Public

Code Administrator Meeting Summary

GC0155 Workgroup 19

Date: 22/11/2024

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Chair: Teri Puddefoot

Proposer: Bieshoy Awad

Key areas of discussion

Agenda

The Chair discussed the importance of accepting meeting invitations to ensure proper tracking and planning. The agenda included reviewing timelines, action logs, Terms of Reference, workgroup alternatives, and the consultation document and legal text updates and comments. The timeline was noted as outdated, and it was suggested that the Workgroup revisit it. Action log updated with comments.

Actions

The action log review highlighted several ongoing actions, including discussions about independent consultancy and the need for fixed timelines. Workgroup members emphasised the importance of moving actions forward and closing them where possible. Specific actions discussed included updates on meetings, consultancy options, and feedback on technical feasibility and compliance issues.

Workgroup Alternative

The Chair updated the Workgroup on WAGCM 2 and said that the proposer is satisfied with its current state. However, legal text updates will need amending, and work is ongoing in the background.

Workgroup Consultation

The consultation document and legal text were discussed, with updates being made to reflect ongoing work and feedback.

There was a discussion around the possibility of engaging an independent consultant as part of ongoing meetings to address specific issues. This option is being considered to provide additional insights and expertise.

The Workgroup covered the inclusion of exceptions in bilateral agreements for reactive support during high voltages, particularly for existing wind farms. The aim is to ensure transparency and reasonableness in these agreements.

Electromagnetic Transients (EMT) models were discussed to assess plant performance during overvoltage conditions, with a focus on new plants. The models are required to match actual plant performance, providing a way to gather data on recent plant.

The Proposer clarified that it does not use EMT models provided by Users to systematically validated the plant compliance and that, even if the User provided a model that proves that the plant is non-compliant under a particular condition, this would not be picked up unless the test case used to validate the model reflects that specific condition. NESO asserted that responsibility for compliance sits with the User.

A conversation touched on the validation process for turbines or prototypes, which currently only covers undervoltage scenarios. This indicates that OEMs may need to expand it to include overvoltage situations to ensure comprehensive performance assessments.

The Workgroup discussed the need for legal text and mandates to support alternatives being considered by the workgroup, ensuring that all legal aspects are addressed and finalised. This is essential for the legitimacy and implementation of proposed alternatives.

Compliance studies and the challenges of simulating realistic fault scenarios was addressed, particularly in achieving certain retained voltage levels. This highlights the need for realistic assumptions and methodologies in compliance testing.

The proposal discusses operation during temporary overvoltage conditions, emphasising the need for a clear interpretation and consistent application across different plants. This is crucial for effectively managing overvoltage scenarios and ensuring uniform standards.

The Workgroup discussed a proposed clarification of the fault ride through definition, extending it to cover the entire event, including any subsequent transients. This aims to ensure a comprehensive understanding and application of fault ride through requirements. The propose noted that the definition only covers the ECCs and is not relevant to the CCs. So, the clarification was also mirrored in the fault ride through section of the CCs.

The proposal to clarify the definition that some participants believe does not cover the clarification lead to a debate on whether this constitutes a clarification or an increase in requirements. The need for a consultation question to gather feedback on the general understanding of this issue was emphasised.

There was a conversation that addressed the current definition of fault ride through, which is in response to voltage dips conditions, and the proposal to clarify it by referring to transients triggered by that dip (or fault clearance) including any overvoltage. This change would require redefining the term to ensure clarity and compliance with Grid Code requirements.

The introduction of new text, particularly concerning Temporary Over Voltage (TOV), was debated. Concerns about the implications for existing systems and compliance were raised. The conversation highlighted the need for clear guidelines and the potential impact on generators and Transmission owners.

There was a discussion on the challenges of managing risk and compliance costs associated with new requirements, particularly in real-time operations. The potential financial burden on generators and consumers was considered, along with the need for clear direction from regulatory bodies.

The conversation addressed the workgroup's scope and Terms of Reference, emphasising the importance of staying within defined boundaries while considering the value of proposed modifications. The need for a clear understanding of the scope is crucial to avoid overstepping boundaries.

The Workgroup discussed the management of TOV events in power systems, especially the need for plant to handle these events without disconnecting from the grid. The conversation highlighted the importance of balancing system stability with power plant's operational capabilities. TOV events are not frequent, but they pose a risk that needs to be managed to maintain system stability. Generation plant is expected to ride through TOV events up to a certain maximum level, but not beyond it. The risk of TOV is partially transferred to generators, who must ensure compliance to avoid disconnection and partially to the TOs and NESO who would need to ensure that the limits are maintained at all times. New plant is required to be designed to handle maximum TOV levels from the outset. Existing plant must demonstrate compliance with actual events, which could be lower than the absolute maximums.

The importance of managing risks associated with power generation and ensuring compliance with grid requirements to prevent Low Frequency Demand Disconnection (LFDD) events was highlighted. There needs to be a focus on proactive management and collaboration between generators and the system operator.

There is a need to clarify terms within the Grid Code, particularly those related to fault ride through and transient overvoltages, to ensure consistent understanding and application across the industry. The conversation suggested potential modifications to the Grid Code to address these issues.

The Workgroup addressed the need for users to comply with voltage requirements, which may change over time, necessitating modifications to

existing systems. The discussion includes scenarios where users must adapt to new voltage limits to remain compliant.

The impact of new requirements on existing plant is a significant concern, with some plant potentially unable to meet new standards. For plant unable to meet the new requirements, several strategies were proposed to achieve compliance or mitigate risks. These include temporary restrictions, additional measures, and potential cost recovery schemes.

The inclusion of worked examples in the consultation document was requested to ensure practical understanding and application of the requirements. These examples help stakeholders visualise the implications and necessary actions for compliance. Examples should cover various scenarios to address different compliance challenges and facilitate better decision making and planning.

The financial implications for Transmission Owners (TOs) when investment is required to deal with User's inability to meet Grid Code requirements were discussed. As TO's are unlikely to be able to recover the costs of such investment through standard transmission charges. This situation may necessitate a one-off charge for specific users.

The conversation addressed the compliance issues related to location, and the need for risk management strategies. These strategies aim to minimise the risk of tripping and ensure compliance with grid requirements. Additional reserves may be required during high risk periods.

The Workgroup stated that the TGN 288 is not an industry standard for overvoltages, but it is being included in agreements by National Grid, which may not reflect industry standards. The acceptance of these requirements by generators is voluntary and subject to negotiation. The process of consulting on TGN 288 limits aims to establish a widely accepted standard, with the outcome determining the new normal for compliance. This process involves balancing the responsibilities and risks between TOs and generators. TGN 288, introduced in May 2016, is a key reference for requirements in England and Wales.

A Workgroup member mentioned that older plant may face disproportionate challenges in meeting new compliance requirements due to their lower

capability and previous interpretations of the Grid Code. This could result in higher costs and efforts to achieve compliance, posing a significant risk to this plant. The age of the plant may be considered in derogation requests.

The proposer noted that the limits under discussion(as per TGN 288 and as per the alternative proposed by other workgroup members), when reflected at the User System Entry Point for embedded plants, would be within the limits of the G59 overvoltage protection. This would mean that if an embedded plant is able to remain connected within the limits specified in G59, such plant should not have any significant issue with TOV on the transmission system provided it stays within the limits of TGN288

The new requirements introduced in CC6.3.15, particularly concerning active power requirements after a fault was addressed. This represents a shift from previous standards, which focused primarily on reactive power during faults. The change is seen as a new requirement for compliance and there was a debate on whether this requirement should be included. Existing plant may be excluded if it cannot comply without causing issues and the requirement affects synchronous machines and Power Park Modules (PPMs) differently.

The management of TOV events was discussed, with a focus on how these events are currently handled and the frequency of their occurrence. The conversation suggested that TOV events are infrequent and localised, reducing the need for systematic management.

The Workgroup explored the current risk mitigation strategies and system management practices, emphasising the need for clear documentation of these processes. The conversation highlighted the importance of understanding the background and current practices to inform future decisions. The "do nothing" cost is considered low due to the infrequency of events.

A point was made that stating that the current requirement necessitates that PPMs/Generating Units are required to ride through an “infinite” temporary overvoltage is what is withholding the agreement to a solution. The Proposer responded that the current requirement is to ride through whatever post fault temporary overvoltage that may occur, and that “infinite” is a theoretical position that is not going to materialise in reality. The Proposer went on to suggest that

assuming the absence of a cap on temporary overvoltage means that there are no requirements to ride through anything above the steady state overvoltage limit is an unreasonable stance, noting that 1) the presence of transients and oscillations around what is a post fault steady state voltage levels is an established fact and that 2) ignoring the forementioned fact and other indications in the Grid Code that temporary overvoltage of magnitudes above 1.1pu occur amounts to unrealistic optimism in designing the plant. The Proposer went on to note that removing any requirement on plant to ride through realistic post fault temporary overvoltage conditions is likely to socialise the costs of this unrealistic optimism amongst all Users including those who have made realistic assumptions.

The Proposer also noted that it is important to ensure the right balance of the requirements and that eventually all costs are passed to Users and, thereafter, consumers in one way or another. For example, excessive operational costs that may arise from removing any obligations on fault ride through would increase BSUoS charge, excessive transmission investment costs required by setting a tight margin would affect TNUoS charge, and specification of an excessively high cap on TOV could require excessive investment from Generators. Noting that, the right balance is likely to achieve some sharing in the burden of managing the risk without disproportionate costs on any specific party and without socialising the cost of managing the implications of any unrealistic assumptions made by any specific User among the rest of the industry.

A Workgroup member provided the following post Workgroup meeting:

- The Proposer stated that trips relating to high voltages do not occur all that often and that when they do the User which tripped is/will be issued with a LON to 0MW until the User has taken actions to resolve the issue. Many Workgroup members do not agree with this but this is the approach NESO stated it has taken and would take in future.
- It was established on the call that no additional risk mitigation has been put in place by NESO to account for the fact that the overall HVRT performance of existing plant is an unknown. The example given by the Workgroup member was a potential mitigation to hold additional frequency response in case of trips relating to High Voltage Ride Through (HVRT).

- NESO has been aware of this risk since the beginning of GC0155 and has not taken any such mitigating actions. The 'Do Nothing' cost to the consumer, as of today, is therefore zero (it was stated that the risk is not deemed to be sufficiently high to take specific actions targeted at mitigating HVRT risk).
- This is essential background information to include in the Workgroup consultation at the beginning, to help the reader (who has not been in the Workgroup meetings) to put the issue into perspective, especially when read in conjunction with the original proposal and the alternative proposals.

NESO notes that the costs of manging the risk remain negligible because 1) the number of occasions of the failure of plant to ride through post fault TOV remain low and 2) once it is established that the risk of tripping exists for a certain plant, it is addressed through the process of management of non-compliance. If the frequency of events is to increase in the future, or if it is no longer possible to manage that risk through the LON process, NESO would be required to secure for the loss of that plant. The cost of that would comprise the cost of MWh of frequency response up to the plant's annual energy yield and the cost of synchronising additional inertia if the cumulative sum of generation loss increases RoCoF beyond the maximum level that could have a consequential effect on the network.

Next steps

- Workgroup members were encouraged to review Terms of Reference.
- A timeline for future actions and meetings will be circulated for feedback.
- Updated actions will be shared with the workgroup.
- Feedback from workgroup members is crucial for future planning.

Actions

Action Number	Workgroup Raised	Owner	Action	Comment	Due by	Status
39	WG8	BA	Discuss CC.6.1.11 (CC.6.1.7 now) with TOs and manufactures and feedback to WG with strawman.	Amalgamated into Action 67.	WG19	Closed
45	WG10	Ofgem	Ofgem Check with Legal if CRM should be put in place if applying retrospectively.	Chair to chase email.	WG20	Open
49	WG12	All	Consider TOV graph, what palatable limits might be.	Requires further elaboration.	WG20	Open
56	WG14	BA	Proposer to trace discussions on issues with fault ride through requirements from GC0111 and GC0137.	No narrative found in previous reports.	WG19	Closed

61	WG15	All	Workgroup members to provide feedback on why BCA doesn't work and how they feel they can better comply.	To be provided during WG discussions and documented within the WG consultation document.	WG20	Open
64	WG16	BA	Review text for ECC.6.3.15.8 and consider non-compliance issues.	No updates needed.	WG19	Closed
65	WG16	All	Provide challenge and provide feedback on risks re Operation During Temporary Overvoltages section.	To be provided during WG discussions and documented within the WG consultation document. Include how the system is currently managed. WG need more data and when TOV occur and how this and	WG20	Open

				Frequency is managed.		
66	WG16	All	Provide feedback on the Issues with the current requirements and validate that these points are correct.	To be provided during WG discussions and documented within the WG consultation document.	WG20	Open
67	WG18	BA/AP	Consider the technically feasibility of different magnitudes and the overall impact this would have on the stability of the system.	Ongoing discussions and considerations for consultant review.	WG20	Open
68	WG18	All	Have further discussions with manufacturers with everyone present or obtain written documents from them to	BA is currently conversing with a generator on conceptual ideas with further	WG20	Open

			understand if TGN288/ RFG-2 figures can be met or if other levels need to be considered. Also carry out some case studies on specific plant to understand how the solution may be implemented in reality.	conversations to be arranged.		
69	WG18	TP	Re-share information presented by Tony earlier in the Workgroup on Compliance studies for line-to-line fault.	Email sent to WG members	WG19	Closed
70	WG19	BA	Include worked examples in the consultation document.		WG20	Open

Attendees

Name	Initial	Company	Role
Teri Puddefoot	TP	NESO	Chair
Jess Rivalland	JR	NESO	Technical secretary
Graham Lear	GL	NESO	Code Representative
Bieshoy Awad	BA	NESO	Proposer
Alastair Frew	AF	Drax	Workgroup Member
Afshin Pashaei	AP	NGET	Workgroup Member
Fraser Norris	FN	SSE	Workgroup Member
Martin Aten	MA	Uniper	Workgroup Member
Nicola Barberis Negra	NN	Orsted	Workgroup Member
Owen Curran	OC	Siemens	Workgroup Member
Andrew Larkins	AL	Sygensys	Observer
John Fradley	JF	NESO	Observer
Mike Kay	MK	Independent	Observer
Mzamoyabo Sibanda	MS	SSE Renewables	Observer
Vincenc Casadevall	VC	GE Renewable Energy	Observer