

- i) **an alternative Single Line Diagram that accurately reflects the revised layout and in such case shall also include appropriate associated data representing the relevant changes, or;**
- ii) **submit an accurate and unambiguous description of the changes to the Single Line Diagram previously submitted for the time of peak GB Transmission System Demand.**

Where a User does not submit any changes, NGET will assume that the Single Line Diagram (and associated circuit and node data) provided at the time of peak GB Transmission System Demand will be valid for all other times. In respect of such other times, where the User does not submit such nodal demands at the times defined in PC.A.4.3.1(a), (c), (d) and (e), the nodal demands will be pro-rata, to be consistent with the submitted Connection Point Demands.

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 and PC.A.4.3.5 above into a cohesive forecast and will use this in preparing Forecast Demand information in the Seven Year Statement and may use this 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)**, (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:~~

~~(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** (to the nearest 5MW/5Mvar);~~
- ~~(iii) the arrangements (eg. manual or automatic) for transfer together with the time required to effect the transfer.~~

~~(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** (to the nearest 5MW/5Mvar);~~
- ~~(iii) the arrangements (eg. manual or automatic) for transfer together with the time required to effect the transfer.~~

PC.A.4.5 Post Fault User System Layout

PC.A.4.5.1 Where for the purposes of **NGET** assessing against the Licence Standards an **Access Group**, the **User** reasonably considers it appropriate that revised post fault **User System** layouts should be taken into account by **NGET**, the following information is required to be submitted by the **User**:

- i) the specified **Connection Point** assessment period (PC.A.4.3.1,(a)-(e)) that is being evaluated;
- ii) an accurate and unambiguous description of the **Transmission Interface Circuits** considers to be switched out due to a fault;

- iii) appropriate revised **Single Line Diagrams** and/or associated revised nodal **Demand** and circuit data detailing the revised **User System(s)** conditions;
- iv) where the **User's** planned post fault action consists of more than one component, each component must be explicitly identified using the **Single Line Diagram** and associated nodal **Demand** and circuit data;
- v) the arrangements for undertaking actions (eg the time taken, automatic or manual and any other appropriate information);.

The **User** must not submit any action that it does not believe to be feasibly achievable during the assessment period specified (subject to there being no further unplanned outages on the **User's User System**).

PART 3

NETWORK DATA

PC.A.8 To allow a **User** to model the **GB Transmission System**, **NGET** will provide, **upon request**, 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 **NGET** 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 shall be provided**. These **the** 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 either at the Connection Point or (where NGET agrees) at suitable nodes (the nodes to be agreed with the User) 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 **NGET** 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**;
 - (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**;
 - ~~(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 Demand constituting the (π) loadflow equivalent; and,**

- (xi) where the agreed boundary nodes are not at a **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, **NGET** 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** **NGET** will provide the appropriate supergrid transformer data.
- (e) The positive sequence X/R ratio and the zero sequence impedance value will correspond to the **NGET** 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 **NGET** will, insofar as such request is reasonable, provide the information as soon as reasonably practicable following the request.

DATA REGISTRATION CODE - REVISIONS

DRC.5.2 Methods of Submitting Data

DRC.5.2.1 Wherever possible the data schedules to the **DRC** are structured to serve as standard formats for data submission and such format must be used for the written submission of data to **NGET**.

DRC.5.2.2 Data must be submitted to the **Transmission Control Centre** notified by **NGET** or to such other department or address as **NGET** may from time to time advise. The name of the person at the **User** who is submitting each schedule of data must be included.

DRC.5.2.3 Where a computer data link exists between a **User** and **NGET**, data may be submitted via this link. **NGET** will, in this situation, provide computer files for completion by the **User** containing all the data **fields** in the corresponding **DRC** schedule.

~~Data submitted under Schedule 5, with the exception of the single line diagram, shall~~ **can** be submitted on floppy disk **in an electronic format** using a proforma to be supplied by **NGET**; ~~or by any other means or format as may~~ **to be agreed between the User and annually in advance with NGET**. ~~This proforma is to be supplied by NGET no later than calendar week 19 in each year~~ **In all cases the data must be complete and relate to, and relate only to, what is required by the relevant section of eth Grid Code.**

DRC.5.2.4 Other modes of data transfer, such as magnetic tape, may be utilised if **NGET** gives its prior written consent.

DRC.5.5 Substituted Data

DRC.5.5.1 In the case of PC.A.4 only, if the data supplied by a **User** does not in **NGET's** reasonable opinion reflect the equivalent data recorded by **NGET**, **NGET** may estimate such data if and when, in the view of **NGET**, 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** deems appropriate.

DRC.5.5.2 **NGET** will advise a **User** in writing of any estimated data it intends to use pursuant to DRC.5.5.1 relating directly to that **User's Plant** or **Apparatus** where it does not in **NGET's** reasonable opinion reflect the equivalent data recorded by **NGET**. Such estimated data will be used by **NGET** in place of the appropriate data submitted by the **User** pursuant to PC.A.4 and as such shall be deemed to accurately represent the **User's** submission until such time as the **User** provides data to **NGET's** reasonable satisfaction.