# National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS)

## Modification Register

(Updated January 2016)

## Modification Summary

Dates in **bold** are confirmed dates, while dates in *italics* are anticipated dates for future milestones.

| SQSS GSR No. | Title | Modification Proposal Raised | Workgroup Report Approved by Review Panel | I/C Published | I/C Closed | Responses Received | Modification Report Submitted to Authority | Authority Decision | Implementation Date |
|---|---|---|---|---|---|---|---|---|---|
| 008 | Regional Variations and Wider Issues | **2008** | → | → | → | → | **19 October 2011** | **Pending** | |
| ~~010~~ | ~~Review of Onshore Generation Connection Criteria~~ | ~~**5 October 2010**~~ | ~~**17 May 2012**~~ | ~~**18 June 2012**~~ | ~~**17 August 2012**~~ | ~~**3**~~ | ~~**N/A**~~ | ~~**N/A**~~ | ~~**N/A**~~ |
| 011 | Review of Offshore Networks | **5 October 2010** | **17 July 2012** | **6 August 2012** | **1 October 2012** | **0** | **18 August 2014** | **Pending** | |
| 012 | Treatment of Interconnectors | **5 October 2010** | *April 2016* | | | | | | |
| 014 | Offshore Transformer Requirements | **19 November 2012** | **2 April 2014** | **13 October 2014** | **14 November 2014** | **5** | *February 2016* | | |
| 015 | Normal Infeed Loss Risk | **27 May 2013** | **2 October 2013** | **11 November 2013** | **6 December 2013** | **3** | **10 March / 13 August 2014** | **3 December 2014** | **Pending** |
| 016 | Embedded Generation Scaling | **22 July 2013** | | | | | | | |
| 017 | Treatment of Switch Faults in Operational Timescales | **5 February 2014** | | | | | | | |

## Modification Summary

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|---|---|---|---|---|---|---|---|---|---|
| 018 | Treatment of Sub-Synchronous Oscillations in the NETS SQSS | **4 December 2013** | **2 December 2015** | | | | | | |
| 019 | Review of Chapter 7 Double Busbar Requirements | **2 April 2014** | | | | | | | |
| ~~020~~ | ~~Modification of Clause 7.8.1.1 to Allow Single Transformer Offshore Substations of Capacity Greater Than 90MW~~ | ~~**27 October 2014**~~ | ~~**7 October 2015**~~ | ~~**N/A**~~ | ~~**N/A**~~ | ~~**N/A**~~ | ~~**N/A**~~ | ~~**N/A**~~ | ~~**N/A**~~ |
| 021 | Operational and Planning Criteria for 220kV Transmission Assets | **4 February 2015** | **5 August 2015** | **21 September 2015** | **16 October 2015** | **1** | **23 December 2015** | **Pending** | |
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## Ongoing Modifications

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| **SQSS GSR No.** | 008 |
| **Title** | Regional Variations and Wider Issues |
| **Proposer** | NETS SQSS Review Panel Secretary on behalf of the Three Transmission Licensees (SHETL, SPT and NGET) |
| **Submitted** | 2008 |

| Modification Description | Progress |
|---|---|
| GSR008 seeks to undertake a "fundamental review" of the NETS SQSS. | ***Modification Proposal***<br><br>***Workgroup***<br><br>***Industry Consultation***<br>An Industry Consultation was published on 23 April 2010 with a closing date of 4 June 2010. A number of responses were received.<br><br>***Modification Report***<br>A Modification Report has been prepared and submitted to the Authority for a decision.<br><br>***Authority Decision & Implementation***<br>GSR008 was submitted to the Authority for a decision on 19 October 2011. The Authority has yet to publish their decision. |

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| **SQSS GSR No.** | 011 |
| **Title** | Review of Offshore Networks |
| **Proposer** | NETS SQSS Review Panel Secretary on behalf of the Three Transmission Licensees (SHETL, SPT and NGET) |
| **Submitted** | 5 October 2010 |

| Modification Description | Progress |
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| GSR011 was raised to develop NETS SQSS criteria applicable to interconnected offshore networks.<br><br>The current standards provide criteria for radially connected windfarms. However, there is a need for 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. | ***Modification Proposal***<br>The Modification Proposal was proposed at the Industry Workshop on 5 October 2010 where the NETS SQSS Review Panel determined that the Modification Proposal will progress to a Workgroup.<br><br>***Workgroup***<br>The NETS SQSS Review Panel determined that a Workgroup was required to investigate the issues around NETS SQSS criteria applicable to interconnected offshore networks. The Terms of Reference have been agreed by the NETS SQSS Review Panel and the first Workgroup meeting took place in February 2011.<br><br>***Industry Consultation***<br>An Industry Consultation was published on 6 August 2012 with a closing date of 1 October 2012. No responses were received, although subsequent discussion with the Authority produced queries which have been worked through ahead of the submission of the Modification Report.<br><br>***Modification Report***<br>A revised Modification Report, addressing the queries raised by the Authority, was submitted on 15 May 2013. Further queries were subsequently raised and these continue to be worked through.<br><br>***Authority Decision & Implementation***<br>GSR011 was formally re-submitted to the Authority for a decision on 18 August 2014. The Authority has yet to publish their decision. |

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| **SQSS GSR No.** | 012 |
| **Title** | Treatment of Interconnectors |
| **Proposer** | NETS SQSS Review Panel Secretary on behalf of the Three Transmission Licensees (SHETL, SPT and NGET) |
| **Submitted** | 5 October 2010 |

| Modification Description | Progress |
|---|---|
| GSR012 was raised to consider the appropriate treatment of interconnectors within the NETS SQSS.<br><br>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. | ***Modification Proposal***<br>The Modification Proposal was proposed at the Industry Workshop on 5 October 2010 where the NETS SQSS Review Panel determined that the Modification Proposal will progress to a Workgroup.<br><br>***Workgroup***<br>The NETS SQSS Review Panel determined that a Workgroup was required to investigate the issues around the treatment of interconnectors within the NETS SQSS. The Terms of Reference have been agreed by the NETS SQSS Review Panel and the first Workgroup meeting took place in March 2011.<br><br>However, due to personnel change and the difficulties this Workgroup was experiencing, the Workgroup has formally been re-established and re-started with a new Workgroup lead.<br><br>***Industry Consultation***<br>GSR012 has not yet progressed to this stage.<br><br>***Modification Report***<br>GSR012 has not yet progressed to this stage.<br><br>***Authority Decision & Implementation***<br>GSR012 has yet to be submitted to the Authority for a decision. |

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| **SQSS GSR No.** | 014 |
| **Title** | Offshore Transformer Requirements |
| **Proposer** | John Zammit-Haber (NGET) |
| **Submitted** | 19 November 2012 |

| Modification Description | Progress |
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| GSR014 was raised to investigate whether the current requirements for two transformers and two substation bays where offshore cables connect to the onshore transmission system is necessary or whether two transformers connected to a single bay or even a single transformer and single bay would be sufficient. | ***Modification Proposal***<br>The Modification Proposal was proposed at the NETS SQSS Review Panel meeting on 19 November 2012 where the NETS SQSS Review Panel determined that the Modification Proposal will progress to a Workgroup.<br><br>***Workgroup***<br>The NETS SQSS Review Panel determined that a Workgroup was required to investigate whether to amend the requirement for two transformers and two substation bays where offshore cables connect to the onshore transmission system. The Terms of Reference have been agreed by the NETS SQSS Review Panel and a Workgroup has been established. The Workgroup Report has since been approved at the April 2014 NETS SQSS Review Panel.<br><br>***Industry Consultation***<br>An Industry Consultation was published on 13 October 2014 with a closing date of 14 November 2014. Five responses were received (Blue Transmission, DONG Energy, Scottish Power Renewables, Statkraft and National Grid Electricity Transmission).<br><br>***Modification Report***<br>A Modification Report was presented to the 5 August 2015 NETS SQSS Review Panel. It was agreed that this should now be submitted to the Authority. This shall happen in due course.<br><br>***Authority Decision & Implementation***<br>GSR014 has yet to be submitted to the Authority for a decision. |

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| **SQSS GSR No.** | 015 |
| **Title** | Normal Infeed Loss Risk |
| **Proposer** | Graham Stein (NGET) |
| **Submitted** | 27 May 2013 |

| Modification Description | Progress |
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| GSR015 was raised to amend the GSR007 requirement to contain a loss of up to 1320MW to the normal infeed loss criteria of -0.5Hz in operational timescales from 1 April 2014 onwards, without restricting new connection activity.<br><br>The proposed change would therefore avoid an increase in costs incurred to procure additional frequency response. If the change is not made, these costs will be incurred in the absence of any actual change in the risk of frequency deviation below 49.5Hz. | ***Modification Proposal***<br>The Modification Proposal was proposed at the NETS SQSS Review Panel meeting on 5 June 2013. Further comment was invited from NETS SQSS Review Panel Members. It was agreed that the Modification Proposal will not progress to a Workgroup but straight to Industry Consultation.<br><br>***Workgroup***<br>A Workgroup was not established for GSR015.<br><br>***Industry Consultation***<br>An Industry Consultation was published on 11 November 2013 with a closing date of 6 December 2013. Three responses were received (EdF Energy, National Grid Electricity Transmission and Scottish and Southern Energy).<br><br>***Modification Report***<br>A Modification Report that summarises the Industry Consultation responses has been produced and submitted to the Authority for a decision.<br><br>***Authority Decision & Implementation***<br>GSR015 was initially submitted to the Authority for a decision on 10 March 2014. The Authority responded with a number of questions. These were addressed and GSR015 was formally re-submitted to the Authority for a decision on 13 August 2014. The Authority approved GSR015 on 3 December 2014. However, for these changes to take effect, the Authority will need to modify the electricity transmission licenses so that they refer to the new version of the NETS SQSS. Since this modification is not considered to be time-critical, the Authority has not yet issued a statutory consultation to modify the licenses. The Authority will do this at an appropriate stage in the future. |

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| **SQSS GSR No.** | 016 |
| **Title** | Embedded Generation Scaling |
| **Proposer** | Vandad Hamidi (NGET) |
| **Submitted** | 22 July 2013 |

| Modification Description | Progress |
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| GSR016 was raised to specify how embedded generation should be treated in Chapter 4 MITS studies. The GSR009 modification to the NETS SQSS in 2011 specified certain scaling factors for various types of generation (based on fuel type) with different scaling factors under the economy and security criteria. These scaling factors are only considered for "large" power stations (i.e. generation over 100MW in England and Wales).<br><br>Boundary transfer calculations are performed assuming static net demand within the boundaries. The net demand is supplied to transmission companies as part of Week 24 Data submissions from the DNOs. Given the increase in the penetration of embedded generation, it is no longer possible to accurately calculate boundary transfers without considering the impact of embedded generators within the boundaries. To date, there is no standard treatment of embedded generation in the DNO submissions, leading to various assumptions across GB.<br><br>It is therefore recommended to amend the NETS SQSS to explicitly specify how to include the impact of small and medium power stations on boundary calculations. | ***Modification Proposal***<br>The Modification Proposal was proposed at the NETS SQSS Review Panel meeting on 22 July 2013 where the NETS SQSS Review Panel determined that the Modification Proposal will progress to a Workgroup, subject to ratification of the Terms of Reference.<br><br>***Workgroup***<br>The NETS SQSS Review Panel determined that a Workgroup was required to investigate these issues. The Terms of Reference have been agreed by the NETS SQSS Review Panel and a Workgroup has been established.<br><br>***Industry Consultation***<br>GSR016 has not yet progressed to this stage.<br><br>***Modification Report***<br>GSR016 has not yet progressed to this stage.<br><br>***Authority Decision & Implementation***<br>GSR016 has yet to be submitted to the Authority for a decision. |

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| **SQSS GSR No.** | 017 |
| **Title** | Treatment of Switch Faults in Operational Timescales |
| **Proposer** | Ben Marshall (NGET) |
| **Submitted** | 5 February 2014 |

| Modification Description | Progress |
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| Under the current version of the NETS SQSS, switch faults are secured for new generation connections but only with respect to limiting the loss of power infeed to the infrequent infeed loss risk. Switch faults can potentially cause wider system issues such as instability, system splits, cascade tripping and voltage collapse depending on the substation at which they occur, the network running arrangement and the generation and demand levels at the time of the fault.<br><br>GSR017 will therefore undertake a review of the current NETS SQSS and will determine the need case for securing against the above challenges in the event of switch faults in operational timescales. | ***Modification Proposal***<br>The Modification Proposal was proposed at the NETS SQSS Review Panel meeting on 5 February 2014 where the NETS SQSS Review Panel determined that the Modification Proposal will progress to a Workgroup, subject to ratification of the Terms of Reference.<br><br>***Workgroup***<br>The NETS SQSS Review Panel determined that a Workgroup was required to investigate these issues. The Terms of Reference have been agreed by the NETS SQSS Review Panel and a Workgroup has been established.<br><br>Due to the complex issues this Workgroup is investigating, they are not expected to report back to the NETS SQSS Review Panel in 2015.<br><br>***Industry Consultation***<br>GSR017 has not yet progressed to this stage.<br><br>***Modification Report***<br>GSR017 has not yet progressed to this stage.<br><br>***Authority Decision & Implementation***<br>GSR017 has yet to be submitted to the Authority for a decision. |

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| **SQSS GSR No.** | 018 |
| **Title** | Treatment of Sub-Synchronous Oscillations in the NETS SQSS |
| **Proposer** | Graham Stein (NGET) |
| **Submitted** | 4 December 2013 |

| Modification Description | Progress |
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| A number of Transmission Licensees and Transmission Users are in the process of enhancing their networks or connecting generation using Series Capacitor and / or HVDC technology. Both of these types of equipment can cause sub-synchronous oscillations (SSO) to occur by interacting with other User's equipment in the form of sub-synchronous resonance (SSR) or sub-synchronous torsional interaction (SSTI).<br><br>The Grid Code Review Panel Paper: "Suppression of Sub-Synchronous Resonance from Series Compensators" (pp13/54) proposed changes to the Grid Code to place obligations on Transmission Licensees to mitigate SSR where Series Compensation is deployed. The Grid Code Review Panel asked that these proposals be given further consideration in light of concerns raised by Transmission Licensees about how and where any SSR related obligations are expressed within the transmission frameworks. The Grid Code Review Panel also asked whether there was a need to capture SSR and SSTI within the NETS SQSS. | ***Modification Proposal***<br>The Modification Proposal was proposed at the NETS SQSS Review Panel meeting on 4 December 2013 where the NETS SQSS Review Panel determined that the Modification Proposal will progress to a Workgroup, subject to ratification of the Terms of Reference.<br><br>***Workgroup***<br>The NETS SQSS Review Panel determined that a Workgroup was required to investigate these issues. The Terms of Reference were approved at the 2 April 2014 NETS SQSS Review Panel and a Workgroup has been established. The Workgroup Report was presented and approved at the 2 December 2015 NETS SQSS Review Panel. This shall now proceed to industry consultation in due course.<br><br>***Industry Consultation***<br>GSR018 has not yet progressed to this stage.<br><br>***Modification Report***<br>GSR018 has not yet progressed to this stage.<br><br>***Authority Decision & Implementation***<br>GSR018 has yet to be submitted to the Authority for a decision. |

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| **SQSS GSR No.** | 019 |
| **Title** | Review of Chapter 7 Double Busbar Requirements |
| **Proposer** | Gareth Parker (DONG Energy) |
| **Submitted** | 2 April 2014 |

| Modification Description | Progress |
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| DONG Energy suggests that current interpretation of the NETS SQSS mandates the use of a double busbar (or equivalent) arrangement for the first onshore substation for offshore transmission system connections. However, a cost benefit analysis (CBA) performed by DONG Energy aims to demonstrate that this requirement is not the most economic and efficient solution for all offshore wind-farm connections. DONG Energy therefore proposes that this interpretation within the NETS SQSS for the need to have double busbar substation arrangements is addressed and subject to NETS SQSS Review Panel assessment, this deterministic requirement be removed if no net benefit can be demonstrated for this configuration of switchgear when considering the specific characteristics of offshore generation connections. | ***Modification Proposal***<br>The Modification Proposal was proposed at the NETS SQSS Review Panel meeting on 2 April 2014 where the NETS SQSS Review Panel determined that the Modification Proposal required further consideration at a dedicated Workshop that was scheduled for 23 May 2014.<br><br>***Workgroup***<br>Following this Workshop, the NETS SQSS Review Panel determined that a Workgroup was required to investigate these issues further. The Terms of Reference were approved at the 4 June 2014 NETS SQSS Review Panel and a Workgroup has been established.<br><br>***Industry Consultation***<br>GSR019 has not yet progressed to this stage.<br><br>***Modification Report***<br>GSR019 has not yet progressed to this stage.<br><br>***Authority Decision & Implementation***<br>GSR019 has yet to be submitted to the Authority for a decision. |

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| **SQSS GSR No.** | 021 |
| **Title** | Operational and Planning Criteria for 220kV Transmission Assets |
| **Proposer** | Bless Kuri (SHE Transmission) |
| **Submitted** | 4 February 2015 |

| Modification Description | Progress |
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| The first 220kV assets will shortly be introduced onto the National Electricity Transmission System (NETS) with the commissioning of the Kintyre-Hunterston subsea AC link that shall consist of two 220kV subsea cables between Crossaig on the Kintyre peninsula and Hunterston.<br><br>This proposal therefore seeks to modify the NETS SQSS to adopt the 275kV planning and operational voltage limits for 220kV and to modify the defined term "supergrid" to include 220kV by aligning this with the Grid Code definition which considers any voltage above 220kV as a supergrid voltage. | ***Modification Proposal***<br>The Modification Proposal was proposed at the NETS SQSS Review Panel meeting on 4 February 2015.<br><br>***Workgroup***<br>The NETS SQSS Review Panel was of the opinion that a Workgroup was not required to progress this Modification Proposal. However, a detailed impact assessment was requested. This was completed by Bless Kuri and presented at the 1 April 2015 NETS SQSS Review Panel.<br><br>***Industry Consultation***<br>A draft Industry Consultation Document was presented at the 3 June 2015 NETS SQSS Review Panel. This was released for Industry Consultation on 21 September 2015 for a period of 20 working days closing on 16 October 2015. One response (Vattenfall) was received.<br><br>***Modification Report***<br>The Modification Report was presented and approved at the 2 December 2015 NETS SQSS Review Panel.<br><br>***Authority Decision & Implementation***<br>GSR021 was formally submitted to the Authority for a decision on 23 December 2015. The Authority has yet to publish their decision. |

## Concluded Modifications

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| **SQSS GSR No.** | 010 |
| **Title** | Review of Onshore Generation Connection Criteria |
| **Proposer** | NETS SQSS Review Panel Secretary on behalf of the Three Transmission Licensees (SHETL, SPT and NGET) |
| **Submitted** | 5 October 2010 |

| Modification Description | Progress |
|---|---|
| GSR010 was raised to continue the work of Workgroup 2 (WG2) of the fundamental NETS SQSS Review (GSR008) which had been investigating Generation Connection Criteria.<br><br>Presently the NETS SQSS specifies the same standard of connection for all generators. However, 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.<br><br>WG2 considered that providing a firm connection for a small intermittent generator could be uneconomic but that such customers may be nervous to accept a non-standard connection. WG2 therefore proposed a deterministic methodology that 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. | ***Modification Proposal***<br>The Modification Proposal was proposed at the Industry Workshop on 5 October 2010 where the NETS SQSS Review Panel determined that the Modification Proposal will progress to a Workgroup.<br><br>***Workgroup***<br>The NETS SQSS Review Panel determined that a Workgroup was required to investigate the issues around Onshore Generation Connection Criteria. The Terms of Reference have been agreed by the NETS SQSS Review Panel and the first Workgroup meeting took place in February 2011.<br><br>***Industry Consultation***<br>An Industry Consultation was published on 18 June 2012 with a closing date of 17 August 2012. Three responses were received (E.ON, International Power and SHETL).<br><br>***Modification Report***<br>The decision was taken at the 1 April 2015 NETS SQSS Review Panel that a Guidance Note shall formally replace any official submission to the Authority to request a change to the NETS SQSS.<br><br>***Authority Decision & Implementation***<br>The Guidance Note negates the need for a change to the NETS SQSS and therefore no Authority decision is required. GSR010: Review of Onshore Entry Criteria is therefore considered as concluded and closed and shall be removed from the NETS SQSS Modification Register accordingly. |

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| **SQSS GSR No.** | 020 |
| **Title** | Modification of Clause 7.8.1.1 to Allow Single Transformer Offshore Substations of Capacity Greater Than 90MW |
| **Proposer** | Nigel Platt (Siemens Power Transmission) |
| **Submitted** | 27 October 2014 |

| Modification Description | Progress |
|---|---|
| Siemens, along with other manufacturers, are developing new systems to provide lower cost export of offshore wind farm power to shore. A common feature of these systems is the simplification of the offshore equipment and in particular a reduction in the number of transformers on each offshore installation. Siemens propose that current interpretation of the NETS SQSS prevents the use of single transformer installations at power levels above 90MW and that this is hampering the introduction of these lower cost solutions. Siemens have therefore requested a review of the relevant sections of the NETS SQSS to allow the compliant use of these new, lower cost solutions. | ***Modification Proposal***<br>The Modification Proposal was proposed at the NETS SQSS Review Panel meeting on 3 December 2014 where the NETS SQSS Review Panel determined that the Modification Proposal required further consideration and that a Workgroup should be established.<br><br>***Workgroup***<br>The NETS SQSS Review Panel determined that a Workgroup was required to investigate these issues. The Terms of Reference were approved at the 1 April 2015 NETS SQSS Review Panel and a Workgroup has been established. The first Workgroup meeting was held on 5 June 2015.<br><br>***Industry Consultation***<br>GSR020 has not yet progressed to this stage.<br><br>***Modification Report***<br>The decision was taken at the 7 October 2015 NETS SQSS Review Panel that an Open Letter and Guidance Note clarifying the relevant sections of the standards shall formally replace any official submission to the Authority to request a change to the NETS SQSS.<br><br>***Authority Decision & Implementation***<br>The Open Letter and Guidance Note negates the need for a change to the NETS SQSS and therefore no Authority decision is required. GSR020: Modification of Clause 7.8.1.1 to Allow Single Transformer Offshore Substations of Capacity Greater Than 90MW is therefore considered as concluded and closed and shall be removed from the NETS SQSS Modification Register accordingly. |