

GB SQSS REVIEW REQUEST

DATE: 27 September 2007

1. Title of review request
Review of Section 2 (Design of Generation Connections) of the GB SQSS version 1.0 September 22, 2004
2. Name of Proposer (<i>include name of contact person</i>)
Chandra Trikha – System Planning Manager, Scottish Hydro Electric Transmission Limited.
3. Proposer Contact Details ⁱ
Address: 55, Vastern Road, Reading, Berkshire, RG1 8BU
Telephone: 01189 534661 (direct) 01189 534657 (fax) 07767 850084 (mobile)
e-mail: chandra.trikha@scottish-southern.co.uk
4. Description of issue(s)/Defect(s) to be addressed by the request
<p>Section 2 of the GB SQSS (Design of Generation Connections) details the planning criteria for direct connection of one or more power stations to the GB Transmission system.</p> <p>Section 2, clause 2.3 requires that either the deterministic criteria detailed in clauses 2.5 to 2.13 is satisfied or that variation to the deterministic criteria, at the customer's request, is in accordance with clauses 2.15 to 2.18.</p> <p>The proposer considers that compliance with the minimum deterministic criteria in Section 2 for the connection of renewable type generation on radial 132kV transmission networks is not consistent with SHETL's pre-BETTA licence standard and is incompatible with the broader licence condition of developing the transmission system in an economical, efficient and coordinated manner.</p> <p>The relevant clauses that require review are 2.8, 2.9, 2.10, 2.12 and 2.13.</p> <p>In SHETL's "South West" area (Argyll, Kintyre and Cowall) the transmission system is radial in nature (i.e. it is not part of the Main Interconnected Transmission System). This network serves the main demand centres at Carradale, Port Ann, Taynuilt and Dunoon. A total of around 100MW of hydro generation is also connected to this network. More recently this network has been subjected to ever increasing applications for the connection of wind generation, either directly to the transmission system or embedded in the user (SHEPD as a DNO) system. The existing 132kV transmission system is radial and has limited capacity.</p> <p>In order to connect the renewable generation that has applied in this area, in accordance with the requirements of section 2, SHETL will require extensive and costly transmission reinforcement. This in turn will delay the connection of the renewable generation. Some of the overhead line reinforcement options for this area may be impracticable to achieve due to difficulty in obtaining planning consents. Consequently, reinforcements may involve land and subsea cable installations.</p> <p>SHETL also believe that the requirements of section 2 of the GB SQSS should be considered with respect to SHETL's pre-BETTA transmission standard for the connection of</p>

generation (PLM-SP-1, Issue 1, Planning Standard of Security for the Connection of Generating Stations to the System) to ensure consistency of approach, bearing in mind that it was a requirement that no material impact should arise from the harmonisation of the pre-BETTA security standards to form the GB SQSS.

Section 2 of the GBSQSS as presently written does not allow SHETL the opportunity to ensure that any reinforcements on radial networks of this sort are economic and efficient.

SHETL does recognise the need to ensure that the transmission system can be securely operated in an optimum manner i.e. reinforcement investment plus operating cost are optimised. It is considered that the section 2 of the GB SQSS does not currently allow this evaluation to take place.

5. Description of the review request, its nature and purpose

SHETL would like that the GB SQSS Review group should consider the following review work.

(a) Review clause 2.8 and 2.9:

These clauses define deterministic criterion under system intact and under planned outage conditions.

Clause 2.8.4:

The words in clause 2.8.4 “conditions on the GB transmission system shall be set to those which ought reasonably to be expected to arise in the course of a year of operation” and “typical power station operating regimes” are vague and open to interpretation.

The wording of this clause is unclear. As currently written the requirement under these clauses suggest that the generation (in general but renewable generation in South West) should all be set to maximum output against a background of demand throughout the year including summer minimum demand and summer circuit pre-fault ratings. Under these circumstances the network should never exceed its capacity. Therefore in cases of renewable generation (being intermittent, having more than one turbine at one site, diversity as a result of multiple site in a geographic area) it highly likely that the network will have a relatively low utilisation.

For large conventional generation (single or grouped) which are controllable and despatchable, it may be ‘reasonable’ to assume that these are all set to their maximum output for assessment under section 2. However for a radial 132kV network with multiple, relatively small and intermittent generation sources, SHETL consider it inappropriate to judge compliance based on all of these generators at their maximum output at the summer minimum demand period and with summer circuit pre-fault ratings.

SHETL’s investigation of actual windfarm outputs in Kintyre area suggest that for 85% of the time output is below 50% of rated output (summer load factor is around 21%).

Consequently, SHETL believe that the section 2 criteria should be based on a generation background condition which is ‘typical’ for the season being assessed. An economic assessment would then be appropriate to determine whether it is more economic to constrain generation off at times of high transfer or to reinforce the transmission network to

relieve these constraints. This approach is more in line with Section 4 of the GB SQSS where compliance is determined at the winter peak demand condition with an economic assessment required to determine the need or otherwise for reinforcement at other demand conditions.

Where there is no generation 'visible' to the GBSO (i.e. all small and embedded) then no constraining action can be taken by the GBSO. It would then be necessary to determine the transmission capacity based on the worst case combination of events. This would correspond to maximum generation output against a background of summer minimum demand and summer circuit pre-fault ratings

(b) Review clause 2.10:

This clause describes the post-fault deterministic criteria under system intact conditions. SHETL believe this clause as currently written is inconsistent with clause 2.12 and 2.13 for application in SHETL's area and is inconsistent with SHETL's pre-BETTA standard for the connection of generation.

Clause 2.10.3, 2.10.4 and 2.10.5:

Clause 2.10.3 requires compliance for a double circuit fault where the circuits are in E&W or in SHETL's area. This is a regional variation as it only applies to the transmission circuits that are in E&W or in SHETL's area and does not apply in SPT's area.

Clause 2.10.4 applies to all three TOs and requires compliance for a single circuit fault with the prior outage of another circuit.

Clause 2.10.5 requires compliance with a busbar fault which in the South West area of SHETL (Inveraray substation) will result in loss two 132kV circuits.

(c) Review clause 2.12 and 2.13:

Clause 2.12 requires that for the background conditions set in clause 2.8 with a local system outage (planned outage), the operational criteria of Section 5 of the GB SQSS (Operational criteria) must be met. For Scotland this effectively means an (N'-1) with a local fault outage (unplanned) resulting in N-2. Clause 2.13 then requires that operational measures be considered and the decision for reinforcement based on economics. This is directly in conflict with clause 2.10.4 which is a deterministic N-2 criteria with no economic assessment required.

Pre BETTA:

PLM-SP-1:

SHETL's pre-BETTA standard for the connection of generation required the following criteria to be met;

- i) Where the generation being considered is less than 1320MW then the minimum number of circuits is two and the credible outage contingency is "any one circuit" (PLM SP-1, clause 3.2.1).
- ii) In addition, clause 3.22 states that for generation with medium or low annual load factors, circuit ratings should be based on winter ratings.

The current GB SQSS section 2 criterion are not consistent SHETL's pre BETTA standard.

In summary, for 132kV radial systems....

SHETL feels that without economic and efficient evaluation, on parts of its 132kV transmission system that were never developed and designed to withstand (N-D) fault outage very expensive reinforcements will be required to meet the criterion of section 2 of the GB SQSS.

6 (a) Parts of the GB SQSS that require amendment to give effect to the request

The conclusion of the review may result in amendments to section 2 of the GB SQSS. In particular clauses 2.8, 2.9, 2.10, 2.12 and 2.13 very expensive reinforcements will be required, may require change.

6 (b) Parts of the GB SQSS that would otherwise be affected by the request

Section 1 of the GB SQSS may also be affected in general and clause 1.7, Figure 1.1 and clause 1.8 in particular.

6 (c) Nature and contents of amendments or effects

The details provided in sections 4 and 5 above covers nature and contents of amendments.

7. Justification of the request, giving the background thereofⁱⁱⁱ

1. The current standard may result in uneconomic development of radial 132kV transmission networks in SHETL's area.
2. Delay in connecting renewable generation schemes.

8. Potential impact of the request on other Core Industry Documents ^{iv}
It is unlikely that the changes will have impact on other Core Industry Documents.
9. Potential impact of request on relevant computer systems ^v
None



Guidance notes

- (i) Please include address, contact telephone/fax number and optionally, a contact email address.
- (ii) Impact on the GB SQSS - Where possible, give an indication of those parts of the GB SQSS which, in the opinion of the Proposer, would be likely to require amendment in order to give effect to (or would otherwise be affected by) the request and an indication of the nature and contents of those amendments or effects (including, where relevant, any need for the establishment of new, or removal of existing GB SQSS criteria and methodologies).
- (iii) Justification - Please give reasons why you believe that the request would better facilitate achievement of the GB SQSS objectives as compared with the then current version of the GB SQSS, together with background information in support thereof. If more space is needed you can use additional sheets of paper which should be attached to this form.
- (iv) Core Industry Documents include but not limited to The Grid Code, System Operator – Transmission Owner Code and the Connection and Use of System Code
- (v) Where possible, please give an indication of the potential impact of the request on relevant computer systems and processes used by the Transmission Licensees.
- (vi) Incomplete forms will not be processed. The Proposer may be asked to clarify any information that is not clear. The Proposer's attention is drawn to clause **Error! Reference source not found.** of the GB SQSS governance document.