

Grid Code
Working Group

16 August 2021

Our Reference xxxxxxxx

GC0151: Grid Code Compliance with Fault Ride Through Requirements

Confidential response due to commercially sensitive information

Dear Grid Code Working Group,

We would like to thank you for providing us with the opportunity to respond to the Grid Code Compliance with Fault Ride Through Requirements.

We would like to respond to the captioned consultation based on our experience of investing in and operating offshore transmission assets (OFTOs) in Great Britain.

As such our response to the consultation is from that of a transmission network operator. Please refer to Appendix 1 to this letter for our response to the consultation.

If you have any follow up queries please do not hesitate to contact us.

Regards

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Workgroup Consultation Response Proforma

GC0151: Fault Ride through process

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 **16 August 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 **Nisar Ahmed**, Nisar.Ahmed@nationalgrideso.com or grid.code@nationalgrideso.com

Respondent details	Please enter your details
Respondent name:	Click or tap here to enter text.
Company name:	Click or tap here to enter text.
Email address:	Click or tap here to enter text.
Phone number:	

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 GC0151 Original Proposal better facilitates the Applicable Grid Code Objectives?	With regards to the Grid Code objectives as detailed from page 28 of the consultation, we agree that the proposal in GC0151 as put forward by the proposer (SSE) facilitates the applicable Grid Code objectives far greater than the letter issued by the ESO on 07 May 2021.
2	Do you support the proposed implementation approach?	We do not support the implementation approach, as full consideration has to be taken of the interaction with other codes, especially the STC. Therefore, any solution for the Grid Code should not be implemented until due process has been undertaken regarding any required changes to all codes especially the STC.
3	Do you have any other comments?	Can clarity please be provided to ensure that the same principles for failure of a fault ride through will be applied to National Grid Electricity Transmission plc (" NGET ") as per all other network operators.
4	Do you wish to raise a Workgroup Consultation Alternative Request for the Workgroup to consider?	No.
Specific GC0151 Workgroup Consultation questions		
5	Do you have any comments on the Process to be followed after a suspected fault ride through failure?	<p>We consider the ESO response timescales outlined in its letter dated 07 May 2021 are unrealistic and unachievable for the vast majority of suspected fault ride through failures e.g.</p> <p><i>'the User will have 2 hours to respond and Network Operators must respond as soon as reasonably practicable with a preliminary report into the loss of output' and 'The User or Network Operator should follow this up within 2 days or as soon as reasonably possible with a full explanation in accordance with OC5.4.2.2, OC10.4.1.4 and STCP 03-1 Section 3.2'.</i></p> <p>Within the 2 hour time period only basic SCADA alarms can be reviewed and reported on which will be of limited value.</p>

		<p>In addition, the 2 day timescale to follow up the preliminary report with a full explanation is impracticable in the vast majority of cases. We note that the 2 day timescale is supplemented with 'as soon as reasonably practicable' but why state a deadline that in the majority of cases will never be met.</p> <p>Please note that any fault involving protection settings can be very complex to analyse.</p> <p>We therefore agree with the Proposers process that allows three months from the date of submission of waveform data by NGESO (note this should include all details of the fault e.g. date, time, fault level etc,) to investigate and if necessary, resolve the cause of any non-compliance.</p> <p>We agree with the Proposer that this time is required in order to:</p> <ul style="list-style-type: none"> • gather relevant SCADA error logs and protection settings; • obtain system fault level data at the time of the fault; • if required, commission consultants to provide the necessary modelling; • services to model generator/interconnector/network asset controls; • repeat required FRT modelling scenarios; and • Implement any setting changes.
6	Do you have any comments on the required sharing by the ESO of largest infeed loss information?	We agree that if the dynamic largest infeed is to be used in any forced reduction then the dynamic largest infeed loss information should be provided by the ESO.
7	Do you have any comments on the sharing of user lessons learned information (including any information from Fault Data/Recorders?	We agree that sharing of lessons learned via an ESO summary report should be undertaken. However, we would request that this covers all plant and apparatus involved in the fault ride through incident including Users and TO's including those of NGET.

8	Do you have any comments on the sharing of information by the ESO on faults (with or without identified FRT issues)?	As per our response to question 7 it is good practice to share information on faults in order for the industry to learn lessons.
9	The proposal sets out the time to investigate by the User et al. Do you believe this time is appropriate or not? Please provide your rationale	<p>We consider that the process outlined in the ESO letter dated 07 May 2021 are unrealistic and unachievable for the vast majority of suspected fault ride through failures.</p> <p>We therefore agree with the Proposers process that allows three months from the date of submission of waveform data by NGESO (note this should include all details of the fault e.g. date, time, fault level etc,) to investigate and if necessary, resolve the cause of any non-compliance.</p> <p>We agree with the Proposer that three months from the date of submission of waveform data by NGESO (note this should include all details of the fault e.g. date, time, fault level etc,) is required in order to:</p> <ul style="list-style-type: none"> • gather relevant SCADA error logs and protection settings; • obtain system fault level data at the time of the fault; • if required, commission consultants to provide the necessary modelling; • services to model generator/interconnector/network asset controls; • repeat required FRT modelling scenarios; and • Implement any setting changes. <p>Our only concern is the implantation of any changes within the three month timescale, which should be agreed on a case by case basis dependent upon the impact on the maximum infeed loss. The rationale is that an OFTO could be forced to take an outage, which may incur availability penalties and associated loss of generation for issues which could wait to be resolved at the next planned outage.</p>
10	The proposal sets out the MW threshold. Do	The 100MW threshold appears to be reasonable.

	you believe this is appropriate or not? Please provide your rationale	
11	The proposal sets out the level of the forced constraint. Do you believe this is appropriate or not? Please provide your rationale	<p>The proposal allows for an immediate forced constraint where an ION is in force or in the case of a FON from three months from the date of submission of waveform data by NGESO to investigate and if necessary, resolve the cause of any non-compliance.</p> <p>The proposed level is:</p> <p>70% of the station TEC/ asset capability; or the prevailing largest infeed limit (whichever is lowest)</p> <p>We have no strong views on the proposed levels but would highlight that as Network operators we are concerned with the unintended impact of this proposal and that of the process outlined in the ESO letter dated 07 May 2021.</p> <p>We consider the same operational restrictions should be applied to all Network operators i.e. NGET should be subject to the same restrictions and this is not clear in either proposal.</p> <p>It should be noted that the main FRT issue on a Network will be the mal-operation of the protection system. Protection systems are very complex and despite the best and most rigorous commissioning, it is accepted within the protection commissioning community that it is only when the protection system remains stable during a through fault that the protection system is fully proven. In addition, determining the root cause of a protection system mal-operation can be very complicated thus it can take time to establish the root cause prior to taking corrective action to prevent re-occurrence.</p> <p>During the investigation period, the ESO, as per its letter dated 07 May 2021, may prevent the transmission system returning to service. This would result in large commercial impacts for both the Network operator and the generator and potentially a significant impact on the safety and security of the electricity system.</p>

		<p>If NGESO applied a restriction on the Network of an OFTO to say 70% of the TEC due to a protection mal-operation on the OFTOs Network (either with an FSKN after three months, or ISKN immediately), then this restriction will directly commercially impact the generator whose generation may also be curtailed and who may be compliant with FRT. In addition restricting this generation may not be the best operational choice and may impact security of supplies. Please note it is a key element of the OFTO regime resulting in low financing costs that the OFTO does not take generation risk.</p> <p>Finally putting an immediate restriction where an ION is in place will have issues for the OFTO sale process where the OFTO will need assurances that any failure of the generator to comply with FRT compliance does not impact the OFTOs Network and restrictions will not be applied to the OFTOs Network.</p>
12	Do you believe that the methodology should apply differently to projects in receipt of an ION or a FON?	<p>Yes. A system operating under a FON has passed compliance tests witnessed and approved by the ESO. Whilst an ION has yet to complete compliance testing.</p> <p>However, any retrospective difference needs to consider any interaction with the OFTO who will be in receipt of an ISKN. Any forced reduction, which will be for the generator to resolve, should not result in an availability penalty for the OFTO under its transmission licence. Therefore, there needs to be clarity that where an OFTO has an ISKN and there is a fault ride through issue due to the generators assets this will not result in a forced reduction of the OFTOs transmission system.</p>
13	Should the ESO have the ability to constrain a User suspected of FRT failure ahead of further investigation?	<p>No. This leads to a presumption of guilty until proven innocent with associated financial implications. If the ESO has the ability to constrain a User or Network suspected of FRT failure ahead of further investigation, then if the User or Network is proven innocent in any future investigation then the ESO should be compelled to financially compensate the User or the Network operator.</p>

14	In respect of the voltage wave form data, should the Grid Code prescribe or not the format in which that data is to be provided? Please provide your rationale.	The Grid Code should not prescribe the data format. Power system analysis software can be different and thus the format of the data different. It is therefore better to request this in a format that is mutually agreed by both parties (Requesting Party and Providing Party).
15	In respect of the constraint limitation to be applied to affected parties, should this be set within a range or a fixed value? If so, what do you believe that to be. Please provide your rationale.	Please refer to our response to question 11.
16	Would you agree that a generator should continue to operate if there was a derogation required?	Yes. As the issuance of a derogation would also be accompanied by specific timelines and actions to be undertaken in order for the derogation to be lifted/removed. This would also need to be applied on a case by case basis.
17	Do you believe that generators operational history should be taken into account when deciding upon the constraint level whilst an investigation is taking place?	As this is specific to generators we do not offer a response to this question.
18	Do you have any comments on possible Alternative from the ESO as included in the consultation?	<p>Please find below relevant extracts of our response to the ESO letter dated 07 May 2021.</p> <p>ESO Action 3: <i>interim process that we will be using whilst full code modifications are developed.</i></p> <p>Our response: Firstly, can NGESO please confirm that this interim guidance will be applied to all TSOs and generators including NGET?</p> <p>We are fully supportive of NGESO issuing a Significant Incident Request (“SIR”) following any</p>

unexplained disconnection, along with the subsequent investigating and responding to the SIR so that the root cause is established and actions taken to prevent re-occurrence, however, we consider there are some unintended consequences with Appendix 1 of your letter dated 07 May 2021 as follows:

Paragraph 3: Return to normal operation should not be undertaken until compliance has been confirmed in writing to the Power System Manager. If this cannot be confirmed, the relevant Generator, HVDC System and Network asset(s) should remain out of operation.

Our concern is mainly in regard to a protection system mal-operation. Protection systems are very complex and despite the best and most rigorous commissioning, it is accepted within the protection commissioning community that it is only when the protection system remains stable during a through fault that the protection system is fully proven. In addition, determining the root cause of a protection system mal-operation can be very complicated thus it can take time to establish the root cause prior to taking corrective action to prevent re-occurrence.

Therefore, is it the right operational decision not to return a transmission circuit to service until this complex investigation has concluded with the resultant reduction in green generation available to the UK?

In our experience NGET returned circuits to service following suspected protection mal-operations pending investigation and remediation of the protection settings in order to restore supplies.

A good example is the recent trip at Heysham 400kV substation on 22 July 2021 where we understand four busbars tripped. We understand that at the time only one busbar trip could be explained (due to a current transformer). Shortly after the fault we also understand that at least one or two of the remaining busbars that tripped were

		<p>returned to service pending the outcome of the investigation into the trip. This was probably the correct operational decision, especially reconnecting supplies to demand customers including nuclear power plants, but it emphasises the complexity of a blanket ban on any return to service until fully explained and corrective actions are undertaken.</p> <p>There needs to be consistency for generators, OFTOs, and onshore TSOs, in any decision not to return to service a transmission circuit following an unexplained fault involving a protection mal-operation.</p> <p><i>Paragraph 4: the User will have 2 hours to respond and Network Operators must respond as soon as reasonably practicable with a preliminary report into the loss of output. The User or Network Operator should follow this up within 2 days or as soon as reasonably possible with a full explanation.</i></p> <p>We do not consider that 2 hours to produce a preliminary report will be sufficient time. Within this time period only basic SCADA alarms can be reviewed and reported on which will be of limited value.</p> <p>We also consider that the 2 day timescale to follow up the preliminary report with a full explanation to be impracticable in the vast majority of cases. We note that the 2 day timescale is supplemented with 'as soon as reasonably practicable' but why state a deadline that in the majority of cases will never be met.</p> <p>Please note that any fault involving protection settings can be very complex to analyse and as such this timescale should be extended.</p>
19	Do you have any comments on the Strawman document on the FRT process?	<p>The strawman legal drafting has not been commented on in detail as it needs careful review and consideration and as such there is insufficient time in this very short two week consultation window over the holiday season to achieve this.</p>



Any change to the legal drafting in the Grid Code will need to be replicated in the STC and go through the STC governance process. In addition any proposed changes should not result in additional costs being incurred.

Legal Text