**IBRTF Report To ROS**

**May 2023**

**Chair: Mohammad Albaijat, Vice-Chair: Julia Matevosyan**

**IBRTF last met on April 14, 2023 (Webex)**

**It was only open meeting session.**

**Discussion Items:**

**IBR Ride-Through Requirements NOGRR 245**

Presented by Stephen Solis (ERCOT)

The presentation covered feedback to the comments received for NOGRR 245:

* + ERCOT made clarifying edits based on feedback to frequency ride-through (FRT) and voltage ride-through (VRT) requirements.
	+ ERCOT reduced the phase angle jump requirement from 45 degrees to 25 degrees while clarifying the time frame to be sub cycle to cycle.
	+ ERCOT extended implementation deadlines out an additional 12 months from what was originally proposed to balance feedback that more time was needed to implement changes and the IBR performance failure risk that remains on the ERCOT system.
	+ ERCOT clarified that any equipment limitation that fails to meet the ride-through performance requirements would be subject to restrictions after the implementation date.
	+ ERCOT has incorporated most of technical feedback provided and will continue to consider any technical feedback to improve NOGRR 245 and its implementation.
	+ ERCOT would like ROS to consider approval of NOGRR 245 with ERCOT comments in the May ROS meeting.

**OEM Presentation Nordex (wind turbine manufacturer)**

Presented by Malte Laubrock (Nordex)

The presentation covered capabilities of existing and future Nordex WGRs to comply with NOGRR245 requirements

* + FRT and VRT requirements proposed in NOGRR245 can be met by existing and future equipment
	+ Instantaneous Overvoltage requirement requires getting confirmation from component manufacturers (converter, pitch, yaw, generator are affected by this requirement) -it was pointed out in the meeting that this requirement is not retroactive and only applies to new equipment
	+ Existing RMS and PSCAD models already included capabilities required by NOGRR245
	+ Some crosschecks are needed for units older than 10 years.

**OEM Presentation Power Electronics (inverter manufacturer)**

Presented by Stephen Giuere (PE)

The presentation covered capabilities of existing and future Nordex WGRs to comply with NOGRR245 requirements

* + FRT and VRT requirements proposed in NOGRR245 can be met by more recent and future equipment
	+ Legacy HEC units cannot meet VRT requirement as per NOGRR245 and will require a significant cost to customers to meet backwards compatibility requriements
	+ Instantaneous Overvoltage requirement testing scheduled W14/W15 for the latest generation of inverters. For the existing prior generation of inverters, it is unclear yet if hardware or firmware retrofits will be needed.
	+ Phase angle jump requirements, recommend matching IEEE2800 requirements – Already done by ERCOT in response to stakeholder comments for NOGRR245
	+ Existing PSSE and PSCAD models already included capabilities required by NOGRR24, no updates needed.
	+ Uncertainty on how to test for compliance in the absence of IEEE2800.2 test procedures.

**March 10th Event Update**

Presented by Julia Hariharan (ERCOT)

* + Phase-to-ground fault in West Walley area on March 10, 2023 at 4:48 am CDT on high side of thermal generator’s main power transformer (MPT), a minute later followed by another phase-to-ground fault on the high side of another MPT at the same site. Both faults normally cleared. The plant was not generating at the time
	+ The event resulted in a loss of ~271 MW of wind generation
	+ System frequency dropped to 59.957 Hz and returned to 60 Hz within 37 seconds
	+ South Texas PMU recorded the lowest voltage of 0.64pu on a 345 kV line
	+ Categorized as NERC Cat 1 event (unexpected outage, contrary to design, of three or more BES Facilities caused by a common disturbance)
	+ Sub-synchronous oscillations observed in the Laredo area (due to the first fault isolating the circuit where the oscillations originated)
	+ RFIs sent out to REs of 8 facilities (consisting of 12 units lost)
	+ Inconclusive information from RFI based on 3 responses received so far.
	+ ERCOT will continue following up with REs.
	+ NERC Brief Report was due 4/28

**IEEE2800 Conformity Assessment Ahead of IEEE2800.2, Status Updated on IEEE2800.2**

Presented by Andy Hoke (IEEE P2800.2 WG Chair)

* + Provided brief update of IEEE2800 scope, approval and applicability
	+ Provided brief scope of IEEE2800.2 Recommended Practice for Test and Verification Procedures for Inverter-Based Resources Interconnecting with Bulk Power Systems, which includes: unit type testing, plant design evaluation, as-built evaluation and commissioning testing, post commissioning model validation, monitoring, periodic tests & verification.
	+ IEEE2800 applies to IBR plant (not a single inverter or WTG). Therefore Certification of inverters/WTGs by Nationally Recognized Test Laboratory is unlikely, and OEMs “self-certification” at unit level is not possible. There will be no IEEE2800 certified equipment but rather IEEE2800 compatible one (if IEEE2800 are taken into account by OEMs). This is different from IEEE1547 paradigm where equipment certification play a large role in conformity assessment.
	+ The presentation outlined what OEMs, developers and ISOs/TDSPs can do already today to prepare for IEEE2800
	+ Adoption of IEEE2800 is not contingent upon publication/adoption of IEEE2800.2. In absence of IEEE P2800.2, IBR owners, TS owners/operators, OEMs, etc. could develop their own test and verification procedures or use existing procedures.
	+ For systems experiencing IBR ride-through events/problems, some requirements may be higher priority than others (ride through of low voltage, TOV, ROCOF, phase jump)
	+ Many utilities/ISOs are already moving towards adoption
	+ Developers, OEMs and other stakeholders are highly encouraged to joint IEEE P2800.2 Working Group!

**NERC Alert Level 2 Focused on IBR Performance Issues for GOs**

Presented by David Penny (TRE)

* + NERC issued the Inverter-Based Resource Performance Issues Alert to Generator Owners (GOs) of Bulk Electric System (BES) solar photovoltaic (PV) generating resources.
	+ This alert comes after NERC analyzed multiple large-scale disturbances involving widespread loss of inverter-based resources (IBRs), which resulted in abnormal performance across several BES solar PV generating resources.
	+ The document contains recommendations for specific actions that should be taken, and entities registered under the GO function are required to acknowledge receipt and respond to a series of questions. Responses are due by 12:00 a.m. Eastern on June 30, 2023.

**Industry Update**

Presented by Julia Matevosyan (ESIG)

* + EPRI started a new project. on Verifying Performance of Bulk Power System-Connected Solar, Wind, and Storage Plants. The goal of the project is to guide the stakeholders through IEEE2800 adoption and conformity assessment – all interested parties can consider joining the project
	+ NYSRC issued a dart of Proposed Reliability Rules and Requirements PRR 151, proposing the wholesale adoption of IEEE2800-2022 (with a few exceptions) in NY. Stakeholder comments were due by 04/27, implementation within six months of approval. Currently, not retroactive, but this is still under consideration.
	+ NERC EMT Guideline was approved by NERC Reliability and Security Technical Committee and new NERC EMT Task Force started under NERC Inverter Based Resource Performance Subcommittee
	+ ESIG Spring Technical Workshop Update: Entire session dedicated to recently approved or under-development specifications for Grid Forming Inverters (in Great Britain, Australia, European Union, and USA – by DOE-funded project consortium). Session on High IBR studies and tools.
	+ National Grid Electricity System Operator (Great Britain) recently published Grid Forming Best Practice Guide, which outlines recommended practices for assessing conformity of grid forming resources with the grid code specifications.