

Consideration of FERC Order 901 Directives

Milestone 3: Project 2021-01 System Model Validation with IBRs

Consideration of Directives relating to MOD-033 Steady-State and Dynamic System Model Validation

Directive Language	Standards Impacted	Consideration of Directives
<p>P85. “Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal to direct NERC to include in the new or modified Reliability Standards technical criteria to require registered IBR generator owners to install disturbance monitoring equipment at their buses and elements, to require registered IBR generator owners to provide disturbance monitoring data to Bulk-Power System planners and operators for analyzing disturbances on the Bulk-Power System, and to require Bulk Power System planners and operators to validate registered IBR models using disturbance monitoring data from installed registered IBR generator owners’ disturbance monitoring equipment.”</p>	<p>MOD-026 MOD-033</p>	<p>MOD-026-2 requires the GO(s) or TO(s) to perform Model Validation for individual registered IBR facilities and equipment. The TP(s) review and approve Model Validation of individual registered IBRs facilities and equipment by assessing GO(s) or TO(s) Model Validation results against the TP and PC’s joint requirements. Therefore, the TP and PC are part of the Model Validation process for registered IBRs.</p> <p>In MOD-033 System Model Validation activities, the operation data (such as from state estimator) is used to initialize the system model to the state just before the disturbance. The disturbance is recreated in the model, and the system model response is compared to the field event. Registered IBR models are validated (i.e. undergo Model Validation activities) when PC(s) compare disturbance monitoring data (quantities such as Real Power, Reactive Power, and Voltage) obtained from the GO(s) or TO(s) with the same quantities from the simulated System model of the same disturbance; this is done under MOD-033 activities. Discrepancies can be addressed through either MOD-026-2 Requirement R6 which requires GO to address model deficiencies identified and communicated by TPs and PCs, or MOD-032 Requirement R3.1.</p> <p>Each TP is either their own PC or within PC’s footprint such that system model validation by PC(s) does not present a reliability gap.</p>

Consideration of Directives relating to MOD-033 Steady-State and Dynamic System Model Validation

Directive Language	Standards Impacted	Consideration of Directives
		<p>MOD-033 requires Planning Coordinators to perform Model Validation of system models, which include registered and unregistered IBR models.</p> <p>MOD-033 provides a mechanism for Planning Coordinators to obtain disturbance data as part of "System behavior data" either through Reliability Coordinators and Transmission Operators, or through Reliability Standard PRC-028 .</p> <p>Generator Owners are required to provide disturbance data to Planning Coordinator as per Reliability Standard PRC-028.</p>
<p>"Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to submit new or modified Reliability Standards that require Bulk-Power System planners and operators to validate, coordinate, and update in a timely manner the system models by comparing all generator owner, transmission owner, and distribution provider verified IBR models (i.e., models of registered IBRs, unregistered IBRs, and IBR-DERs that in the aggregate have a material impact on the Bulk-Power System) and resulting system models against actual system operational behavior."</p>	MOD-033	<p>System models assembled by each Planning Coordinator using the verified modeling data provided by equipment/facility owners (including facility owners of registered IBRs, unregistered IBRs and DERs) in accordance with MOD-032, R2 and Part 2.1 are required to be validated against actual system operational behavior by the proposed MOD-033-3, Requirement R1, Parts 1.1 and 1.2. This system model validation is accomplished by requiring comparison of the simulation performance of the steady state and dynamic system models to actual system behavior at least once every 24 calendar months.</p>
<p>"Specifically, we direct NERC to develop new or modified Reliability Standards that require planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each</p>	MOD-033	<p>Proposed MOD-033-3 requires the validation of each Planning Coordinator's portion of the interconnection-wide system model by comparing simulation results with real-time data recordings. Aggregation of system model validations performed for each Planning</p>

Consideration of Directives relating to MOD-033 Steady-State and Dynamic System Model Validation

Directive Language	Standards Impacted	Consideration of Directives
interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection-wide models (i.e., system models) and the validation of each respective system model.		Coordinator’s planning area results in interconnection-wide system model validation. System models include unregistered Inverter-Based Resources (IBRs) and aggregate Distributed Energy Resources (DERs) when present. The phrase “unregistered IBR” refers to a Bulk-Power System connected IBR that does not meet the criteria that would require the owner to register with NERC for mandatory Reliability Standards compliance purposes.
“NERC may implement this directive by modifying Reliability Standards MOD-032-1 and MOD- 033-2 or by developing new Reliability Standards to establish requirements mandating an annual process to coordinate, validate, and keep up-to-date the transmission planning, operations, and interconnection-wide models. ”	MOD-033	Modified MOD-033-2 to clarify and enhance the requirements for validating system models.
“ Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030 and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date. ”	MOD-033	Developed MOD-033-3 Implementation Plan.