

PJM Compliance Bulletin

Compliance Bulletin (CB) CB016

MOD-026-4-Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions

MOD-027-4-Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions

General

This bulletin describes the processes by which PJM will respond to requests from Generator Owners for information as specified in MOD-026-4 and MOD-027-4, as well as the processes for a Generator Owner to provide validated modelling data to PJM in furtherance of the purposes of MOD-026-4 and MOD-027-4, and how to schedule staged tests with PJM Dispatch for model verification.

Background

MOD-026-4 and MOD-027-4 are both NERC Reliability Standards related to system-level modeling and validation.

The purpose of MOD-026-4 is to verify that the generator excitation control system or plant volt/var control function model (including the power system stabilizer model and the impedance compensator model) and the model parameters used in dynamic simulations accurately represent the generator excitation control system or plant volt/var control function behavior when assessing Bulk Electric System (BES) reliability.

The purpose of MOD-027-4 is to verify that the turbine/governor and load control or active power/frequency control model and the model parameters, used in dynamic simulations that assess Bulk Electric System (BES) reliability, accurately represent generator unit real power response to system frequency variations.

PJM is responsible for the development of a Regional Transmission Expansion Plan (RTEP) for the PJM system that will meet the needs of the region in a reliable, economic and environmentally acceptable manner. The annual RTEP includes a comprehensive review of PJM Bulk Electric System (BES) facilities as required by NERC Standard TPL-001-4. PJM maintains a series of power flow and stability cases that represent a range of critical system conditions for a range of forecast demand levels and study years.

Validated modeling data helps to ensure that the dynamic information used in Planning and Operations analysis accurately represents expected generator behavior.

Compliance

Standard MOD-026-4 — Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions

“R1 Each Transmission Planner shall provide the following requested information to the Generator Owner within 90 calendar days of receiving a written request :

- Instructions on how to obtain the list of excitation control system or plant volt/var control function models that are acceptable to the Transmission Planner for use in dynamic simulation,*
- Instructions on how to obtain the dynamic excitation control system or plant volt/var control function model library block diagrams and/or data sheets for models that are acceptable to the Transmission Planner, or*
- Model data for any of the Generator Owner’s existing applicable unit specific excitation control system or plant volt/var control function contained in the Transmission Planner’s dynamic database from the current (in-use) models, including generator MVA base.”*

“R6. Each Transmission Planner shall provide a written response to the Generator Owner within 90 calendar days of receiving the verified excitation control system or plant volt/var control function model information in accordance with Requirement R2 that the model is usable (meets the criteria specified in Parts 6.1 through 6.3) or is not usable.

6.1. The excitation control system or plant volt/var control function model initializes to compute modeling data without error,

6.2. A no-disturbance simulation results in negligible transients, and

6.3. For an otherwise stable simulation, a disturbance simulation results in the excitation control and plant volt/var control function model exhibiting positive damping.

If the model is not usable, the Transmission Planner shall provide a technical description of why the model is not usable.

Instructions for obtaining MOD-026-4 data, providing validated modeling data, making updates if required and receiving confirmation that these changes are useable is available at PJM’s Planning Community website:

<https://pjm.force.com/planning/s/mod-026-and-mod-027-request>

PJM will only consider correspondence sent to Planning Community as an official request and/or submittal.

MOD-027-4 — Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions

“R1. Each Transmission Planner shall provide the following requested information to the Generator Owner within 90 calendar days of receiving a written request: [Violation Risk Factor: Lower] [Time Horizon: Operations Planning]

- Instructions on how to obtain the list of turbine/governor and load control or active power/frequency control system models that are acceptable to the Transmission Planner for use in dynamic simulation,*
- Instructions on how to obtain the dynamic turbine/governor and load control or active power/frequency control function model library block diagrams and/or data sheets for models that are acceptable to the Transmission Planner, or*
- Model data for any of the Generator Owner’s existing applicable unit specific turbine/governor and load control or active power/frequency control system contained in the Transmission Planner’s dynamic database from the current (in-use) models.”*

“R5. Each Transmission Planner shall provide a written response to the Generator Owner within 90 calendar days of receiving the turbine/governor and load control or active power/frequency control system verified model information in accordance with Requirement R2 that the model is usable (meets the criteria specified in Parts 5.1 through 5.3) or is not usable.

5.1. The turbine/governor and load control or active power/frequency control function model initializes to compute modeling data without error,

5.2. A no-disturbance simulation results in negligible transients, and

5.3. For an otherwise stable simulation, a disturbance simulation results in the turbine/governor and load control or active power/frequency control model exhibiting positive damping.

If the model is not usable, the Transmission Planner shall provide a technical description of why the model is not usable. [Violation Risk Factor: Medium] [Time Horizon: Operations Planning]”

Instructions for obtaining MOD-027-4 data, providing validated modeling data, making updates if required and receiving confirmation that these changes are useable is available at PJM’s Planning Community website:

<https://pjm.force.com/planning/s/mod-026-and-mod-027-request>

PJM will only consider correspondence sent to Planning Community as an official request and/or submittal.

Scheduling Staged Tests

PJM does not have a specific procedure for how to perform a staged test under MOD-026 and MOD-027. However, PJM requires resources to schedule this testing that must be reported as an “Informational” eDART ticket three days in advance. A follow up call shall be placed to PJM RE desk at 610-666-4507 immediately prior to testing to ensure they are aware of testing and potential impacts. If the resource is not dispatchable, the resource should be represented as “fixed gen” in Markets Gateway during the test period.

Generation Owner Guidance

[PJM has developed the guidance for Generation Owner to prepare and submit the document for NERC MOD-026 and NERC MOD-027. Guidance is available at the below link.](#)

<https://www.pjm.com/planning/services-requests/planning-modeling-submissions>

Development History

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| <u>Revision: 5</u> | <u>Date: xx/xx/22</u> |
| <u>SME:</u> | <u>DengJun Yan, Senior Engineer, System Planning Modeling and Support</u> |
| <u>Author:</u> | <u>DengJun Yan, Senior Engineer, System Planning Modeling and Support</u> <u>Gizella Mali, Sr. Analyst II, NERC Compliance</u> |
| <u>Reviewers:</u> | <u>David Egan, Manager, System Planning Modeling and Support</u> <u>Tom Foster, Manager, NERC Compliance</u> <u>RSCS Members</u> |
| <u>Approver:</u> | <u>Michael Del Viscio, Sr. Director, Compliance & Reliability Standards</u> |
| <u>Reason for Review</u> | <u>Cover to cover period review.</u> <u>Added 'Generation Owner Guidance' section</u> <u>Minor errata changes.</u> |

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| Revision: 4 | Date: 04/12/21 |
| Author: | Kyle Clifford, Senior Engineer, System Planning Modeling and Support |
| Reviewers: | David Egan, Manager, System Planning Modeling and Support Tom Foster, Manager, NERC Compliance |
| Approver: | Michael Del Viscio, Sr. Director, Compliance & Reliability Standards |
| Reason for Review | Added 'Scheduling Staged Tests' section |

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| Revision: 3 | Date: 09/28/18 |
| Author: | Kyle Clifford, Senior Engineer, System Planning Modeling and Support Stan Sliwa, Senior Engineer, Transmission Planning |
| Reviewers: | Jason Connell, Manager, System Planning Modeling and Support Mark Holman, Manager, NERC and Regional Coordination |
| Approver: | Robert Eckenrod, Chief Compliance Officer |
| Reason for Review | Annual Review. Updated process to utilize the PJM Planning Community website instead of the email address NERC.Transmission.Planner@pjm.com as the official location to handle MOD-026-1/MOD-027-1 requests. |

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| Revision: 2 | Date: 08/03/17 |
| Author: | Bill Harm, Senior Consultant, NERC and Regional Coordination Stan Sliwa, Senior Engineer, Transmission Planning |
| Reviewers: | Mark Sims, Manager, Transmission Planning Mark Holman, Manager, NERC and Regional Coordination |
| Approver: | Robert Eckenrod, Chief Compliance Officer |
| Reason for Review | Annual Review. |

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| Revision: 1 | Date: 08/26/15 |
| Author: | Bill Harm, Senior Consultant, NERC and Regional Coordination Yonas Habtemichael, Engineer Transmission Planning |
| Reviewers: | Mark Sims, Manager, Transmission Planning Mark Holman, Manager, NERC and Regional Coordination Robert Eckenrod, Counsel, Office of General Counsel |
| Approver: | Tom Bowe, Executive Director, Reliability and Compliance |
| Reason for Review | Annual Review. Included text to clarify the process to obtain, change, and confirm MOD-027 data. |

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| Revision: 0 | Date: 6/24/2014 |
| Author: | Bill Harm, Senior Consultant, NERC and Regional Coordination Yonas Habtemichael, Engineer Transmission Planning |
| Reviewers: | Mark Sims, Manager, Transmission Planning Stephanie Monzon, Manager, NERC and Regional Coordination Robert Eckenrod, Counsel, Office of General Counsel |
| Approver: | Tom Bowe, Executive Director, Reliability and Compliance |
| New CB | Standards become enforceable 7/1/2014. |