

Code Administrator Meeting Summary

Meeting name: GC0155 Clarification of Fault Ride Through Technical Requirements - Workgroup Meeting 14

Date: 13/12/2023

Contact Details

Chair: Milly Lewis, National Grid ESO (milly.lewis@nationalgrideso.com)

Proposer: Terry Baldwin, National Grid ESO (Terry.Baldwin@nationalgrideso.com)

Key areas of discussion

The Chair welcomed attendees to the Workgroup and outlined the objectives for the meeting:

- To review the Action Log for any updates
- To review the modification timeline
- To review the draft Workgroup Consultation document

Review of the Action Log

Actions listed in the meeting slides were addressed:

- Action 29 re: GEP parameters - agreed to close.
- Action 39 re: Proposer reviewing CC6.1.11 – agreed to remain ‘Open’ as the Proposer feels development of this area is likely to remain ongoing throughout the modification. The Proposer noted that questions will be asked on this for the Workgroup Consultation.
- Action 45 & 47 – agreed to remain ‘Open’ as a response has not been received from the Authority to date. ESO intend to share information with the Authority by mid-January 2024 (which may not be shared with the Workgroup if confidential information is involved).
- Action 49 re: TOV graph – agreed to remain ‘Open’ until reviewed by the Workgroup.
- Action 51 re: effects of lower voltage – agreed to remain ‘Open’ with the Proposer to review past meeting notes to understand the action more clearly.

Review of the proposed timeline

The Chair shared the proposed timeline from the meeting slides which included additional Workgroups to reflect the scale of the modification and consideration of consultation responses. Submission to the Authority was planned for October 2024.

A Workgroup member suggested the need for a longer consultation period due to the scale/intricacy of the modification which was agreed by the group.

The timeline was reviewed at the end of the meeting where it was agreed that more Workgroups would be required prior to Workgroup Consultation and the 12 January 2024 meeting would need to be moved to allow for work to be completed.

ACTION 53 (Chair): Timeline to be re-drafted, shared with Workgroup for comment and submitted to Grid Code Panel (for Chair & Proposer to discuss at Panel due to the number of timeline changes to date).

Review of the draft Workgroup Consultation document

The Chair shared the document with the Workgroup and noted that the focus for this meeting was to review the outline of the defect and how the Proposer's solution (the Original) addresses it, and sections of the document relating to the Workgroup Alternative Grid Code Modification (WAGCM1) if possible.

The Chair clarified the purpose of each section of the document and, for this case, how the 'Proposer's solution' section requires focus on the Original solution, with Workgroup discussions to feature in the 'Workgroup Considerations' section of the document. When the document is finalized, it will be decided whether legal text remains in the document (to explain parts of the solution) as well as being in the legal text annex. The Proposer noted that they are working on additional text to feature in the document but would share that in due course for Workgroup consideration.

A Workgroup member expressed that the 'Proposer's solution' section should be clear that it's the Proposer's view of their preferred solution, not views shared by the Workgroup (as some Workgroup members are supporting WAGCM1).

There was discussion to clarify who the Proposer of GC0155 is, as the modification had originated as a WAGCM from another modification raised by another Workgroup member. A Workgroup member felt that the document should outline that the premise of GC0155 was originally to address requirements from the original WAGCM (referred to as WAGCM2) and Temporary Over Voltage (TOV) requirements. The Chair suggested that the Executive Summary section could reference the Workgroup's difference of opinion on solutions as it'll be the introduction to the document (but will be written once the rest of the document is finalized).

The Proposer explained the wording used in the following topics of the 'Proposer's solution':

Clarification of Fault Ride Through Requirements

- There were minor grammatical adjustments made to the text via the Chair and the Proposer of the original WAGCM agreed that the wording reflected the concerns of that WAGCM.
- This section was agreed by the Workgroup.

The Existing Clarification – clause CC 6.3.15 (a) (i) only

- The Proposer explained that this section was to outline what happens when an offshore wind farm attaches to a High Voltage Direct Current (HVDC) link. The

Proposer suggests that the clause should be clear that if there is a voltage dip or fault under 140 milliseconds, the wind farm should ride through and not trip/disconnect. They suggest that removing part of this existing clause referring to 'load rejection' would remove confusion about disconnecting.

- There was discussion between Workgroup members about the technical feasibility of the solution, but it was clarified that this is not changing/adding requirements as the clause already exists, but removing wording which causes misunderstanding and potentially unnecessary disconnection. A Workgroup member confirmed that wind farms are designed to manage a grid fault in this way.
- An ESO observer gave a short summary of the way the HVDC conventionally works to help Workgroup members and agreed to share wording of this for reference.

ACTION 54 (JF) - Summary of how HVDC conventionally works to be shared with the Workgroup.

- The Chair suggested identifying where Workgroup discussions can move from this section into 'Workgroup considerations'.
- The Workgroup agreed with the suggested wording and clause change.

Additional clarification required – clause CC 6.3.15 (a)(i)

- This section relates to what generator plant is designed for and when it is required to trip.
- A supporter of WACM1 noted that they disagree with the solution (this can be expressed in 'Workgroup Considerations').
- When a Workgroup member asked whether illustrative diagrams were needed, the Proposer of the original WAGCM2 suggested it remain in for illustration (although they won't be in the legal text).
- A diagram's caption was re-added after being deleted in error.
- The Proposer explained that the change here was to i) add additional text into clause CC 6.3.15 (a)(i) and ii) modify the wording of clause ECC 6.3.15.8 (vi). Point (vii) is to be deleted and wording for protection schemes and setting international electrical faults included in a separate point in the solution.
- A Workgroup member suggested clause references be checked e.g., CC 6.3.15.10 (iv) and reference to voltage requirements in Scotland.

ACTION 55 (BA) - Baseline legal text quoted in the document to be checked (for correct text and references)

- The Proposer confirmed that the TOV section, as part of the original solution, was unchanged.
- The Workgroup agreed to the wording discussed, to the Chair's suggestion to move a consultation question to the relevant section and to return to the TOV section at a later date for final approval.

Further compliance issues

- The Proposer explained that two issues had been identified with the current fault ride through requirements.
- The Proposer of the original WAGCM2 explained that discussions in GC0111 (Fast Fault Current Injection specification text) and GC0137 (Minimum Specification Required for Provision of GB Grid Forming (GBGF) Capability (formerly Virtual Synchronous Machine/VSM Capability)) had highlighted these issues, however another Workgroup member did not believe discussions happened around this beyond power pack modules (especially on GC0111).

ACTION 56 (BA) – Proposer to trace discussions on issues with fault ride through requirements from GC0111 and GC0137.

Fault current injection

- A Workgroup member questioned whether power pack modules would be triggered to provide reactive current if voltage dipped below 90%, to which another Workgroup member confirmed that full reactive current shouldn't be injected. They noted that this applies to existing wind turbines which are subject to the CC section of the Grid Code too.
- The Workgroup then discussed the concept of proportional current injection and the k factor, as used in other countries' grid codes, suggesting benefits for system security. It was suggested that a separate modification would be needed to address this.
- A Workgroup member suggested a change of reference in this section to ECC 6.3.15.1(a)(ii).
- A Workgroup member noted the proportionality of voltage featuring in ECC 6.3.16 but agreed a conflict with the Grid Code as to the definition of proportionality. Another Workgroup member suggested that compliance would be met as long as the k factor was over 3.5 (but that it should be appropriate). The Proposer of the original WACM2 noted that the WAGCM featured a graph similar to that in ECC 6.3.16 but the Workgroup had not agreed it.
- A Workgroup member noted that an interpretation of what maximum reactive current is features in the ECC but not the CC and reactive current should be proportionate to voltage change.
- **ACTION 57 (BA)** – Proposer to review wording re: fault current injection to reflect wind farms, voltage detection and proportionality (and speak with relevant Workgroup members to agree any points of contention).

Legal text for CC 6.3.15.1 (a)(i): re: performing during overvoltages

- The Proposer explained that the change here had been made to cover non-synchronous (e.g. connected using power electronics (HVDC, wind turbine, battery)).
- A Workgroup member suggesting a wording change to reflect maximum reactive current possible in proportion to the retained voltage.

ESO

- A Workgroup member suggested that the wording be reviewed to better reflect the intent.
- The Proposer of the original WAGCM2 suggested that the terms 'maximum' and 'possible' be reviewed in the text.

ACTION 58 (BA) – Review section for performing during overvoltages, checking for any missing baseline legal text in these sections, conferring with Workgroup members and reviewing the clause reference at the base of page 11.

Timings were reviewed at the end of the meeting (see earlier reference to decisions to revise the timeline).

The Chair asked the Workgroup members responsible for WACM1 whether they needed the Original to be complete before going through their solution. They noted a conflict with overvoltage protection in Scotland so expected some fine-tuning before it was complete but felt happy for the ESO and the Workgroup to review it.

AOB

A Workgroup member requested that the draft Workgroup Consultation document be shared for collaborative working.

ACTION 59 (Chair) – Collaborative working options to be explored for working on the draft consultation document.

Next Steps

- *Proposer to review the changes discussed, consult Workgroup members as necessary and add to their solution in the draft Workgroup Consultation document.*
- *Timeline to be adjusted and shared with the Workgroup.*
- *Collaborative working solution to be explored for the draft Workgroup Consultation*
- *Workgroup on 12 January to be cancelled.*
- *Workgroup members to prepare to discuss Workgroup considerations, TOV, WAGM1 and consultation questions in upcoming meetings.*

Actions

Action number	Workgroup Raised	Owner	Action	Comment	Due by	Status
29	WG7	BA	To have a conversation offline on understand GEP parameters.	Included in previously circulated draft text	WG8	Closed
39	WG8	BA	Discuss CC.6.1.11 with TOs and manufactures and feedback to WG with strawman		WG9	Ongoing
45	WG10	Ofgem	Check with Legal if CRM should be put in place if applying retrospectively		WG11	Open

47	WG11	SS	Come back with feedback on action 43		Early August 2023	Open
48	WG12	AM	Share RMS/EMT Study with WG	Have been shared with ESO, but as these studies are confidential they are not something that would be shared outside the SOs and TOs	WG13	Closed
49	WG12	All	Consider TOV graph, what palatable limits might be		WG13	Open
51	WG12	BA	Share the results of the effects with a lower voltage		WG13	Open
53	WG14	Chair	Timeline to be re-drafted, shared with Workgroup for comment and submitted to Grid Code Panel	Chair & Proposer will be invited to discuss this at Panel.	WG15	Open
54	WG14	JF (ESO)	Summary of how HVDC conventionally works to be shared with the Workgroup		WG 15	Open
55	WG14	BA	Baseline legal text quoted in the document to be checked (correct text and references included)	Ref: ECC.6.3.15.8 (vi) & CC 6.3.15.10 (iv)	WG 15	Open
56	WG14	BA	Proposer to trace discussions on issues with fault ride through requirements from GC0111 and GC0137		WG 15	Open
57	WG14	BA	Proposer to review wording re: fault current injection to reflect wind farms, voltage detection and proportionality (and speak with relevant Workgroup members to agree any points of contention).		WG 15	Open
58	WG14	BA	Review section for performing during overvoltages, checking for any missing baseline legal text in these sections, conferring with Workgroup members and reviewing the clause reference at the base of page 11.		WG 15	Open

59	WG14	Chair	Collaborative working options to be explored for working on the draft consultation document.	WG 15	Open
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Attendees

Name	Initial	Company	Role
Milly Lewis	ML	Code Administrator, ESO	Chair
Elana Byrne	EB	Code Administrator, ESO	Tech Sec
Bieshoy Awad	BA	ESO	Proposer
Alastair Frew	AF	ESO	ESO Rep
Andrew Vaudin	AV	EDF	Workgroup Member
Fraser Norris	FN	SSE	Workgroup Member
Isaac Gutierrez	IG	Scottish Power	Workgroup Member
Mark Aten	MA	Uniper	Workgroup Member Alternate
Mike Kay	MK	Independent	Workgroup Member
Nicola Barberis Negra	NN	Orsted	Workgroup Member
Nathanael Sims	NS	NGET	Workgroup Member Alternate
Owen Curran	OC	Siemens	Workgroup Member
Priyanka Mohapatra	PM	Scottish Power	Workgroup Member
Tim Ellingham	TE	RWE Generation UK, RWE Renewables	Workgroup Member
John Fradley	JF	ESO	Observer
Julie Richmond	JR	Scottish Power	Observer
Mzamoyabo Sibanda	MS	SSE Renewables	Observer
Shilen Shah	SS	Ofgem	Ofgem Representative
Sigrid Bolik	SB	Siemens	Observer
Terry Baldwin	TB	ESO	Observer

