MIDWEST RELIABILITY ORGANIZATION
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[Registered Entity Name]

NERC ID: [NCRXXXXX]

MOD-026-1 - Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions, R2

3rd Quarter 2018 Self-Certification

Instructions

1. Populate the cover page by adding your entity's name and NERC identification number.
2. Complete the tasks listed under **Assessment Guidance**.
3. Log into **webCDMS** and complete your self-certification response.
4. Submit via the MRO EFT Encrypted FTP2 Site:
    a. This completed Worksheet; and
    b. Specific evidence requested within this document. Please make sure to use unique file names for each evidence file submitted, and identify within your narratives which specific evidence files support each conclusion made. These references and the use of unique file names helps facilitate and expedite MRO's review of the Self-Certification work that has been performed.

Scope

MOD-026-1 - Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions – R2

R2. *Each Generator Owner shall provide for each applicable unit, a verified generator excitation control system or plant volt/var control function model, including documentation and data (as specified in Part 2.1) to its Transmission Planner in accordance with the periodicity specified in MOD-026 Attachment 1. [Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]*

2.1. *Each applicable unit's model shall be verified by the Generator Owner using one or more models acceptable to the Transmission Planner. Verification for individual units less than 20 MVA (gross nameplate rating) in a generating plant (per Section 4.2.1.2, 4.2.2.2, or 4.2.3.2) may be performed using either individual unit or aggregate unit model(s), or both. Each verification shall include the following:*

2.1.1. *Documentation demonstrating the applicable unit's model response matches the recorded response for a voltage excursion from either a staged test or a measured system disturbance,*

2.1.2. *Manufacturer, model number (if available), and type of the excitation control system including, but not limited to static, AC brushless, DC rotating, and/or the plant volt/var control function (if installed),*

2.1.3. *Model structure and data including, but not limited to reactance, time constants, saturation factors, total rotational inertia, or equivalent data for the generator,*

2.1.4. *Model structure and data for the excitation control system, including the closed loop voltage regulator if a closed loop voltage regulator is installed or the model structure and data for the plant volt/var control function system,*

2.1.5. *Compensation settings (such as droop, line drop, differential compensation), if used, and*

2.1.6. *Model structure and data for power system stabilizer, if so equipped.*

M2. *The Generator Owner must have and provide dated evidence it verified each generator excitation control system or plant volt/var control function model according to Part 2.1 for each applicable unit and a dated transmittal (e.g., electronic mail message, postal receipt, or confirmation of facsimile) as evidence it provided the model, documentation, and data to its Transmission Planner, in accordance with Requirement R2.*

Purpose:

3. To verify that the generator excitation control system or plant volt/var control function[1] 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.

Applicability:

4.1 Functional Entities:

4.1.1 Generator Owner

4.1.2 Transmission Planner

4.2. Facilities:

For the purpose of the requirements contained herein, Facilities that are directly connected to the Bulk Electric System (BES) will be collectively referred as an "applicable unit" that meet the following:

4.2.1 Generation in the Eastern or Quebec Interconnections with the following characteristics:

4.2.1.1 Individual generating unit greater than 100 MVA (gross nameplate rating).

4.2.1.2 Individual generating plant consisting of multiple generating units that are directly connected at a common BES bus with total generation greater than 100 MVA (gross aggregate nameplate rating).

4.2.4 For all Interconnections:

- A technically justified[2] unit that meets NERC registry criteria but is not otherwise included in the above Applicability sections 4.2.1, 4.2.2, or 4.2.3 and is requested by the Transmission Planner.

[1] Excitation control system or plant volt/var control function:

a. For individual synchronous machines, the generator excitation control system includes the generator, exciter, voltage regulator, impedance compensation and power system stabilizer.

b. For an aggregate generating plant, the volt/var control system includes the voltage regulator & reactive power control system controlling and coordinating plant voltage and associated reactive capable resources.

[2] Technical justification is achieved by the Transmission Planner demonstrating that the simulated unit or plant response does not match the measured unit or plant response.

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Assessment Guidance

1. Provide a list of all applicable facilities. If the entity does not own applicable facilities or this requirement is not applicable to the entity, skip to step 6.

Applicable Facilities	
Filename	
Comments	

2. Select a random sample from your population identified in step 1 using the following sampling logic. (A random sample can be selected using statistical functions available in Microsoft Excel or through use of RAT-STATS, a free sampling tool available from the U.S. Department of Health & Human Services Office of Inspector General.)

From the population:

a. Select at least 10% of the population (maximum number sampled 10) making sure at least five are sampled (e.g. if fewer than 50 exist in your population, select at least five).
b. If five or fewer total exist in the population, select the whole population.

Also provide supporting evidence of the sampling process used including: (1) full population, (2) samples selected, and (3) output from the statistical function used to perform the sampling (e.g. RAT-STATS output).

File(s) Contents	***File Name / Page(s)***
Full Population	
Samples Selected	
Statistical Function Output	
Comments	

3. For each sampled facility, please provide documentation and data (as specified in Part 2.1) to ensure that generator owner verified its generator excitation control system or its plant volt/var control function model to its Transmission Planner in accordance with the periodicity specified per Attachment 1 of MOD-026-1. Enter the evidence filenames below; also, please upload these files via the EFT server. Please add more rows as needed.

Verification of each sampled facility	
Facility #1 (Name(s))	
Verification Filename(s)	
Comments	
Facility #2 (Name(s))	
Verification Filename(s)	
Comments	
Facility #3 (Name(s))	
Verification Filename(s)	
Comments	
Facility #4 (Name(s))	
Verification Filename(s)	
Comments	

4. For all of the sampled facilities listed in step 3, provide evidence to show both:
(1) the verification was submitted to its Transmission Planner and
(2) the Transmission Planner found the model(s) acceptable. Also, provide the date the verification was due, the basis for the due date, and the date it was actually submitted.
Please add more rows as needed.

Verification of each sample facility	
Facility #1 (Name(s))	
Submission of Verification (Filename(s))	
Due Date	
Basis for Due Date	
Submission Date	
Evidence to show Acceptance (Filename(s))	
Facility #2 (Name(s))	
Submission of Verification (Filename(s))	
Due Date	
Basis for Due Date	
Submission Date	
Evidence to show Acceptance (Filename(s))	
Facility #3 (Name(s))	
Submission of Verification (Filename(s))	
Due Date	
Basis for Due Date	
Submission Date	
Evidence to show Acceptance (Filename(s))	
Facility #4 (Name(s))	
Submission of Verification (Filename(s))	
Due Date	
Basis for Due Date	
Submission Date	
Evidence to show Acceptance (Filename(s))	

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5. Was each sample selected in step 3 verified, and was this verification submitted in accordance with the periodicity specified in Attachment 1? Submit either "Yes" or "No" below and then skip step 6.

   ☐ Yes, respond "Compliant" for R2 to the Self-Certification in webCDMS. Include a comment summary and upload supporting documentation to the FTP2 server.

   ☐ No, respond "Not Compliant" for R2 to the Self-Certification in webCDMS. Include a comment summary based on potential issues and upload supporting documentation to the FTP2 server.

6. If a registered entity does not own any applicable facilities or the registered entity believes this requirement is not applicable to it, submit either "Do not own" or "Not Applicable" below.

   ☐ Do not own, respond "Do Not Own" for R2 to the Self-Certification in webCDMS. Include comments supporting the "Do Not Own" response and upload supporting documentation to the FTP2 server.

   ☐ The entity does not meet the applicability requirements, respond "Not Applicable" for R2 to the Self-Certification in webCDMS. Include comments supporting the "Not Applicable" response and upload supporting documentation to the FTP2 server.

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Document Submittals

MRO requires copies of the following be submitted with the self-certification response:

a) This worksheet;
b) Supporting documentation referenced in the Assessment Guidance;

Please make sure to use unique file names for each evidence file submitted, and identify within your responses to the steps above which specific evidence files support each conclusion made. These references and the use of unique file names helps facilitate and expedite MRO's review of the Self-Certification work that has been performed.

All other data related to the registered entity's analysis and self-certification response are to be retained for at least 180 days after the submission date. MRO staff may request submission of additional information at a later date to verify accuracy of self-certification submittals.