

# **National Electricity Transmission System Security and Quality of Supply Standard**

## **GSR008 – Regional Variations and Wider Issues Amendment & Update Report**

**Prepared by the SQSS Review Group for submission to the Authority**

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# Executive Summary

In 2008 the Security and Quality of Supply Standards Review Group established a wide ranging review of the National Electricity Transmission System (NETS) Security and Quality of Supply Standard (SQSS). The progress of the Review and a number of draft proposals to modify the SQSS were reported to the broader industry, with comments sought, in two consultations: the Fundamental Review Update and Consultation Report (henceforth referred to as the “principles consultation”), and the SQSS Fundamental Review text consultation (henceforth referred to as the “text consultation”). Several industry responses to the consultations were received. This report summarises the proposals and the industry's comments, and sets out the SQSS Review Group's recommendations regarding immediate changes to the SQSS, and the ongoing development of further amendments.

A number of recommendations to amend the NETS SQSS are made in this report. These amendments remove several regional variations; address some of the inconsistencies between the standard and P2/6, and introduce flexibility in some areas of planning and operation that will result in efficiencies, whilst not adversely affecting customers.

The general consultation feedback on these proposals was supportive: none of the recommendations were opposed.

In several areas proposals were discussed in principle, with a view to undertaking further work to develop those that were generally supported. This report discusses these proposals and the comments received.

The consultation documents are available at:

<http://www.nationalgrid.com/uk/Electricity/Codes/gbsqsscode/fundamental/April+2010+Consultation/>

The industry feedback and the Review Group's replies are included in appendices 2 and 3.

A revised version of the NETS SQSS, indicating the recommended changes, is included in appendix 1.

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# 1 Introduction

The National Electricity Transmission System (NETS) Security and Quality of Supply Standard (SQSS) Review Group is responsible for ensuring that the NETS SQSS is kept up-to-date and relevant as the energy industry develops and technology advances.

In 2008 it was recognised that the high penetration of intermittent generation connecting to the network and the significant changes taking place within the power industry necessitated a wide ranging review of the SQSS. A review was therefore initiated in late 2008. In April 2010, the SQSS Review Group published an update and consultation report<sup>1</sup>, summarising and seeking the broader industry's feedback on the findings and recommendations of the review to date. This consultation will be referred to in this report as the "principles consultation". In March 2011 the Review Group consulted on NETS SQSS text proposals intended to implement the proposals made in the principles consultation<sup>2</sup>. This consultation will be referred to as the "text consultation".

Six responses to the principles consultation were received, and two to the text consultation. The SQSS Review Group has replied to each of them. A copy of this correspondence is included in appendix 2 (principles) and 3 (text).

The consultations addressed a number of separate issues. This report summarises for each issue: the proposal put forward in the consultation, the feedback received from industry, and the NETS SQSS Review Group's recommended way forward.

The proposals and issues described in this report broadly fall into three categories:

1. those that are recommended to be implemented immediately by way of an amendment to the NETS SQSS,
2. those areas for which there is broad agreement regarding the principle but for which further work is required to establish the details before they can be implemented,
3. and finally those issues that will require further consideration and experience before firm proposals can be made.

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<sup>1</sup> The NETS SQSS Fundamental Review: Update and Consultation Report was published on 23 April 2010. The report comprised of five individual working group reports, and a summary report. Throughout this document, each of the five working groups and their reports are referred to in the shorthand form: WG1, WG2, WG3, WG4 and WG5.

The summary and working group reports are available online at:

<http://www.nationalgrid.com/uk/Electricity/Codes/gbsqsscode/fundamental/April+2010+Consultation/>

<sup>2</sup> The text consultation is available at:

<http://www.nationalgrid.com/uk/Electricity/Codes/gbsqsscode/fundamental/March11Consultation>

This report addresses each of these categories separately. A revised version of the NETS SQSS text, reflecting the changes proposed for immediate implementation, is included in Appendix 1.

## 2 General Consultation Feedback

Six consultation responses were received for the principles consultation, from:

- Centrica Plc
- E.ON UK plc.
- EDF Energy plc
- Electricity North West Limited
- International Power (IPR) on behalf of First Hydro Company, Saltend Cogeneration Company Ltd., Rugeley Power Ltd., Deeside Power Ltd. and Indian Queens Power Ltd.
- Durham and Herriot-Watt Universities

Several of the consultation responses included comments that were applicable to many of the proposals/issues discussed in the consultation report. These general comments are summarised below, along with the SQSS Review Group's response.

- Several respondents commented that there has been a variable approach to industry engagement throughout the review to date. They expressed their appreciation of the workshops held by the Review Group, and indicated their eagerness to be more involved in the ongoing review, noting that wide industry involvement will aid the development of proposals and improve the industry's understanding of them.

The SQSS review group acknowledges that industry involvement in the development of the NETS SQSS is important and beneficial to all parties. Over the past months the SQSS Review Group has sought to better engage with industry by means of open letters, consultations and a program of workshops. The SQSS Review Group's intention is for the heightened level of industry engagement to continue in the development of both the future work programme and of amendment proposals. Proposals to modify the SQSS governance arrangements have recently been consulted on and are being progressed. These proposals aim to ensure that there is appropriate representation of the whole industry on the Review Group, and that a clear, formal modification process is applied.

- Concern was raised by most respondents that the likely impact (especially commercial impacts) of the amendment proposals on grid users ought to be assessed and explained.

The SQSS Review Group agrees that the impact on all stakeholders should be assessed and explained. None of the proposals recommended for immediate adoption are considered to have a material adverse impact on any customers. Nevertheless, the perceived impact of each amendment proposal is commented on in this report.

The ongoing development of the principles proposed in the consultation document, but not yet ready for implementation, will involve significant investigation of the technical and commercial impacts on stakeholders. Any specific amendments that are identified will be subject to further industry consultation before being recommended for adoption. The perceived impact of the amendments will be explained in these consultations.

- Some parties expressed disappointment at the "relatively low key" nature of the firm proposals to date.

The scope of the review initially included a review of the principles of the NETS SQSS. However, following ongoing discussions within the Review Group, and with industry, the Review Group believes that, due to the potential significance of any changes, it is essential to understand the broader views of all stakeholders before the direction of any future work considering the principles can be determined. As part of RIIO-T1, the onshore TOs and Ofgem are consulting with all stakeholders on these, and similar, issues. The Review Group will provide updates on these consultations, and on any guidance they give for further NETS SQSS review, in its regular workshops and open letters.

- Several respondents emphasised that "the quality and reliability of electrical supply is of fundamental importance for all connectees to the GB transmission system i.e. suppliers, consumers and generators." (words quoted from one respondent, but the point was made by several)

This view is shared by the SQSS Review Group and is the reason why changes to the NETS SQSS must be carefully considered – especially proposals that would utilise unproven techniques and technology to offset investment in proven approaches. This isn't to say that novel approaches should not be considered, but rather that they should be considered carefully so that any decision is well informed of the benefits, risks and practicalities.

Two responses were received in respect of the text consultation, from EdF-energy and the Renewable Energy Association (REA).

EdF-energy commented that the text proposals appear to give effect to the principles proposals. They noted that consultation responses are not generally made visible, and believe this is a shortfall compared with other codes. The Review Group acknowledges this issue. The NETS SQSS website is currently being re-structured and brought up to date with all appropriate documentation, and the formal governance to be introduced will specify the documentation that needs to be visible, and the timing of this.

The REA commented on several of the proposals, suggesting wording to changes to improve and clarify the text. The proposal text in Appendix 1 includes most of the suggestions.

The specific comments on each proposal, and the Review Group's view, are discussed in section 3 of this report.



## 3 Amendment Proposals

### *3.1 Adjusted N-1-1 Requirement*

Section 4 of the NETS SQSS requires that, on the NGET transmission system, a single circuit outage is considered with the prior outage of another transmission circuit or a generating unit, reactive compensator or other reactive power provider when designing the transmission system against a peak demand background, i.e. an N-1-1 criterion. This requirement does not apply in the SPT and SHETL transmission areas. Following a review of both the probability of an N-1-1 event at peak demand, and consideration of the possible impacts of such an event, the SQSS Review Group recommended that the requirement be relaxed to only consider the prior outage of another transmission circuit when the circuit on prior outage contains a transformer or cable section that is wholly or mainly outside a substation. It is not intended to change the requirement to consider N-1-1 events at other times, when system maintenance increases the likelihood of their occurrence. For more information please refer to section 7.15 of the update and consultation document.

No respondents explicitly referred to this amendment in their response to the principles consultation, although IPR and ENW included statements of general support for all proposals not explicitly commented on. In its response to the text consultation, the REA suggested a modification relating to the treatment of multiple generating units with a common breaker. The Review Group agrees with the suggestion, and the proposed text includes the change.

Adoption of this amendment will mean that certain fault situations will no longer be catered for in the design of the transmission system. In a small number of cases this may result in less transmission infrastructure being built. Analysis work within NGET shows that the N-1-1 peak demand criteria drives investment for only a limited number of boundaries, and that the capability requirement is only a small amount greater than that for the double circuit loss. Most overhead line faults are transient: that is the circuit is restored by auto-reclose systems within a minute of its loss. Should the reclosure fail the fault is classed as permanent. For permanent faults operational planners will re-secure the system against the loss of the double circuit. Consequently the system will be secure for the loss of a further single circuit. In practice, permanent single circuit faults are likely to be of relatively short duration (hours or days rather than weeks). Longer duration outages will result from incidents, such as damage to towers, that affect the double circuit. Any impact will be in the cost of constraining plant to secure the system: additional cost may arise in cases where the system capability is lower than if the N-1-1 condition had been designed for. However, given the very infrequent nature of two independent overlapping permanent overhead line outages within a region at the time of peak demand and the likely duration of any such outages, the operational impact will be small, and is expected to be lower than the cost of transmission system reinforcement associated with the criteria.

The SQSS Review Group therefore recommends that clause 4.6.6 of the NETS SQSS is modified as shown in the revised SQSS wording in Appendix 1.

### ***3.2 Clarification Regarding Use of Dynamic Ratings***

The three Transmission Owners already make extensive use of seasonal ratings. In operating the system National Grid uses revised ratings on selected circuits based on day ahead predicted weather using the Met Office Rating Enhancements system. Nevertheless, the increasing potential for new online circuit-rating technologies to further enhance the utilisation of the network to the maximum extent permitted by ambient conditions is recognised. Not all circuits will benefit from the use of dynamic ratings, as in some cases the maximum requirement for the circuit is within existing seasonal ratings.

The NETS SQSS does not prevent the use of dynamic ratings in system planning and operation. The principles consultation document proposed that the definitions of 'Pre-Fault Rating' and 'Unacceptable Overloading' in the NETS SQSS be modified to explicitly address the consideration of dynamic ratings during system studies. The intention was that the decision to actually employ dynamic line-rating technology in specific situations would be made by designers and operators based on the options available. For more information please refer to section 7.12 of the update and consultation document.

Following the principles consultation, only one respondent directly addressed this amendment proposal, indicating that they are "very supportive of the use of dynamic ratings to make best use of existing assets". However, when responding to the proposal on generation connection designs (section 4.1), several respondents made the point that local connections should always be capable of receiving a generator's full output. In response to the text consultation, the REA expressed support for some use of dynamic ratings in planning timescales.

Following further discussion within the TOs, the review group is recommending a modified version of the principles consultation proposal. The group believes that in practice it will only be possible to make use of dynamic ratings in operational timescales. The actual capability of a line at any time depends on a large number of factors such as ambient temperature, wind speed and direction, and circuit loading over the previous hours. Consequently the capability of a circuit will vary considerably and designers can only realistically consider ratings based on their likelihood. The seasonal capabilities currently used are derived probabilistically and the review group's view is that they should continue to be used in designing the system. This modified proposal was included in the text consultation.

In general, the increased use of dynamic ratings will cost-effectively allow power transfers above the seasonally derived level when ambient conditions permit this. This on-average increase in network capacity will lead to reduced levels of transmission constraints. Detailed investigations taking a wide range of factors into account (ratings and types of existing infrastructure, interoperability of online monitoring devices with existing equipment, new

communications requirements, topography along circuit routes, market behaviours, weather patterns etc.) will be required to quantify the net benefit in individual circumstances.

The SQSS Review Group recommends that the modified amendment is incorporated into the NETS SQSS. Please refer to appendix 1 for proposed modifications to the definitions of Pre-fault Rating and Unacceptable Overload.

### ***3.3 Assumed Reactive Power Output of Generators***

In setting the background conditions for designing generation connections, it is normally required that the real power output of a power station shall be set to its registered capacity, and the reactive power output is set to the full leading or lagging output that corresponds with this level of active power output. However, in section 2.8.3 there is a regional variation that allows the reactive output of generators within SPT and SHETL areas to be set to "that which may reasonably be expected". The variation was included to reflect the fact that some pre-existing generators, if running at full lead or lag, would result in system voltage non-compliance. It was considered that this obligation is unnecessarily onerous. It is proposed that the regional variation in 2.8.3 can be removed if clause 2.8.2 is modified so that it applies throughout GB and also permits the use of reactive power outputs "which may reasonably be expected under the conditions". For more information please refer to section 5.10.1 of WG2's report.

Only one respondent directly addressed this amendment proposal, indicating that they anticipated no impact on users and asking for clarification if this is not the case. Another respondent indicated their general support of efforts to remove regional variations, indicating that they appeared to be "relatively minor and well thought through".

In responding to the text consultation, the REA proposed that the same proviso should be applied when setting generator reactive power outputs to undertake voltage analysis, both for step changes and continuous operation.

The SQSS Review Group considers the changes initially proposed, and those proposed by the REA, to be minor, with no impact on users. The Review Group supports the REA proposal in respect of voltage step change analysis. Essentially, it will enable planners to exercise reasonable discretion when setting the reactive power output levels of generators throughout Great Britain (instead of just in Scotland) in the background cases for network stability and voltage studies. In practice, planning engineers are unlikely to invoke this freedom unless the default full leading or lagging requirement is obviously unreasonable. Given that historically this has only been a problem for a small number of generators in Scotland, this SQSS amendment is unlikely to actually change the generation backgrounds which are studied. Nevertheless, removing regional variations within the SQSS makes it clearer for all stakeholders. The SQSS Review Group therefore recommends that this amendment proposal is adopted. Proposed wording to effect this change are included in appendix 1.

### **3.4 Double Circuit Line Faults in the SPT Area**

There is a second regional inconsistency in the criteria relating to the design of generator connections, in the sub-section that specifies the contingencies for which the post-fault criteria will apply. Criterion 2.10.3 specifies that a double circuit overhead line is only considered "where any part of either circuit is in the England and Wales area or the SHETL area" (i.e. not entirely within the SPT area). This regional difference was included when the SQSS' jurisdiction was originally extended to include Scotland, since a double circuit fault on parts of the 132kV SPT network can result in non-compliance. This regional variation is also included in chapter 4 of the SQSS, which relates to the design of the Main Interconnected Transmission System (MITS). Given that the issue identified is on the 132kV SPT system, WG2 proposed that inclusion of this criterion within Section 2 of the Standard is not considered appropriate and it can therefore be removed. However, the removal of the clause from chapter 4 of the SQSS was not recommended without a detailed assessment of the derogations and capital expenditure that this would necessitate. For more information please refer to section 5.10.2 of WG2's report.

As for the previous amendment, only one respondent directly addressed this amendment proposal in the principles consultation, indicating that they anticipated no impact on users and asking for clarification if this is not the case. Another respondent indicated their general support of efforts to remove regional variations, indicating that they appeared to be "relatively minor and well thought through". There were no comments following the text consultation.

The SQSS Review Group considers this change to be minor with no material impact on users or planners. The motivation for the change is simply that the regional inconsistency's inclusion in chapter 2 is redundant and detracts from the clarity of the criteria. The SQSS Review Group therefore recommends that this amendment is adopted. Revised wording for clause 2.10.3 is shown in appendix 1.

### **3.5 Presentational Changes to Demand Security Table**

When comparing the demand criteria aspect of the NETS SQSS with P2/6, there are a number of areas where the two Standards are not aligned. Some of the miss-alignments are presentational and therefore readily addressed. The "Minimum planning supply capacity following secured events" table in the SQSS has a corresponding table in P2/6. To help improve the alignment between the two standards, WG2 proposed to adjust the presentation of this table by introducing a "Demand Group Class" field, and using nomenclature and banding that is consistent with P2/6 (i.e. Demand Classes A ( $\leq 1\text{MW}$ ) through to Class F ( $>1500\text{MW}$ )). Additionally, the orientation of the table will be adjusted, to align with P2/6. For more information please refer to section 6.6.1 of WG2's report for further information.

One respondent directly addressed this amendment proposal in its response to the principles consultation, reiterating previous concerns regarding NGET's move to the SQSS from the then P2/5 standard in the 1990s, and welcoming all efforts to re-align the SQSS with P2/6. The REA welcomed the proposals in its text consultation response.

This proposal only relates to the presentation of criteria and not to the criteria themselves. Therefore this amendment should have no impact of grid users. Nevertheless, this proposal is the first step towards re-aligning the SQSS with the P2/6 standard, a process which should reduce the confusion associated with conflicting standards relating to the design of Grid Supply Points, improving efficiency and clarity within the industry. The SQSS Review Group therefore recommends the proposed amendment, as shown in appendix 1.

### ***3.6 Contribution of Embedded Generation to Demand Security***

The assumed contribution of embedded generation impacts on the design of demand connections. Presently the SQSS (the standard which TOs must comply with) considers this on a much less granular level than Engineering Recommendation P2/6 (the standard which DNOs must comply with), leading to conflicting requirements for the design of grid supply points (GSPs). WG2 has developed proposals that seek to improve the SQSS' consistency with P2/6, including revising a table in the SQSS which indicates the maximum effective contribution of different types of embedded generation to demand group importing capacity, and the provision of additional guidance to DNOs regarding the submission of grid code data to National Grid. In the longer term, once additional experience with intermittent embedded generation has been gained, the working group recommended the joint review of the SQSS and P2/6. For more information, please refer to sections 6.4, 6.6 and 7.4 of WG2's report.

The main impact of this change should be greater consistency between DNOs and TOs regarding the design of GSPs, and a more accurate consideration of the contribution of embedded generation. The required importing capability of GSPs may be revised upwards or downwards depending on the composition of embedded generation within the demand group supplied by each GSP and the assumptions which were previously made regarding the classification of intermittent generation (since the existing SQSS process involves some judgement). In any case, the change is only to the determination of GSP importing capability and will not affect the assessment of the GSPs required export capability.

In respect of the principles consultation, one respondent welcomed efforts to re-align the interface requirements of the SQSS and P2/6 and pointed out that a joint review of these standards could be the appropriate point to also consider the implications of smart grids to ensure that a consistent approach is adopted (e.g. consistent assumptions regarding the levels of demand response).

Another respondent agreed that more work is required to update assumptions on the contribution that embedded generation makes to demand security. They also expressed concern that the implications for grid users are not entirely clear and requested additional time to appraise the proposals.

A third respondent indicated that they would be reluctant to change P2/6 until further operating experience with the availability and reliability of wind generation is obtained. Nevertheless, they do support a joint review with P2/6 (and wish to be engaged in such work), suggesting that such a review should also take into account of the growing levels of latent demand, energy storage, and demand side management.

In responding to the text consultation, the REA commented that the text better aligned the NETS SQSS and P2/6.

The SQSS Review Group recommends this proposal as a step towards bringing consistency of standards. It acknowledges the need for a joint review of the NETS SQSS and P2/6 and has begun discussions with DNOs and the ENA. The proposed SQSS changes are shown in appendix 1.

### ***3.7 Clarification of Applicability of Generation Connection Criteria***

The existing NETS SQSS clause 1.10 states that, “The generation connection criteria applicable to the onshore transmission system are set out in Section 2 and cover the connections which extend from the generation points of connection and reach into the MITS.” Clause 1.10 could be understood to imply that generation connections arising from the application of Section 2 will become part of the MITS, which may not always be the case (e.g. radial connection via 132kV circuits). Furthermore, were the proposal to introduce tiered generation connection standards (refer to section 4.1) be introduced, small intermittent generators may be connected via single circuit connections, and such connections could not be considered as part of the MITS. To resolve this confusion, WG2 propose some changes to the introductory section 1 of the NETS SQSS that clarify the scope of the later sections of the NETS SQSS, together with a couple of corresponding definition changes. For more information please refer to section 7.2 and 7.3 of WG2’s report.

Only one respondent addressed this amendment, seeking clarification regarding the likely impact of this change on customers (including the impact on the infrastructure that will need to be developed and the implications for generators of being on a non-MITS connection) and seeking an understanding of how a Connect & Manage will impact on this proposal. The proposed changes are intended to clarify the requirements of the NETS SQSS and will not have a material impact.

### ***3.8 Clarification of the Overlap of Generation and Demand Criteria***

Increasingly the development of embedded generation within demand groups is leading to situations where the local generation can exceed the local demand, causing the GSP to export. Presently, it is not clear whether the criteria applicable to a generation connection or that applicable to a demand connection should be applied in such cases. This will become

more relevant if the proposal for small low-fuel-availability generators to be connected via non-firm connections (see section 4.1) is progressed. In order to ensure the security of demand within GSPs that have significant volumes of embedded generation, the working group proposed the inclusion of an additional paragraph which requires that exporting GSPs should be designed to comply with both section 2 (generation connections) and section 3 (demand connections) criteria. For more information please refer to section 5.4 and 7.3 of WG2's report.

No consultation respondents directly addressed this proposal, although one respondent indicated that they supported all of the proposals that they did not specifically address in detail.

Following discussion within the TOs, the proposal has been modified to include the clarifications as sub clauses of the existing requirement in 1.23 rather than as separate, new clauses. The review group believes that this approach provides greater clarity. This change was included in the text consultation, and was supported by the REA in its response.

The impact of this change on customers is expected to be very minor. The reliability requirements for large demand connections exceed those for similarly sized generation connections. Generally GSPs have been established to supply demand, and generators have subsequently taken advantage of the LV connection and embedded themselves within the GSP. Prior to the development of embedded generation, the GSP would have been designed to comply with the demand connection requirement. Therefore, in essence, this change simply makes it clear that the criteria that already apply to a GSP should not be relaxed if generation subsequently develops within the GSP, formalising a working assumption already in use within the TOs. The REA noted that whilst this proposal will have limited impact on plant requirements, the presence of embedded generation will have an impact if changes are made to the manner in which it is considered to provide security (section 3.6).

The SQSS Review Group recommends that the modified amendment proposal be adopted. It is recognised that this requirement may need to be revisited as more experience is gained with embedded generation's ability to provide demand security, and following the expected joint-review of the SQSS connection criteria and the P2/6 standard.

### ***3.9 Requirement to Assess Circuit Breaker Faults for their Potential to Cause Unacceptable Voltage Rise***

Presently the SQSS does not require that circuit breaker faults are considered when assessing the network's voltage compliance, although the previous PLM-ST-9 standard did require this. A circuit breaker fault has potential to cause a significant voltage rise that could lead to extensive insulation damage across multiple circuits, leading to long outages of circuits and busbars. WG4 recommended that the SQSS be modified to include a requirement to ensure that circuit breaker faults do not cause unacceptable voltage rise.

One respondent indicated that they considered the proposal to assess the potential for circuit breaker faults to cause unacceptable voltage rise to be sensible. Another respondent did not directly address this proposal but strongly articulated their concern for a stable and secure power system, which this proposal would enhance.

Although circuit breaker faults are rare, the review group believes that the potentially significant consequences of them merits their consideration in designing the transmission system and recommends this proposal.

### ***3.10 Consideration of generator trips***

The NETS SQSS currently includes consideration of the loss of generation in terms of its impact on system frequency. WG4 noted that generation losses will usually cause step changes in voltages. It noted that previous standards considered a loss of generation as a secured event in system design and operation and proposed that the criteria be re-instated.

The impact of the step change on customers will vary according to the size of generation, its pre-trip reactive loading, the voltage level to which the generator is connected, and the strength of the local network. It is anticipated that generating unit sizes will increase in the future and that there is likely to be a greater capacity of generation connected at 132kV. These factors may lead to greater step changes affecting customers in the future. WG4 noted that generation trips are relatively common events.

No respondents explicitly commented on the principle of this proposal. The REA suggested a text modification to clarify that, when considering the prior outage of generating units sharing a common breaker, account should be taken of whether faulted units can be separately isolated.

Based on the potential for generation losses to impact on customer quality of supply, and the potential for greater impacts in the future, the review group recommends this proposal, as modified by the REA comments.

### ***3.11 Revised Voltage Standards***

WG4 reviewed all of the voltage criteria in the SQSS with a view to improving consistency throughout Great Britain, identifying the technical limitations, and ensuring that these are respected while increasing the flexibility available to network planners and operators. For the full detail of WG4's recommendations, please refer to sections 4.3 and 4.4 of their report. Key proposals include:

- removal of several regional consistencies, differentiating by voltage level rather than region



- differentiating between 'hard limits' (driven by infrastructure capabilities and contractual arrangements) which must never be violated and 'soft limits' which, with careful consideration during detailed scheme design, can be exceeded if there are good reasons to do so (e.g. a significant cost saving)
- allowing system operators more discretion in setting the pre-fault voltage levels while ensuring that the post-fault voltage criteria are always complied with
- revised GB-wide voltage step-change limits that distinguish between 'frequent' and 'infrequent' operational switching

One respondent stated that they support the recommendations to clarify and align, as far as reasonably practicable, the voltage criteria across regions, particularly the revisions to upper limits based on plant capabilities. Another respondent stated that the recommendations do not seem to fundamentally change the principles behind the standards and that, subject to assessment, they should not pose a threat to their power stations.

The proposals will not affect the security or quality of supply for customers. Voltages will still always be maintained within statutory limits, which haven't changed. The proposal will afford more flexibility in system design and operation within this range, allowing efficiencies to be pursued. The Review Group recommend implementation of the proposal.

### ***3.12 Voltage step change criteria***

As described in previous sections, a number of proposals are intended to remove regional differences and better align the requirements of the NETS SQSS with those of P2/6. In discussions following the consultations, the Review Group has identified a material change that the proposals have inadvertently introduced, relating to operational requirements applied to the 132kV transmission system in Scotland. The current requirements and practice do not apply voltage step change criteria at Grid Supply Points (or groups of GSPs) in Scotland, with a demand less than 1500MW, following the loss of a 132kV double circuit (clauses 5.3 and 5.4). However, the proposals consulted on included a requirement to apply voltage step change limits to these demand groups for these circuit losses, should any demand remain connected following the loss of circuits (note 12 following table 6.5). The proposals therefore would unintentionally introduce more onerous requirements. Consequently the Review Group proposes a modification to the text consulted on, such that Note 12 of table 6.5 is changed from

For demand groups with aggregate demand less than 1500 MW, this criterion applies to any demand left connected post-fault.

To

In planning timescales, for demand groups with aggregate demand less than 1500 MW, this criterion applies to any demand left connected post-fault. Operationally, this criterion only applies for demand groups with aggregate demand greater than 1500 MW.

This modification will ensure both consistency between chapters 5 and 6 of the NETS SQSS,

and that the current requirements are maintained.

## 4 Specific Principles for Detailed Development

Several proposals were put forward in the Update and Consultation Report that were acknowledged to require further investigation before they could be implemented: to refine parameters, study the possible impacts, and develop appropriate commercial arrangements. These issues tended to be the main focus of feedback from the industry. In all cases, the industry's comments and concerns will be highly influential in setting the direction of future development. The issues and the range of industry views are outlined below.

Three industry working groups have been established this year to progress some of the issues. These are:

1. Offshore networks – looking at requirements appropriate to the connection of Round 3 wind farms and the development of integrated offshore networks
2. Interconnectors – considering how to include interconnectors in planning and operational analysis
3. Entry criteria – looking at issues around generation connection

The Review Group has recently consulted on proposals to introduce formal governance arrangements for the NETS SQSS. These arrangements will provide a clear means to identify and take forward potential modifications to the standard. The Review Group anticipates that future work priorities, for the issues discussed in this report and those newly arising, will be established under the proposed arrangements once they are implemented.

### 4.1 Basis for Connection Capacity

The update and consultation report proposed superseding the use of 'Registered Capacity' with the 'Local Capacity Nomination' (LCN) as the basis of capacity within the SQSS. LCN was developed during the Transmission Access Review (TAR) and at the time of the working group 2 report was being considered for incorporation into the Connection and Use of System Code (CUSC). LCN reflects the commercial position of the generator, rather than the physical capability of the generation and is open to change or trade over time. For more information, please refer to WG2's report, sections 5.6.1 and 5.9.

Several consultation respondents addressed this issue at some length, making the following points:

- One respondent agreed that TEC is not a suitable basis for the design of generation connections since TEC is a commercially variable parameter which could change frequently.

- LCN as proposed was still a commercial term that relates to the maximum generation within a year, rather than the maximum technical capacity. Several respondents indicated that all generators will wish to export at their maximum technical capacity at some point (even if only in emergency conditions) and the design of local connections should always accommodate this. Therefore, a reference to the generator's capacity might be more appropriate than a commercial term.
- One respondent supported the use of LCN, subject to how the TAR CUSC amendments progress.
- One respondent explained that implicitly there are two separate considerations in connecting a power station – one being the local connection which must be able to withstand all operation conditions of the power station, and the other being the wider transmission system where some diversity/sharing is likely to occur and it might be possible to scale the output capacity. Given this, the respondent suggested that it may be better to define two separate capacity parameters for use in the two parts of the design process.
- From the TAR CUSC amendment work one recipient understood TEC to refer to the capacity required on the wider transmission system, CEC refers to the connection assets immediate to the generating units, while LCN refers to the local transmission assets in between the connection assets and the wide MITS.
- TEC/LCN trading considerations should not influence connection asset design.

Following the implementation of Connect and Manage, it is no longer proposed to introduce LCN. This will be reviewed in the future if access arrangements are changed to differentiate local and wider capacities. At this time the Review Group would expect the design, CUSC rights and obligations, and charging arrangements to be considered together. In the mean time, the Review Group recommends the continued use of Registered Capacity as the basis for connection capacity.

## 4.2 Revised Minimum Connection Standards

Presently the SQSS specifies the same standard of connection for all generators, but customers can voluntarily opt for a less robust connection if they consider the financial implications of doing so to be favourable, providing they do not adversely affect other users. WG2 considered that providing a firm connection for a small intermittent generator could be uneconomic, but such customers may be nervous to accept a non-standard connection

WG2 therefore proposed a deterministic methodology which specifies different minimum connection robustness for different generator capacities and *source-fuel* load factors. It was proposed that all tiers of connection would be adequate for the full capacity of generation during system intact conditions, but that the different tiers would provide varying levels of capacity following different types of faults. The connection standard would be both a default design and a minimum standard - customers could voluntarily opt for a more robust connection but could not opt for a less robust connection. In other words, a small intermittent generator could still opt to 'upgrade' to a firm connection, but a large base load generator

could not 'downgrade' to a lower connection standard. The thresholds put forward in the proposal were only indicative, intended to illustrate how the proposal might work in practice.

The intention of the proposal is for the expected availability of the *source fuel* rather than the typical operating regime of the generator to be the basis for selecting the connection standard. Therefore a peaking generator which seldom generates but has access to a reliable supply of fuel would be considered to be in the highest tier of source-fuel load factor (and would thus be required to have a more reliable connection). Essentially the proposal is that the more a generator contributes to demand security, the more robust its minimum allowable connection to the MITS should be. Conversely, generators which do not contribute significantly to demand security (e.g. wind) should not be *required* to incur the potentially significant cost of a firm connection (although they may still choose to have a firm connection). The responses received to the consultation suggest that this proposal was not described clearly. This will be taken into account during further work to develop the principles explained above into detailed proposals.

In the update and consultation document, WG2 acknowledge the need for the following additional assessments before a NETS SQSS amendment proposal could be made:

- Cost benefit analysis to confirm the appropriate thresholds between tiers of connection standards
- Assessment of the broader impact of the changes, including the implications for commercial codes
- Assessing the impact of having significant volumes of smaller generators connected via non-firm connections on overall system security
- Further development of standard connection configurations that comply with the different tiers of connection resilience.

For more information, please refer to sections 5.5, 5.7, 5.8, 5.11, and 7.4 of WG2's report.

Most consultation respondents addressed this issue at some length, making the following points:

- There was broad agreement regarding the need for detailed analysis to determine the thresholds between the different levels of connection resilience, and justify the introduction of differential treatment.
- There was a suggestion that the assumed availability of different generation technologies should align with the generation security contributions in the P2/6 standard.
- There was some confusion as to how the source fuel load factor would be determined: whether this will be a generic factor for each generation technology or whether this will be specifically evaluated for each generator (and if the latter, how this would be performed and impact on the negotiation process and timescales).
- There was also confusion as to how the capacity would be assessed in situations where there are multiple units and multiple generators in a similar location – whether the capacities would be aggregated. Any ambiguity would reduce transparency and could lead to confusion when applying the criteria in practice

- All generators will at some point wish to export at their maximum technical capacity, and the SQSS must always accommodate this.
- The economic implications of the different connection options (e.g. whether compensation would be paid if a firm or non-firm connection is interrupted) have not yet been determined, and will require careful consideration.
- The proposal will be easier to understand and critique once example connection designs for each connection tier are developed.
- One respondent expressed concern that the load factor approach adds another layer of complexity to the process
- One respondent welcomed the development of flexible connection design criteria.
- Another respondent supported the arrangement whereby customers can opt for a more reliable connection but cannot chose a less reliable connection.
- One respondent expressed a concern that the contribution to demand security is more important than load factor per se, and that an alternative metric of this might be the expected contribution to peak demand.

The intention of the consultation was to consult on the principle of the proposal. The Review Group believed the response was sufficiently positive to warrant progression of this proposal and established an industry working group in early 2011 to further develop the proposals to a level that can be considered for implementation.

### ***4.3 Clarification Regarding Use of Demand Management***

The review investigated the issue of demand management and concluded that the present NETS SQSS criteria do not present a barrier to the use of demand management in system planning and operation. Demand management is presently considered where it is expected to be available whenever required throughout the timescale under consideration. Historically this has generally been limited to agreements struck with large industrial loads to curtail their demand during adverse circumstances, such as very high demand or following transmission network faults. However, increasing levels of generation variability coupled with the rollout of time-of-use electricity pricing and the development of technologies which allow greater participation of domestic demand in system management is expected to lead to increased levels of demand management. Recognising this, and the potential of demand management to increase the network's effective capability, and/or lower its operating and investment costs, it was proposed to modify the standard to explicitly refer to the consideration of demand management when undertaking system analysis. For more information please refer to section 7.12 of the update and consultation document.

Only one respondent offered their opinion regarding demand management, indicating their support for it and concern that it is presently underutilised. They suggested further analysis into the extent to which it could be utilised and a review of the level of security that demand is willing to pay for – adding their suspicion that such a review would alter the SQSS Review Group's opinion that the SQSS is not the reason for the underutilisation of demand

management. Another respondent commented that the implications of smart meters should be considered in the proposed joint review of the SQSS and the P2/6 standard.

The SQSS Review Group agrees that the linkage between the use of demand management, customer behaviours and customer expectations regarding demand security is not well understood and needs further investigation. Demand management necessarily requires electricity consumers to alter their behaviour, which in turn requires the development of commercial arrangements that encourage such a change in behaviour. The cost savings associated with different levels of demand management will need to be assessed, and the willingness and extent to which customers are prepared to change their behaviour will need to be quantified (e.g. their willingness to move onto dynamic time of use electricity pricing contracts, how much demand can be reduced during cold winter evenings (i.e. peak demand), how long users are prepared to limit their consumption for while repairs are made to faulted infrastructure etc.) This research will be an important aspect of the ongoing assessment of the opportunities provided by demand management. Given this, the SQSS Review Group believes that findings from various field trials of smart meters over the coming years will provide an objective basis for this research. The SQSS Review Group agrees that this research should be jointly performed with the distribution network companies, and agrees with the suggestion that a joint review of the SQSS and P2/6 standards could be a good opportunity to do this.

On the basis that the NETS SQSS does not currently present a barrier to the use of demand management, and in view of the current uncertainty of the extent to which it will be available in the future, the SQSS review group considers that amendment of the standard in this area is not currently warranted, and that further work to better inform a future amendment will be needed.

#### **4.4 Double Circuit Faults in Scotland**

In WG4's review of historical fault rates, WG4 identified that the observed fault rate of 132kV double circuit lines in the SPT area is broadly equivalent to the double circuit fault rate throughout Great Britain. However, a double circuit 132kV fault is not a secured event in SPT areas, unlike SHETL areas. WG4 noted that SPT would need to carry out extensive studies to determine the consequent derogations and system investments before removing this regional variation in the SPT area can be considered.

A related issue is the permitted voltage step-change allowed following secured events on the supergrid. This requirement is relaxed to -12% in SPT and SHETL areas (but not NGET areas) following double circuit overhead line faults, and relaxed to -12% in SHETL and NGET areas (but not SPT) following the loss of a supergrid transformer, busbar section or mesh corner. WG4 recommend the continued assessment of this issue.

For more information, please refer to sections 0.2, 2.10 and 8.3 of WG4's report.

A couple of respondents addressed this issue, indicating their support for the removal of regional variations and improving reliability where practicable and supported by further assessment.

The SQSS review group supports work intended to remove regional variations. Further work would be needed to assess the consequences of modifying the standards before any recommendation could be made.

## **4.5 Definition of Insufficient Voltage Performance Margin**

Voltage instability is a network phenomenon in which a deficit in the regional supply of reactive power causes the voltage in the region to collapse, leading to the disconnection of generators and the loss of supply to consumers. Given the potentially very fast nature of this phenomenon and the serious consequences which can result from it, a 'voltage performance margin' is used to ensure that there is adequate safety margin between any operating point and the voltage stability limit.

The existing SQSS defines the following characteristics as "insufficient voltage performance": voltage collapse, over-sensitivity of system voltage, or the unavoidable exceedance of the reactive capability of generating units such that accessible reactive reserves are exhausted. A voltage performance margin is maintained by requiring that these characteristics are not observed following a secured event with the additional unavailability or loss of any one automatic control device, any one reactive power provider and any "credible demand sensitivities". This application of this criterion is relatively clear for importing regions with limited generation but is more difficult to interpret for system boundaries between major areas that include significant amounts of demand and generation. Additionally, the introduction of large quantities of renewable and embedded generation means that traditional views of demand and generation uncertainties may no longer be valid. WG4 therefore recommended reviewing the definition for suitable voltage stability margins. Possible

alternative forms of specifying the margin used overseas include a set % margin above the voltage stability limit, or a minimum MVar reserve at each bus that is a certain % of the system fault level at the bus. Please refer to section 4.2 of WG4's report for more information.

No respondents specifically addressed this recommendation, although a number of participants indicated their general approval of WG4's proposals and offered their support for the ongoing assessment of issues and the likely implications of amendments.

The Review Group believes there is benefit in providing greater clarity on voltage performance margins. Further work will be needed to identify specific proposals.

## **4.6 System Requirements Following a Switch Fault**

Presently the SQSS requires that the fault outage of a busbar coupler, busbar section or mesh circuit breaker should not cause a loss of power infeed that exceeds the infrequent loss risk. However the SQSS does not specify any restriction of the thermal, voltage and stability performance following these faults. There is therefore a risk that while one of these faults may not directly lead to an excessive loss of power infeed, resulting network conditions (which could exceed the limits that the network is otherwise designed to remain within) may indirectly lead to the loss of additional infeed and put the security of the system at risk. There was previously a requirement that circuit breaker faults should not cause unacceptable voltage rise, and WG4 consider that this requirement should be reinstated, given the potential risk of damage to infrastructure with a sudden and excessive increase in voltage. WG4 recommend that a detailed impact assessment be undertaken to assess the implications of including a requirement for acceptable post-fault thermal, voltage, and stability performance under pre-fault intact conditions – both in terms of any additional capital expenditure that this might necessitate and the additional security that this would provide. Please refer to section 3.6.2 of WG4's report for more information.

One respondent directly addressed this issue, indicating that they considered the proposal to be sensible and that they support further work to finalise the proposal. Other respondents indicated that they generally agreed with the contingency criteria proposals put forward by WG4 and supported the ongoing assessment of their likely implications.

In order to take this proposal forward, it will be necessary to undertake an assessment of the economic case for introducing a requirement to consider the impact of Major System Faults at the planning stage (including busbar coupler, busbar section, mesh circuit breaker fault outages and stuck breaker events), and either securing or mitigating the risk of such events .

## **4.7 Definition of System Stability Requirement**

WG4 investigated the ongoing suitability of the stability criteria in the SQSS. One significant focus of the working group was whether boundary transfer capabilities might be able to be



increased through the use of faster fault clearance times. WG4 concluded that there would be little benefit in doing so, but recommends that further work be carried out to confirm this finding. The working group also considered expressing the oscillatory security requirement in terms of the damping level applied to critical frequencies, instead of a minimum rate of decay of oscillations. This issue requires further assessment before a firm proposal can be made. Please refer to section 5 of WG4's report for more information.

No respondents specifically addressed this recommendation, although a number of participants indicated their general approval of WG4's proposals and offered their support for the ongoing assessment of issues and the likely implications of amendments.

The Review Group considers that the benefits that can be gained from any proposals in this area are unclear. Further work will be needed to develop proposals that provide benefit.

## **4.8 Interconnected Offshore Network Criteria**

Working group 5 looked at the development of criteria to guide the cost-effective development of interconnected offshore transmission networks suitable for connecting very large wind farms (> 1500MW), located far from shore (100-300km), such as those proposed in the Crown Estate's round 3 programme.

Only one respondent addressed the work of WG5, acknowledging that the group has considerably more work to do and that it is too early for the industry to be able to comment meaningfully. The respondent also suggested that there may be some overlap between WG5's work and the need for a review of the treatment of interconnectors in the SQSS.

The Review Group consider the development of SQSS criteria applicable to interconnected offshore networks to be a priority issue, and established a working group in early 2011 with the objective to make recommendations by the end of 2011. A working group has also been initiated to recommend criteria specifying appropriate representation of interconnectors in system planning and operation (section 5.4).

## 5 General Areas for Ongoing Consideration

A number of issues that were included in the review's remit have not been significantly progressed to date due to their novel and complex nature. Nevertheless, the SQSS Review Group recognises the potentially significant impact of some of these issues, and potentially considerable benefit that could be obtained by new approaches. In keeping with industry feedback, the SQSS Review Group propose to keep the issues below under consideration with further investigation of the practical implementation of new approaches and the benefits that could be obtained.

Under the proposed new governance arrangements, it is the intention of the Review Group to develop a programme of future work in conjunction with the wider industry. Below is a discussion of those issues outstanding from the review. Other issues may be added when identified by the industry.

### ***5.1 SMART Transmission Technologies***

A key component of the review was consideration of the opportunities provided by new SMART technologies, including the increased use of dynamic equipment ratings, the wide area monitoring and automatic control of the transmission network (leveraging HVDC and FACTS devices on the network, and the intertripping of demand and generation), and the use of SMART meters to manage demand levels. The NETS SQSS does not preclude the use of such technologies, but neither does it necessitate their use. The review sought to investigate the potential benefits of SMART technologies, but concluded that there is presently insufficient experience with the technologies to confidently and precisely identify their benefit and limitations. WG4 did conclude that intertrips are not a viable alternative to reinforcement to meet peak demand (except in limited circumstances) but that they should be considered as an option in ensuring year round operating conditions, including facilitating outages, can be met. Before the use of SMART technologies could be mandated, concerns regarding their practical implementation and the heightened level of risk associated with relying upon complex distributed systems for the security of the power system will need to be addressed. Please refer sections 6 and 7 of WG4's report for further details.

A number of consultation respondents indicated that they were happy with the greater emphasis on demand response and dynamic ratings proposed in the consultation. One consultation respondent highlighted the value in a joint approach with the distribution networks to develop standards that relate to the utilisation of demand response due to SMART meters, perhaps in conjunction with the joint review of P2/6. Another respondent challenged WG4's conclusion that intertrips do not provide an alternative to reinforcement at the time of winter peak, stating that "year-round assessment should replace winter peak as the principal basis for asset investment." The same respondent indicated their support for increased demand management, suggesting that it is presently underutilised, and that this may be attributable to the review wrongly assuming the level of demand security that

customers are prepared to pay for. This respondent also indicated that they are very supportive of the increased use of dynamic ratings.

The SQSS Review Group supports the use of SMART technologies. It considers that the NETS SQSS currently facilitates their use, as shown by the range of SMART technology that is already deployed on the transmission system. However, the Review Group recognises the importance of continuing to monitor developments in technology to ensure that the NETS SQSS does not become a barrier to their use.

## ***5.2 Optimal Balance between Transmission Infrastructure and Operational Measures***

The main focus of WG3 was studying the characteristics of transmission network design that will minimise the net cost of infrastructure development and power system operation (losses, response and reserve, lost load and SMART technologies such as consumer demand management, intertrips, WAMS, WACS etc.). Generally, the more infrastructure that is developed the less the operational costs become, and so minimising the net cost involves finding the ideal balance between balance between transmission infrastructure and operational measures. Although WG3 made good progress investigating the issues in general, and developing tools to support the ongoing investigation of this balance, it encountered difficulty drawing specific conclusions as these are highly influenced by market behaviours. A change in the market structure could significantly affect the behaviour of participants, which would in turn affect the optimal balance between infrastructure and operational measures. The risk of overinvestment in infrastructure is that the cost of that infrastructure will continue to be incurred for the long economic lifetime of the infrastructure (~40 years), while the risk associated with underinvestment in infrastructure is potential exposure to very high operational costs. Please refer to the WG3 report for more information.

Only one consultation respondent addressed this issue, indicating that because of the sensitivity of the optimal balance to highly variable input parameters they accepted the use of a deterministic approach periodically tested against a cost benefit analysis.

The SQSS Review Group view this issue as very complex. As discussed, the optimum level of transmission is heavily dependent on generation market prices across the lifetime of transmission infrastructure. If the view of the industry is that further work in this area is needed, it will be essential to encompass both technical and commercial issues in a joint programme of work.

## ***5.3 Fair Weather Relaxation of Contingency Criteria***

It is qualitatively recognised that the risk of transmission network faults is heightened during periods of severe weather, and lowered during periods of fair weather. WG4 considered the possibility of relaxing the contingency criteria applied during the real time operation of the

system during periods of 'fair' weather. To make an informed decision, the risk and consequences of a severe transmission fault during 'fair weather' would need to be properly quantified and weighed against the benefits of temporarily releasing additional network transfer capability. WG4 concluded that the subjective manner in which ambient weather conditions have been described in fault records makes it very difficult to confidently quantify the risk in different weather conditions. WG4 did note that over the past 10 years, only half of the 76 double circuit faults could be attributed to the weather, and so the potential case for the fair weather relaxation of contingency criteria is not emphatic. For more information, please refer to section 2.10 of WG4's report.

No consultation respondents specifically addressed this issue.

The SQSS Review Group supports the view of WG4 that the consequences of any relaxation of the standards need to be fully considered. The TOs have sought views on the merits of relaxing the standards through the RIIO stakeholder engagement process. Further industry discussions on the potential benefits and consequences of targeted relaxations to an N-1 criterion are taking place, and will inform the need for further review of the SQSS.

## ***5.4 Treatment of Interconnectors***

There are significant new interconnections to external systems currently under construction and more are planned. Interconnectors can result in large changes in flows within short timescales across the transmission system. It is therefore important to understand the implications and means of managing greater interconnection and market coupling with other European nations, including the extent to which interconnector flow can be relied upon to meet demand and avoid constraining generation. This issue was not significantly progressed in the review.

In early 2011 the Review Group established an industry working group to develop criteria specifying the appropriate treatment of interconnectors. This working group is currently developing proposals and undertaking cost benefit analysis of them to understand their impact.

# **6 Conclusions**

The review has considered a wide range of issues. In its April 2010 consultation it made recommendations to amend the NETS SQSS and to undertake further work in a number of areas. In March 2011, text intended to implement a number of proposals was consulted on. Following the consultations the SQSS review group has discussed the proposals and industry comments on them and makes a number of recommendations.

NETS SQSS amendments are recommended as follows:

- The requirement to consider an N-1-1 condition at peak demand in design studies in England and Wales should be relaxed
- The use of dynamic ratings in operational timescales should be explicitly referred to
- Flexibility should be allowed in setting the reactive output of generators in background conditions across GB, as is currently permitted in Scotland
- A regional inconsistency relating to the consideration of double circuit line faults in the SPT area should be removed
- Changes to the degree to which embedded generation is considered when assessing demand security should be made to align the NETS SQSS more closely with P2/6
- Presentational changes should be made to demand security table to better align with P2/6
- Clarifications on the inclusion of generation circuits as part of the MITS should be introduced
- Clarifications on the applicability of demand and generation criteria to composite groups should be made
- The requirement to ensure that voltages do not rise to unacceptable levels following a circuit breaker fault should be introduced
- Generation trips should be considered when assessing compliance with the standard
- A number of regional differences in voltage criteria should be removed
- Flexibility should be introduced into voltage limits to allow more efficient system design and operation where there is no impact on customers

In the view of the SQSS review group these changes provide greater clarity and consistency within the standard and introduce efficiencies in system design and operation that do not adversely affect customers.

The SQSS Review Group supports the further review and development of the NETS SQSS to ensure that it remains appropriate. This report discusses, in sections 4 and 5, a number of areas in which modifications may bring benefit. The need to involve the wider industry in both identifying priority areas and in developing proposals is essential in ensuring that the NETS SQSS continues to be appropriate against rapidly changing backgrounds. To this end, three new working groups have been established, and a number of industry workshops have been held. Further workshops will be held to inform the industry of progress and to seek feedback on the next steps in developing the NETS SQSS. Under the proposed new governance

arrangements, the industry will be directly involved in prioritising and focussing the ongoing review of the standards.

# Appendices

## ***Appendix 1 Proposed Text to Implement Amendments***

Existing text is shown in black font  
Changes are highlighted in red font.

## ***Appendix 2 Correspondence***