

Grid Code Development Forum

12 December 2019

Agenda

1. Introductions
2. Presentation: Refresh Data Registration Code (Christopher Smith)
3. Presentation: Updates to Compliance Processes and Testing (Mark Horley)
4. Code Administrator Update (Nisar Ahmed, National Grid ESO)
5. Any other business
6. Close

Refresh Data Registration Code



Siemens study options
DATE: 5th December 2019

Problem statement

- Voltage source HVDC projects now starting to be operated
- Industry feedback is that content of the DRC does not map well for this technology
- Requests for additional information outside the DRC has had a material impact.
- Examples
 - DRC Schedule 14: Potentially not relevant for HVDC. It does not take in to consideration the fault infeed characteristics of HVDC.
 - DRC Schedule 5: Requires a general update to incorporate particulars of HVDC
 - DRC Schedule 4: Not written for modern HVDC VSC in mind.
 - DRC Schedule 1: Section on control systems requires a full re-assessment due to HVDC VSC having very complex and wide ranging control architecture.

Proposed solution

- Given the complex interaction between SO, Onshore TO and Developers set up an informal group to identify
 - What is looking to be achieved by the DRC
 - Which sections need refreshing to incorporate VSC

- Output would be to then take forward as a grid code modification.

- Proposed group attendees
 - SO
 - Onshore TO
 - Offshore TO
 - Technology providers (HVDC & Wind Turbine/solar)

Updates to Compliance Processes and Testing

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Presented by
Mark Horley



Compliance Processes Background

The Compliance Processes (CP) were added to the Grid Code some 8 years ago to provide a framework for Users to demonstrate compliance with the Grid Code and Bilateral Connection Agreement.

Prior to this, the process existed in solely in Guidance Notes updated periodically by National Grid based upon from experience.

In parallel with adding the CP, details of the practical on-site testing of generators for compliance was updated in existing Grid Code OC5 “Testing and Monitoring”

European Compliance Processes (ECP) were added recently for EU Users equivalent to the CP & OC5.

Why propose modifications to on-site testing?

Final compliance testing with all stakeholders present on site is effective but can be burdensome and increases travel risk.

These changes facilitate the option of allowing some final testing without on site attendance allowing users more flexibility in scheduling testing

The aim is to deliver:

- a high probability of success for User making the test requirements clearer; and,
- quick turn around of assessment by ESO; while,
- reducing burden and risk of having everybody attend site.

Why change other compliance demonstration requirements?

Wind Turbine suppliers are advising NG ESO that FRT testing of the next generation of large Wind Turbines is impractical using portable on site test facilities.

HVDC Interconnector systems have demonstrated some aspects of compliance in a Factory situation before shipping to site for installation allowing some reduction of work on site.

Detailed changes to Grid Code requirements on voltage control for non-synchronous plant were not reflected in the Compliance Process.

Summary of Modifications - Simulations

CP.A.3.2.1 Add simulation of full speed no load step response simulation for a synchronous generator (Align with ECP.A.3.2.1(ii) and tests).

CP.A.3.2.1/ ECP.A.3.2.1 add on load excitation PSS simulations for pumping mode in the case of pumped storage synchronous generators.

CP.A.3.4/ ECP.A.3.4.1 add an additional simulation for a voltage step to take the Power Park Module from full leading power factor to full lagging power factor. Reflect A.7.2.3.1 (ii) requirements.

CP.A.3.5.4/ ECP.A.3.5.3 additional paragraph requiring Offshore Wind Farms to carry out FRT studies for reasonable depleted network scenarios eg. export cable, primary transformer outage, switching groups.

Summary of Modifications

– Submission Format

ECP.A.4.3.6 / OC5.A.1.4 Add a new section specifying:

- **Formats for submitting test results for each plant type or test being made**
- **Information included on test log sheets.**

This is the currently included in the Guidance Notes published on the NG ESO Grid Code web pages and is to facilitate quicker response to Users when NG ESO has not witnessed testing on site.

Summary of Modifications

– Voltage / Reactive testing

ECP.A.6.4.5 (i) & (ii) / OC5.A.3.4.5 (i) & (ii) reword to clarify how 85% power and 50% power requirements apply

ECP.A.6.5.4 / ECP.A.7.4.4 / OC5.A.3.5.4 / OC5.A.4.4.4 Add +/-4% voltage reference step to existing 1% and 2% steps

ECP.A.6.5.5 / OC5.A.3.5.5 Add example to draw attention to requirement to demonstrate MSC/MSR switching in and out.

ECP.A.6.5.8 / OC5.A.3.5.8 Add a test to demonstrate the transition between voltage control and reactive power control below 20% power output (option in CC.6.3.8 and ECC.6.3.8) if applicable.

OC5.A.3.4.7 Remove type test for reactive power on a Power Park Unit as housekeeping. Historic inconsistency with Manufacturer and Data Performance Report

Summary of Modifications

– Frequency Response Testing

ECP.A.6.6.6 / ECP.A.4.5.6 / OC5.A.3.6.6 / OC5.A.4.5.6 redefine power levels for MLP3 and MLP2 to better reflect the load range of Power Park Modules & HVDC

ECP.A.6.6.8 / ECP.A.7.5.8 / OC5.A.3.6.8 / OC5.A.4.5.8 add a minimum time of 90 seconds to the “Hold until stable” to clearly demonstrate “Secondary Response”.

OC5.A.2.8.9 / OC5.A.3.8.9 / OC5.A.4.5.9 addition test requirement to demonstrate ability to set target frequency. Align with **ECP.A.5.8.9 / ECP.A.6.6.9 / ECP.A.7.5.9**.

Summary of Modifications – Factory Acceptance Testing

ECP.A.6.7.2 / OC5.A.3.7.2

Allow Fault Ride Through testing in a factory test facility instead of a field test. Manufacturer concern impractical with the next generation of offshore wind turbines.

ECP.A.7.1.7 / OC5.A.4.1.3

Include of Factory Acceptance Testing on HVDC Control Schemes prior to shipment to site (in addition to Equipment Certificates) to reduce the scope of on site testing where agreed by NG ESO.



Code Administrator General Updates



Dates for your diary

	January	February	March
GCDF	08/01/2020	05/02/2020	04/03/2020
New Modification Proposal Submission Date	15/01/2020	12/02/2020	11/03/2020
Papers Day	22/01/2020	19/02/2020	18/03/2020
Grid Code Review Panel	30/01/2020	27/02/2020	26/03/2020

Any Other Business

- Establishment of informal group to consider requirements in the DRC for converter connected technology (request for expressions of interest)

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