1 Proposed legal text changes

CP

CP.A.3.2.1 Add an additional simulation of full speed no load open circuit step response test of a synchronous generator to a step change of the voltage reference from 90% to 100%. (this is in line with ECP.A.3.2.1(ii) and test in OC5.A.2).

CP.A.3.2.1 Add an additional paragraph requiring that the on load simulations are repeated at full load pumping in the case of pumped storage synchronous generators.

CP.A.3.4 add an additional simulation a sufficiently large voltage step to take the Power Park Module from full leading power factor to full lagging power factor (amend drafting of CP.A.3.4.2 to correspond). This aligns with CC.A.7.2.3.1 (ii) requirements.

CP.A.3.5 Additional FRT studies for different loading/commissioning scenarios. Additional paragraphs requiring Wind Farms to carry out FRT studies for reasonable depleted network scenarios eg. export cable and/or primary transformer outages.

ECP

ECP.A.3.2.1 Add an additional paragraph requiring that the on load simulations are repeated at full load pumping in the case of pumped storage synchronous generators.

ECP.A.3.4.1 add an additional simulation - a sufficiently large voltage step to take the Power Park Module from full leading power factor to full lagging power factor. (amend drafting of ECP.A.3.4.2 to correspond). This aligns with ECC.A.7.2.3.1(ii) requirements.

ECP.A.3.5 Additional FRT studies for different loading/commissioning scenarios. Additional paragraphs requiring Wind Farms to carry out FRT studies for reasonable depleted network scenarios eg. export cable and/or primary transformer outages.

ECP.A.4.3.6 Add a new section specifying the test data formats for each plant group and test type along with test log sheets. This is currently included in the Guidance Notes published on the NG ESO Grid Code web pages.

ECP.A.6.4.5 (i) & (ii) reword to make clear the requirement to start testing above 85% power as required (ECP.A.6.4.1) but accept result as long as power does not then fall below 50% power.

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

ECP.A.6.5.5 Add example to draw attention to tests to demonstrate MSC/MSR switching.

ECP.A.6.5.6 Amend ECP.A.6.5 Figure 2 to include 4% steps.

ECP.A.6.5.8 Add a section to describe a test to demonstrate the transition between voltage control and reactive power control below 20% power output as allowed by ECC.6.3.2 and ECC.6.3.8 if applicable.

ECP.A.6.6.4 Create frequency response capability figure specifically for preliminary frequency tests.

ECP.A.6.6.6 redefine power levels for MLP3 and MLP2 to better reflect the load range of Power Park Modules.

ECP.A.6.6.8 add a minimum time of 90 seconds to the "Hold until stable to give sufficient time to demonstrate Secondary Response". Clarify requirement for separation between individual tests.

ECP.A.6.7.2 Reword the description of Power Park Unit fault ride through testing to allow larger turbines to be tested on a factory test facility provided all auxiliaries and control systems are present. Currently the wording requires a complete field test of wind turbine structure including tower and blades which is seen as impractical with the latest generation of 10MW+ offshore wind turbines.

ECP.A.7.1.7 Amend paragraph to describe the inclusion of Factory Acceptance Testing on HVDC Control Schemes prior to shipment to site (in addition to Equipment Certificates) to reduce the risk and scope of on site testing where agreed by NG ESO.

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

ECP.A.7.4.6 Amend ECP.A.7.4 Figure 2 to include 4% steps.

ECP.A.7.5.4 Create frequency response capability figure specifically for preliminary frequency tests.

ECP.A.4.5.6 redefine power levels for MLP3, MLP2 and MLP1 to better reflect load range of HVDC Interconnectors. Improve clarity on load points in importing/exporting modes.

ECP.A.7.5.8 add a minimum time of 90 seconds to the Hold until stable to give sufficient time to demonstrate Secondary Response. Clarify requirement for separation between individual tests.

OC5

OC5.A.1.4 Add a new section specifying the test data formats for each plant group and test type along with test log sheets. This is currently included in the Guidance Notes published on the NG ESO Grid Code web pages.

OC5.A.2.8.9 addition test requirement to demonstrate ability to set target frequency. Drafting based on ECP.A.6.6.9.

OC5.A.3.2 & 3.3 tidy up and underline to create title lines for tests to improve identification in Grid Code.

OC5.A.3.4.5 (i) & (ii) reword to make clear the requirement to start test above 85% power as required(OC5.A.3.4.1) but accept result as long as power does not then fall below 50% power.

OC5.A.3.4.7 Remove type test for reactive power on a Power Park Unit as housekeeping. This option was removed from the Manufacturer and Data Performance Report options prior to the approval of the Compliance Processes.

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

OC5.A.3.5.5 Add example to draw attention to tests to demonstrate MSC/MSR switching.

OC5.A.3.5.6 Amend OC5.A.3.5 Figure 2 to include 4% steps.

OC5.A.3.5.8 Add a section to describe a test to demonstrate the transition between voltage control and reactive power control below 20% power output as allowed by CC.6.3.2 and CC.6.3.8 if applicable.

OC5.A.3.6.6 redefine power levels for MLP3 and MLP2 to better reflect the load range of Power Park Modules.

OC5.A.3.6.8 add a minimum time of 90 seconds to the Hold until stable to give sufficient time to demonstrate Secondary Response. Clarify requirement for separation between individual tests.

OC5.A.3.8.9 addition test requirement to demonstrate ability to set target frequency. Drafting based on ECP.A.6.6.9.

OC5.A.3.7.2 Reword the description of Power Park Unit fault ride through testing to allow larger turbines to be tested on a factory test facility provided all auxiliaries and control systems are present. Currently wording requires a complete field test of wind turbine structure including tower and blades which is seen as impractical with the latest generation of 10MW+ offshore wind turbines.

OC5.A.4.1.3 Add a paragraph to describe the use of Factory Acceptance Testing on HVDC Control Schemes prior to shipment to site to reduce the risk and scope of on site testing where agreed by NG ESO.

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

OC5.A.4.4.6 Amend OC5.A.4.4 Figure 2 to include 4% steps.

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OC5.A.4.5.8 add a minimum time of 90 seconds to the "Hold until stable to give sufficient time to demonstrate Secondary Response". Clarify requirement for separation between individual tests.

OC5.A.4.5.9 addition test requirement to demonstrate ability to set target frequency. Drafting based on ECP.A.7.5.9.