

Workgroup Consultation Response Proforma

GC0141: Compliance Processes and Modelling amendments following 9th August Power Disruption

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses to grid.code@nationalgrideso.com by 5pm on **30 March 2021**. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

If you have any queries on the content of this consultation, please contact Joseph Henry Joseph.henry@nationalgrideso.com or grid.code@nationalgrideso.com

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For reference the Applicable Grid Code Objectives are:

- To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity*
- Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);*
- Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole;*
- To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and*
- To promote efficiency in the implementation and administration of the Grid Code arrangements*

Please express your views regarding the Workgroup Consultation in the right-hand side of the table below, including your rationale.

Standard Workgroup Consultation questions		
1	Do you believe that the GC0141 Original	In general, the GC0141 Original Proposal is adequate to facilitate the application objectives.

	Proposal better facilitates the Applicable Objectives?	<p>However, it is good to add “after 30 s of disturbances, the unit should remain connected”.</p> <p>It may be worthwhile to mention the reasons for not support some of the new clauses.</p> <p>The reason for not supporting ECP.A.3.5.5: HVDC has been designed to be robust and to handle different conditions. Therefore, no further study is foreseen needed.</p> <p>The reason for not supporting ECP.A.3.1.2: the HVDC vendors from European have long experiences in delivering HVDC systems, which have been integrated in many different AC network conditions. Due to legal reason and the schedule of the plant delivery the third party tends to complicate problem/issue and it may be unnecessarily costly for both the owner and contractor.</p> <p>The reason for not supporting PC.A.9.8.2.2: The control and protection algorithm and settings may be part of Vendors intellectual property. Thus, it cannot be disclosed.</p>
2	Do you support the proposed implementation approach?	Partly, refer to reply in 1
3	Do you have any other comments?	<p>A new standard from IEEE is under review and it will be published at end of 2021, which is “IEEE P2800 – Standard for interconnection and interoperability of Inverter-Based Resources Interconnecting with Associated Transmission Electric Power Systems”. This standard has covered almost all issues addressed relevant to this working group. Due to intensive reviews from different parties, reasonable requirements are defined and 99% approved.</p> <p>In section ECP.A.3.5.5 of “08_ECP_I5R33 - IE_CRP_Sims -MH210301.pdf”, there is a statement about repetition of studies when there is an outage of a major plant. It’s assumed that the statements are not applicable for outages during commissioning tests. Outages may occur several times during commissioning tests due to unforeseen reasons and may not necessarily have impacts on system studies. If studies are to be repeated every time an outage occurs during commissioning, this would have a substantial impact on the project execution time. Note that a wide range of network</p>

		scenarios is covered in the design studies and hence repetition of studies would not have a value.
4	Do you wish to raise a Workgroup Consultation Alternative Request for the Workgroup to consider?	No. Please take note of the new IEEE standard (IEEE P2800) which will be published shortly.
Modification Specific Workgroup Consultation questions		
5	What should the Independent Engineer's deliverables be with respect to the outcome of the compliance process?	<p>As comment in 1 and 4, we do not think the independent engineers are needed.</p> <p>If the proposal is nonetheless adopted, the Independent Engineer's scope shall be limited to review/comment of technical reports and witness testing. Independent Engineer shall not be involved in any kind of collaboration on the design as this would risk sensitive IP being shared between parties.</p> <p>To elaborate more on the Independent Engineer/Independent Test Body and their appointment mechanism (e.g. which criteria are to be taken into consideration when appointing an Independent Engineer?). How NG/Company is going to approve an Independent Engineer considered to be appointed by an HVDC owner. To consider the impact of this on the project execution time when writing a tech spec.</p>
6	Should there be specific requirements on the retention of data for the User and/or the ESO?	No, the existing practice of using NDAs and license agreement is good enough.
7	Should the detailed design stage be more clearly identified within the Grid Code?	No.
8	What stages of implementation would the industry believe are appropriate?	Design stage.
9	Should the ESO be required to undertake the responsibilities associated with an independent engineer?	As mentioned above, independent engineer is not needed. Should the ESO insists on the independent engineer, the ESO should take the responsibilities in both the quality and time.

	Please outline your rationale.	
10	Should there be greater definition be given to “substantial modification” given that the self-certification process places the onerous on the User to make these decisions?	Click or tap here to enter text.
11	Should there be a review of the effectiveness of GC0141 post implementation and after the industry has experience of implementing?	Yes. Review can be helpful in case some of the GC0141 requirements are proved to be unnecessary (e.g. with regard to the performance) and results in extra complications and cost.
12	What are your thoughts on the workgroup’s discussions regarding compliance repeat plan? How would this work in regard to Independent Engineer Verification?	If the requirements on the performances are defined, the committed studies during design should be sufficient to verify the compliance. Thus, we don’t think the independent engineer is needed in any case.
13	Do you believe that screening processes should be applied ahead of detailed dynamic EMT simulation, and if so, do you believe data exchange should support that?	<p>Yes, screening processes can be relevant to some studies e.g. SSTI or Multi-infeed study (screening study for assessing the risk of adverse interaction among fast active devices). We believe that screening processes should be applied ahead of detailed dynamic EMT simulation.</p> <p>Yes, we believe data exchange should support that. Network models in RMS software (e.g. in Power Factory or PSSE) would be sufficient for that purpose provided that EMT models (with parameters as in real plants) are used in EMT studies afterwards.</p>
14	Do you agree that the roles and responsibilities associated with interaction studies should be detailed and	We do agree that the roles and responsibilities should be detailed. ESO, as the owner and operator of the system, should take the main responsibility to coordinate the exchange of data between vendors via legal platforms.

	clarified, and to what extent?	
15	<p>Do you agree that improved definitions of the types of analysis and definitions suitable analysis environments ahead of the detailed design phase provides useful clarity and minimised project disruption in delivering the principles of this grid code change?</p> <p>Should these form part of legal text or made available with the modification as guidance that may be separately updated from time to time</p>	<p>Yes, we agree that improved definitions of the types of analysis and definitions suitable analysis environments ahead of the detailed design phase provides useful clarity and minimised project disruption in delivering the principles of this grid code change.</p> <p>Yes, these should only be made available with the modification as guidance that may be separately updated from time to time.</p>
16	<p>Do you agree that clarifying roles and responsibility in the management of interaction studies assists more clearly defining the analysis needs of each party, minimising confusion, unnecessary overlap and cost in the design phase?</p>	<p>The quality of interaction studies depends very much on the quality of the models used. ESO to ensure that high quality black boxed EMT models (with control & circuit parameters as in the real plant) are exchanged between different vendors through a legal and IT secure platform. Note that the quality of the study is dependent on the quality of provided network data.</p>
17	<p>Do you agree that small signal analysis supporting the screening of interaction cases should be clearly specified within this grid code change, to better focus the range of EMT studies being discussed, and within the context of existing SSTI and SSO analysis better inform assessment of risks</p>	<p>SSO/SSTI study is typically performed using a small signal analysis (damping torque analysis), followed by time-domain simulation is required. Thus, specifying this in Grid Code wouldn't have a much-added value. Shaft data is important input for SSTI/SSO studies and shall be provided.</p>

	and the need for detailed dynamic simulation which includes shaft data for SSTI?	
18	What is your view on the separation of the simplified RMS model and EMT model when it comes to confidentiality, distribution and the protection of IP?	<p>The simplified RMS model can be more generic. The EMT model is a real system representation, for example, the software for the control is identical to delivered control, and the main circuit equipment is also representing the real HVDC system, thus it may contain a lot of IP information. Therefore, these two types of model should be protected differently. The EMT model deserves all confidentiality protection, as it is the IP of the vendor.</p>
19	As it currently stands, what is your view on the process by which detailed manufacturer EMT-type models are exchanged for necessary studies as part of project delivery?	A black box model may be exchanged with limited output at interface points.
20	Are sections PCA.9.8 and PC.A.9.9 better suited to a guidance document and or should they be included, at least partly, within the legal text? Are there any specific concerns with respect to requirements set out within those sections?	<p>Concerns in PC.A.9.8.2.2 are that this will also enforce the use of reduced, simplified, basic or generic models rather than detailed ones to protect vendor IP. Consequently, the performance will also be less aligned with the real system.</p> <p>Concerns in PC.A.9.9.1: compiled EMT models will always be dependent on the compiler version. There is currently no solution for compiler independency. However, this can be managed by model service agreement allowing for update of models whenever necessary.</p> <p>Concerns in PC.A.9.9.2: if the EMT control system models must be open, it can be a generic model without the real control code which contains the IP of supplier. In order to achieve realistic study results, open code is not recommended.</p> <p>Concerns in PC.A.9.9.3: The vendor has the responsibility to deliver a system which is stable and</p>

		<p>safeguard under different operating conditions. If all setpoints are open and subject to adjustment, who in the end will be responsible for the HVDC system stability and integrity? As also mentioned previously, HVDC vendor should provide robust solution so that it can operate under different network conditions. Thus, any changes are neither needed nor justified.</p> <p>Simulation models that require 10 kHz demands a lot of detailed elements, such as stray components, to be represented in the models and they will run very slow. Frequencies above 3 kHz are usually covered in other type of high frequency analysis tools and models that are specifically built for this purpose. Different models are designed for different study purposes and having a too wide scope in EMT models makes the use very inefficient.</p>
21	In terms of the requirement for existing users to provide sub-synchronous torsional data for existing plant that may be provided, do you see any issues in regard to the provision of this data?	We don't see any issues in regard to the provision of this data according to many years of experience.
22	Should responsibility for interoperability remain with the generator or the ESO, inclusive of interoperability studies such as control interactions and SSCI/SSTI studies? Please provide your reasoning.	If it is due to legal reasons that models from different vendors can not be shared with other vendor, yes the responsibility for interoperability remain with the generator or the ESO, inclusive of interoperability studies such as control interactions and SSCI/SSTI studies. EN 50388 (category EN Traction and Railway standards) provide good example and practice for handling Interoperability in Railway supply system.