

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:	Alastair Frew
Company name:	Drax
Email address:	alastair.frew@drax.com
Phone number:	07730697290

For reference the Applicable Grid Code Objectives are:

- a) *To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity*
- b) *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);*
- c) *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;*
- d) *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*
- e) *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?	<p>It is difficult to make a judgement on this as there is a lack of information available. The ESO indicates there are serious system security concerns, but then only publishes sparse information on real events. If you look at the various events which have occurred as follows:-</p> <p>There was the Western HVDC trip on the 25 October 2020 when some of the worse oscillations were observed on the system, there have been some vague presentations but nothing to explain the events or responses. Users have been chased up about FRT failures, but it has never been confirmed that there actually was an electrical fault on the system, the descriptions says circuit breakers operated incorrectly but that is not an actual fault.</p> <p>There then were the faults at Heysham on the 11 March 2021 there are 2 faults separated by 700ms again there is no real explanation of what happened. Looking at the vague data available most of the users who tripped were close to the faults and it is not clear what they were exposed too and why they tripped. Again users were chased up about FRT failures, but its not clear to wider industry what proportions of the trips are incorrect and what proportion are correct to make a judgment of the security risk.</p> <p>Finally on the 22 May 2021 again at Heysham there is a fault which does not clear correctly due to some other issue, this becomes an unsecured event because 2 independent issues have occurred, again there has been very limited information made available. However, on this there is no follow up on users for FRT failures as the fault duration was too long. This now leads to confusion as the ESO message appears to be there are significant security risks and users need to MEL to 0MW if they trip before 140ms, but when the event duration passes 140ms it ok to trip and nobody seems worried about system security although a significant amount of generator was lost.</p> <p>Hence it is difficult to make a judgement on this issue as there appears to be mixed messages</p>
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		coming from the ESO and a lack detailed reports to make an educated judgement.
2	Do you support the proposed implementation approach?	<p>We have serious concerns about this modification in terms of all the original, ESO alternative and ESO letter. All of these appear to consider that FRT capability is clear cut black or white issue, however this is not the case as was identified in GC0062 and the statement made in the Authority's decision letter which states "It is accepted that generation local to the fault would be permitted to trip (generally through observed instability), but the purpose of 'Mode B' FRT requirements is to ensure that the generation remote from the disturbance remains connected and stable". Whilst we accept all the issues listed in table A2 of the Alternative document fall into the "remote" category of the Authority's statement all proposals do not distinguish between local and remote faults, hence we are concerned that local parties will be unduly penalised.</p> <p>There are appears to be an interpreting that FRT is an absolute obligation to remain in service throughout all faults without tripping. However, this is not the case, and it is actually a theoretical design capability for robustness based on typical expected network information provided by the ESO at the offer stage. As explained in the GC0062 workgroup report results in capabilities which "National Grid believe these proposed requirements strike the right balance between maintaining the safety, security and economy of the transmission system whilst at the same time defining a set of requirements which a synchronous generating unit can reasonably achieve.". Whilst this providing units which are suitably robust it does not mean they will not trip or ride through all events as the actual system operating conditions such as pre & post fault network short circuit levels, voltage and configuration all determine the actual unit response. It is also recognised it the GC0062 report that significant amount of generation could trip off if it located local to the fault but this will fit into the area of unsecured events in the SQSS. Looking at the ESO current concern about large amount of generation tripping off (>1000MW) due to faults, in all the examples given ESO alternative appendix table A1 & A2 the vast majority in these cases was local to the fault as would be expected. Given that the FRT requirements are a design capability to show robustness all compliance demonstrations are by simulation only what is a user going to do if their unit</p>

		<p>trips other than just repeat the simulation, and there is not even a requirement for older sites to do this, which is possibly due to the fact that there is not much can be done about it even if it fails the simulations.</p> <p>The main issue with all the current proposals is users could be MELing to 0MW or restricting output once they have tripped off but it is not clear what they are supposed to do if it is not a simple protection fault and could be restricted off for a considerable time with difficulties proving they can reconnect.</p> <p>We do accept that units remote from the fault should not be tripping off due to incorrect protection or control system settings, but this does appear to be a rather blunt approach to dealing with some of these issues and there must be easier ways of dealing with these issues.</p> <p>If this approach was to continue consideration should be given to separating the treatment of local and remote faults. A possible method of separating the types of faults may be that the if a unit trips within 100ms of fault inception and the voltage at its connection point remained above 30% then this is a remote fault trip with all other faults being treated as local.</p>
3	Do you have any other comments?	<p>The ESO are suggesting that trips caused by FRT failures are creating a situation where the system security is being put great risk. Looking at the list of events which the ESO have provided it is difficult to see how much plant is tripping off incorrectly and how much correctly as there are significant volume differences between the numbers quoted in the System Incident Report compared to the ESO's submission. It would be useful if the ESO could clarify how much plant is tripping and of that what amount was due to incorrect FRT issues.</p> <p>Given the ESO have contacted Users who they have identified as having FRT issues how many have fixed the issues or more importantly how may have not?</p> <p>The other key question is why is this problem suddenly becoming an issue, it is unlikely that all these users suddenly changed their protection</p>

		settings, so what is changing? Is the reduction in inertia levels also resulting in reduction in short circuit levels creating wider spread issues?
4	Do you wish to raise a Workgroup Consultation Alternative Request for the Workgroup to consider?	Yes, we wish to raise the strawman as an alternative to ensure that if it is decided in terms of process that the baseline is the best option there will still be a route to incorporate the corrections and clarifications into the code.
Specific GC0151 Workgroup Consultation questions		
5	Do you have any comments on the Process to be followed after a suspected fault ride through failure?	In general the process seems reasonable, however the area of greatest concern is what happens in the 5% of events (based on the ESO's statement "that in 95% of cases, the reasons for failing to ride through a normal fault, and any solution, are obvious and easily remedied") where there is not a simple solution this proposal ultimately requires someone to fix something.
6	Do you have any comments on the required sharing by the ESO of largest infeed loss information?	We believe this data should be shared.
7	Do you have any comments on the sharing of user lessons learned information (including any information from Fault Data/Recorders)?	Sharing of information would be beneficial to industry allowing parties to better understand what is actually happening on the system and what their plant may actually be subject too. It also useful in developing new systems as actual events and responses would be available.
8	Do you have any comments on the sharing of information by the ESO on faults (with or without identified FRT issues)?	It would be helpful for industry to share such data as this will allow Users to get a better understanding of their plants capabilities when responding to such events.
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>The key question about the timescale to investigate is dependent on what exactly requires to be investigated? If the investigation is only checking protection or control systems settings the timescales are acceptable.</p> <p>However, if the issue relates to a local issue what exactly is a user expected to do, they could just repeat their original compliance simulations, but these will just give the same results as before. A</p>

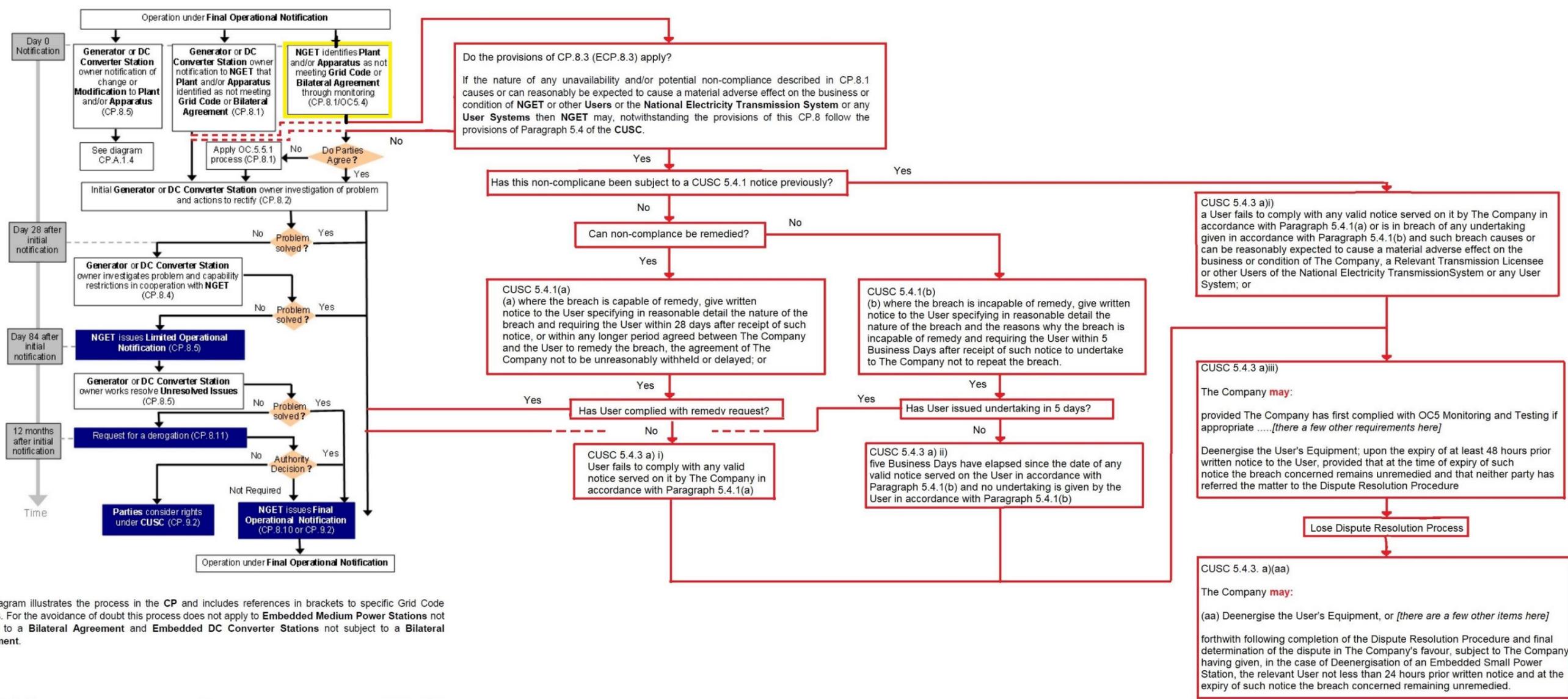
		user is very unlikely to be able to do a complete system study even if the ESO gave them the pre and post fault voltage, pre and post fault short circuit levels, fault location and clearance time. If a user was to undertake such a study it might confirm they should have tripped or not, but how is it relevant is it as the compliance requirement is against offer conditions not the actual conditions on the day.
10	The proposal sets out the MW threshold. Do you believe this is appropriate or not? Please provide your rationale	In principle 100MW appears to be reasonable if restrictions are going to be applied.
11	The proposal sets out the level of the forced constraint. Do you believe this is appropriate or not? Please provide your rationale	No, it not entirely clear that users are in the wrong in this process when they trip and constraining parties off for a one-off event seems excessive. Similarly, it is not entirely clear where this process goes if there is not a clear-cut fault identified or a repair, a user could end up permanently unable to generate.
12	Do you believe that the methodology should apply differently to projects in receipt of an ION or a FON?	Basic FRT compliance will be the same for both and it is not, however there needs to be additional checks to confirm that some settings have not been changed accidentally during the commissioning process.
13	Should the ESO have the ability to constrain a User suspected of FRT failure ahead of further investigation?	No, it is not clear that Users individually are significantly affecting system security. If you consider the various faults at Heysham on the 11 March 2021 there are 2 faults separated by 700ms this then is stated as being an unsecured event under the SQSS. Then on the 22 May 2021 there is a fault which does not clear correctly due to some other issue, again this becomes an unsecured event because 2 independent issues have occurred. However if there is a fault on the transmission system and then a generator mal-operates this is not an unsecured event and is unacceptable, but there are still 2 independent items faulty. There appears to be a different application of SQSS to transmission assets to generation assets.
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.	
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.	If a limit has to be used, then limit should be based on somehow on the SQSS.
16	Would you agree that a generator should continue to operate if there was a derogation required?	Yes, as the most likely parties to need derogations are older parties who have been connected for a long time and may only now be being required to carry out compliance simulations and there is very little these users can do if they are non-compliant.
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?	We believe it is better to deal with this based on whether the trip relates to remote or local faults. If the trip relates to a remote trip is likely to relate to an issue which easier to fix and this is the type of trip the FRT requirements are trying to prevent.
18	Do you have any comments on possible Alternative from the ESO as included in the consultation?	As per answer to question 2 and the following. Its not clear why this potential alternative proposal only introduces changes to OC.5.4 in relation to non-compliance issues where currently the existing processes only uses the OC.5.4 to identify non-compliances and then these are dealt with in CP8, ECP8 and CUSC5.4. Attached figure 1 at the end of this form is a rough interpretation of how I believe the current process works, with the box in highlighted in yellow shows where all the changes are being proposed, admittedly these processes are not very clear. With the proposed changes it is not clear if once an FRT issue is identified does the whole process now reside within the yellow OC.5.4 box or does it advance into the CP8. process or are both occurring in parallel? Can a User end up stuck in the OC.5.4 process without a way out or any remedy course? The proposed measures appear severe with potential significant cost implications should these not be being considered in the CUSC?

		<p>Currently as drafted this potential alternative proposal does not distinguish between FRT issues which result in Units tripping and other response issues relating to FRT. Hence the proposal needs to include the strawman fixes for reactive current response text errors which technically under the current drafting could potentially result in all units which trip off having to remain off on a technicality. This also highlights another issue that any FRT issue could also result in the Unit MELing to zero such as:-</p> <ul style="list-style-type: none"> • Insufficient reactive current • Inadequate damping • Incorrect active power recovery • Insufficient Fast Fault Current Injection <p>The proposal also requires Users to demonstrate that they are compliant after a potential issue has been identified but it is not clear how all Users will be capable of doing this as they do not have sufficient monitoring equipment to do this.</p> <p>In general ok with the OC3 changes.</p>
19	Do you have any comments on the Strawman document on the FRT process?	The strawman is required to fix various issues in the current code text, which if not fixed could lead to consequential issues with the current proposals.
Legal Text		

CP.A.1.4 Illustrative Compliance Process for Ongoing Compliance

Rough interpretation of how CP.8.3, ECP.8.3 and CUSC 5.4 fit into the Compliance Process



This diagram illustrates the process in the CP and includes references in brackets to specific Grid Code clauses. For the avoidance of doubt this process does not apply to Embedded Medium Power Stations not subject to a Bilateral Agreement and Embedded DC Converter Stations not subject to a Bilateral Agreement.

Figure 1 – Rough interpretation of Current Compliance Process