CE Electric UK

Your ref

Our ref

John Scott
Technical Director
The Office of Gas and Electricity Markets
9 Millbank
London
SW1P 3GE

21 September 2007

Asset Management
98 Aketon Road
Castleford
WF10 5DS
http://www.ce-electricuk.com/
tel: 01977 605635
fax: 01977 605594
e-mail: mark.drye@ce-electricuk.com

Dear John,

Electricity Distribution Network Planning – Engineering Recommendation P2/6.

I am writing on behalf of Northern Electric Distribution Limited (NEDL) and Yorkshire Electricity Distribution plc (YEDL), the licensed electricity distributors of CE Electric UK Funding Company Ltd, (CE Electric UK), in response to your letter of 1 August 2007.

CE Electric UK agrees with the general finding of the KEMA report that ER P2/6 is an appropriate standard for use by DNOs to develop a distribution system that meets the needs of customers, but that there are a small number of areas of the standard, or its associated Engineering Technical Report, that could benefit from additional clarification. Such areas include: critical network loading, design practice / standards at the DNO/NGET interface and the application of Group Demand and Transfer Capacity definitions. There are also some material issues identified in the KEMA report that go further than housekeeping changes and that CE Electric UK believes would merit further analysis and discussion. These include consideration of construction outage risks and high-impact, low-probability events.

There is also an issue concerning how a security standard could relate to future network topologies and architectures. Whilst this is an important issue, CE Electric UK is of the view that there should be more clarity of future architecture scenarios before the linkage to security standards could usefully be further explored.

There is a need to develop a view of the relative importance of the issues raised in your letter, together with those raised in the discussion paper presented at the EC3 meeting on 23 August, so that the limited DNO resources available to help progress such issues can be targeted to deliver the maximum benefit. We would welcome the opportunity to become involved in the discussions / working groups arranged to progress the prioritised issues.

The detailed issues raised in your consultation are addressed in the appendix to this letter.

I hope you find these comments helpful. If you have any questions or would like further discussions about any issues in this letter, please do not hesitate to contact myself or Alan Creighton on 01977 605920.

Yours sincerely

pp Mark Drye

Mark Drye
Director of Asset Management

Appendix

Issues to be addressed in the short term

1 Is there adequate clarity in the licence drafting?

Whilst some DNOs may make a distinction between the licence requirement and application of 'guidance', CE Electric UK considers the application of P2/6 to be a definitive requirement and hence would support changes to make it clear that the planning standards in Table 1 should be met.

CE Electric UK agrees with KEMA that removal of the requirement to comply with P2/6 would be a major change that would require an impact statement, as it would remove the security safety-net for system performance.

Of the options proposed for SLC(5), CE Electric UK is of the view that option iii is probably the best, i.e. to clarify the enforceability of P2/6. The KEMA document concludes that P2/6 is a reasonable document to apply to distribution networks and the development of a new similar document, as suggested in option iv, could cause confusion. Our response to the fourth question in the section relating to longer-term issues provides further information on the relevance of P2/6 to network planning and on the suitability of the IIS to drive network investment.

2 ER P2/6 makes reference to Group Demand and Transfer Capacity. During the review of ER P2/5 it was noted that these terms could be more clearly defined. The KEMA/IC report has also raised this issue. Can these terms be better defined for today's highly loaded and often more complex networks?

Group Demand and Transfer Capacity are both defined terms in P2/6 and the associated ETR 130, which provides additional guidance on how to assess them. The focus in the KEMA report relates to the definition of Group Demand Boundaries (or Demand Groups) rather than Group Demand itself. CE Electric UK recognises that there could be different interpretations of these boundaries amongst DNOs and accepts that additional guidance could be provided, although ETR 130 would be a more appropriate document to capture guidance, backed up by a higher-level statement in P2/6. There is probably limited experience in DNOs of identifying complex Demand Groups, particularly on circuits with significant interconnection, and any guidance would need to be carefully considered.

3 ER P2/6 makes reference to Average Cold Spell loading conditions for network capacity assessments – in light of increasing summer loads, should this be replaced by a broader reference to the critical loading conditions for the network?

ER P2/6 does not actually refer to Average Cold Spell loadings and the assessment of network capability should be made against the peak Group Demand. There are two issues in this question that should be teased out:

Firstly, there is a question as to whether networks should be designed on an ACS (or an alternative adjustment methodology) basis to account for the effects of temperature variation on network demand, or whether they should be designed on (a forecast of) observed peak demands. The former approach, of designing to ACS conditions, is taken in the Grid Code, but CE Electric UK's experience is that the errors introduced by the current adjustment process are often significant and

can be greater than the typically small underlying change in Group Demand. Hence we believe that further work would be needed to establish appropriate summer and winter demand adjustment algorithms before adopting such an approach.

Secondly, there is a more general point in the need to make sure that the seasonal capability of equipment is sufficient to cater for the seasonal network demand. This point is made in the definitions of Circuit Capacity in P2/6, but it is accepted that this implicit requirement could be made more explicit and that it could be misleading to undertake a security assessment only at the peak demand.

4 Can substation design at GSPs be better co-ordinated? The Grid Code Review Panel established a Working Group to review data flows between DNOs and NGET relating to ER P2/6 compliance at Grid Supply Points. The Working Group published its report earlier this year but no Grid Code change proposals have, as yet, resulted from this work.

There are several issues in the general area relating to improved co-ordination of the design of GSPs:

- Demand and distributed generation data exchange at the DNO / NGET interface
- Use of DNO demand transfer capability to manage security issues at GSPs
- The equipment installed by NGET

These issues are considered in turn below:

4.1 There are issues relating to the differences between the data required to undertake a P2/6 assessment and that required for a GB SQSS assessment at a GSP, in addition to the different treatment of embedded generation. One issue relates to the differences between the demand data required by NGET under the Grid Code in order to undertake a GB SQSS security assessment (i.e. the maximum demand that in the Users' opinion could reasonably be imposed on the GB Transmission System) and that used by the DNO as specified in P2/6, and the supporting Engineering Technical Report (which requires measured demand and latent demand masked by generation to be identified separately).

The second issue relates to the assessment of the security contribution from distributed generation. The demand data provided to NGET implicitly includes a security contribution from distributed generation, whilst ER P2/6 requires the DNOs to make an explicit assessment of generator security. Currently there are obligations on both NGET and the DNOs to undertake a security assessment against their security standards. Hence, due to the different demand data used and the different treatment of distributed generation, it is possible that a site assessed to be compliant with GB SQSS is non-compliant with P2/6.

CE Electric UK accepts that ensuring that the capability of a GSP is adequate to meet the needs of customers is a joint responsibility between NGET and the DNO. However, there appears to be very little merit in continuing with the present approach, which appears to require NGET and the DNO to undertake very similar analysis using slightly different data to assess the compliance of the same assets against slightly different technical standards. To do so would result in wasting relatively scarce and expensive engineering resources. At a typical GSP it is the NGET assets that provide the bulk of the system security to the demand supplied from the substation. P2/6 permits the DNOs to consider the lower-voltage GSP busbars, which generally are owned and operated by the DNO, on their merits. It therefore seems reasonable as NGET are best placed to undertake the security assessment, with the support of the DNO, of GSPs against the GB SQSS, that such an assessment

should be sufficient to confirm adequacy of the assets at the GSP without the need for the DNO to undertake a P2/6 assessment. This would align well with the situation at shared GSPs where the low voltage busbars are owned by NGET, and hence consideration of the busbars falls naturally to NGET. Compliance of the outgoing circuits from a GSP would continue to be assessed against P2/6 by the DNO.

In summary CE Electric UK is of the view that the security assessment at a GSP should be undertaken jointly by NGET and the DNO, as is presently the case, but that the assessment should be led by NGET and the assessment made against SQSS.

4.2 There is potential for tension between NGET and the DNO in those situations where DNO transfer capacity is required to resolve a security non-compliance at a GSP, particularly where it is required to secure a first-circuit outage. In such situations the DNO may be asked to implement a demand transfer that places its customers on single-circuit risk for the duration of the first-circuit outage to mitigate the risk of a second transmission outage. There needs to be an assessment of the risks to customers in implementing this type of operational arrangement and of the financial exposure of the DNOs from IIS and of NGET from their incentive scheme. Additional clarity of the technical and commercial risks associated with using demand transfer capability would be helpful.

4.3 It is recognised that the replacement of multiple small-capacity SGTs with fewer larger-capacity units can in theory result in a worsening of overall performance. This situation has not arisen recently in CE Electric UK: however, it would be beneficial to have increased understanding of the risks associated with interface substations including the use of transfer capability to mitigate potential NGET reinforcement.

Early experience of ER P2/6 in the treatment of distributed generation

We would welcome views on the changes introduced into ER P2/6 and early experience of their application in assessing the contribution of distributed generation to the capacity of a network to meet group demand

In common with other DNOs CE Electric UK has not used generation to provide security. In the case of the Ferrybridge Ring, where there is a derogation against P2/6, an assessment has been made of the amount of generation that would be required to restore compliance to the Ferrybridge Ring. The conclusion was that significant amounts of the right type of generation would be needed to restore compliance and that it would be unrealistic to plan on this level of generation being available.

Issues to be addressed in the longer term

1 How might the standard be updated to accommodate developments such as active networks, demand-side management and virtual power plants (VPP)?

CE Electric UK agrees that thought needs to be given to the purpose and scope of a network planning security standard as the distribution system becomes more active. However, it will only be really feasible to do this when some of the prospective future scenarios become clearer. As networks become more 'active' there will be an increased need to undertake system modelling and to have clarity on the definition of an outage (primary or secondary equipment) and an understanding of the treatment of controllable demand when assessing underlying demand to be

secured[1], together with the technical and commercial risks and contracts required to design and operate a network with system security depending on VPP systems. NGET's system arguably has these features to a lesser or greater extent and the DNOs could perhaps benefit from a greater understanding of those principles in the SQSS that could become more applicable to DNO networks.

2 Would there be significant value in re-examining the reliability calculations which underpin ER P2/6?

The analysis undertaken by KEMA concludes that, whilst there are some deficiencies in the methodology underpinning P2/6, it is not sufficiently flawed to trigger a material review of the principles or metrics. CE Electric UK supports the view that there would appear to be insufficient drivers to re-examine the reliability metrics, calculations and methodology at the present time.

3 Should the standard be updated to take account of longer construction outages as well as maintenance outages, and the additional risk to consumers that these outages may present?

CE Electric UK is of the view that this is an area where increased understanding of the issues is required so that an industry-agreed methodology for assessing the acceptability of risks during construction outages could be developed. Increasing asset replacement programmes will over time expose customers to risks of extended outages on an increasing number of instances, over and above those that were envisaged in the ACE 51 methodology. The logistical and financial implications of mitigating construction risk could materially increase the costs of a construction project and hence there would be merits in having discussions with Ofgem, DNOs and other stakeholders. There may be synergies between risk mitigation methods that address construction risk and those associated with proposals for increasing the security to Central Business Districts if the risk mitigation involved the commissioning of additional transfer capacity. One possibility for enhancing P2/6 to cater for construction risk is to include a busbar fault within the definition of a second-circuit outage. This would encourage the development of networks with interconnection that is independent of the substation experiencing the second-circuit outage risk.

4 Is there scope to remove the requirement of the design standard for smaller sizes of group demand (e.g. demand groups up to 60MW) and rely purely on output incentives (IIP) as the network design driver for these demand groups?

CE Electric UK is of the view that P2/6 Table 1 drives investment for classes of supply A, D and E, but that it does not drive investment for class of supply C, and that it can drive investment for class of supply B.

The design of networks supplying demand in P2/6 class of supply A is largely driven by the lack of a requirement in P2/6 to provide network redundancy. The relevance of P2/6 is less certain when designing networks supplying demand in P2/6 class of supply B, which are typically supplied by HV feeders. Relatively low-cost initiatives to improve performance, e.g. the installation of HV remote control, are driven by the IIS, but the basic network architecture is driven by P2/6; it is unlikely that IIS could be used to justify a relatively expensive reconfiguration of a HV network to improve

[1] For example if demand side participation resulted in demand that could be disconnected under first-circuit outage conditions, the demand to be secured under first- circuit outage conditions would be reduced.

performance issues associated with networks comprising long overhead circuits. The design of networks supplying demand in P2/6 class of supply C is generally driven by quality of supply considerations rather than by P2/6 requirements.

The design of networks supplying larger demand groups (class of supply D and E) tends to be driven by compliance with P2/6. The types of equipment generally used at the higher voltage levels are more likely to be associated with planning inquiries and wayleave hearings and, whilst the DNO should be able to demonstrate that the planned reinforcement is 'necessary and expedient' (i.e. based on a cost-efficient solution to ensure that network voltages remain within statutory limits and network currents are within the capability of equipment), the presence of a prescriptive backstop planning standard that can be applied on such occasions is helpful. When developing P2/6, the DTI expressed a view that there were merits in having a prescriptive security standard that could be used in planning inquiries.

The KEMA analysis recognised that, at the higher demand groups, IIS may not be an appropriate tool for ensuring sufficient infrastructure. Without some form of backstop it could become increasingly difficult to justify works to mitigate the 'high-impact, low-probability' risks that individually can be small, but if not managed properly could give rise to a high risk or brittle network.

The above paragraphs relate to networks that are totally owned and operated by a DNO. The situation is less clear where the DNO provides a connection to a network owned and operated by an IDNO. Although, from an IIS perspective, the IDNO network would be seen as a single customer connected to the DNO network, the DNO would remain liable for GS payments to all customers connected to the IDNO network for a fault on the DNO system. The IDNO is not subject to an IIS and, without P2/6 to underpin the IDNO's network design, a network could develop with large numbers of customers connected to single HV circuits with no redundancy. Such an arrangement would expose customers connected to the IDNO network to quality of supply risks and also expose the DNO to higher than normal guaranteed standards risks.

In summary, CE Electric UK believes that, where the DNO owns and operates the whole of the relevant network, quality of supply considerations may well drive the development of networks with a higher security than P2/6, and P2/6, with its present levels of security, would therefore become increasingly irrelevant. However, where the DNO network supplies an IDNO's network, where IIS effectively does not apply, CE Electric UK considers that a backstop level of security as per P2/6 should remain. Given the above, CE Electric UK considers that all classes of supply within P2/6 provide a useful function and should be retained.

5 How should environmental and sustainability issues be considered in the design standard?

It is not clear whether there should be a direct linkage between a security standard and a requirement to develop environmentally sustainable networks. It may be best to cover environmental and sustainability issues separately on the basis that environmentally sound and sustainable networks should be developed that satisfy the agreed security standard.

When work is being planned on the system, in addition to addressing the immediate problem, consideration will also be given to designing a scheme that takes account of other known or likely developments within and potentially beyond the normal planning period. This approach may result in a more expensive initial scheme but one that facilitates future development at an economic cost and also minimises the lifetime cost in terms of capital equipment and losses. Typically this is

achieved by applying design standards that, for example, give guidance as to when it is appropriate to install a larger-capacity cable or transformer. There is a need to ensure that, as electricity markets are liberalised, the signals to consider lifecycle costs are maintained.

6 How should the standard be updated to take account of climate change, in particular higher summer loadings and reduced ratings of plant due to higher ambient temperatures?

As mentioned above, there are two issues that should be considered: firstly, the issue of designing a network to cater for a probabilistic demand level rather than an actual demand and, secondly, the need to be focussed on assessing the capacity of plant against the demand on the network across the year rather than a particular season.

7 Some aspects of these issues may be progressed in the short term. Again, we would welcome views here.

CE Electric UK agrees that there would be merit in addressing some issues in the short term and is of the view that the following issues, identified in the KEMA report, could be resolved relatively quickly:

- Critical network loading
- Construction outage risks
- Design practice /standards at the DNO/NGET interface
- Operational co-ordination at the DNO/NGET interface
- Group demands and transfer capacity definitions

In addition to the issues raised in your letter, KEMA identified that there may be other issues that could be worthy of further consideration:

There is an issue relating to common mode failure that could affect the availability of a circuit used to provide redundancy to a site. Typically methods of mitigating common mode failure, e.g. installing a cable along an independent route, are relatively expensive and are difficult to justify. Discussion on how best to improve network resilience by economically designing out common mode failures would be beneficial.

The issue of supply interruption frequency to individual customers is mentioned in the KEMA report but not drawn out in the Ofgem letter. KEMA identified in their report that, whilst there is a multiple interruption guaranteed standard, it may be geared too low to drive investment. CE Electric UK agrees that there would be merit in considering whether a P2/6-style backstop could be developed, possibly in the form of a maximum customer-km product for HV lines to complement the current arrangements.