



**WECC**

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**WECC Generator Unit Model Validation Guideline**

April 23, 2020

# WECC Generating Unit Model Validation Guideline

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## Introduction

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Accurate models of generators and associated controls are necessary for realistic simulations of the electric power system of the western interconnection. Baseline testing and periodic performance validation are required to ensure that the dynamic models and databases that are used in the grid simulations are accurate and up to date.

## Applicability

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Facilities Affected: This Guideline statement applies to generating facilities connected to the Western Electricity Coordinating Council (WECC) transmission grid at 60 kV or higher voltage (both new and existing, synchronous and non-synchronous) with single unit capacity of 10 MVA and larger, or facilities with aggregate capacity of 20 MVA and larger.

1. Entity Responsible:
  - a. Generator Owner
  - b. Transmission Planner
  - c. Regional Reliability Organization

## References

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The following documents referred to in this Guideline are posted in the “Generator Testing Program” area on the WECC website at [www.wecc.org]:

1. Generating Facility Data Requirements
2. Generating Unit Baseline Test Requirements
3. Generating Unit Model Validation Requirements
4. List of WECC-Approved Models
5. Generator Test Exemption Procedure

## Effective Date

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Approved by the Model Validation Work Group at the meeting April 23, 2020.



## Requirements

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### Generator Owner Responsibilities

#### Generating Facility Data

1. The Generator Owner should provide to the Transmission Planner the information for the Generating Facility as specified in the Generating Facility Data Requirements document.
2. The Generator Owner should review, verify and update the Generating Facility data when any of the following conditions occur:
  - a. No later than 180 days after the new Generating Facility is released for Commercial Operation.
  - b. No later than 180 days after an existing generating unit re-starts Commercial Operation with modified equipment, control settings, or software that influences the behavior of the plant with respect to the grid (e.g. excitation retrofit, additional control function within a controller, turbine modification, voltage regulator and power system stabilizer tuning modification, etc.)
  - c. At least once every five years.

#### Baseline Testing

1. The Generator Owner should test the generating unit and validate its model data.
2. The Generator Owner should provide test and validation reports to its **Transmission Planner:**
  - a. For guidance on the test requirements, refer to the current Generating Unit Baseline Test Requirements document.
3. The testing and associated validation by simulation should be performed on a generating unit when any of the following conditions have occurred:
  - a. If the generating project has not been certified by WECC under Generator Testing Program since January 1997.
  - b. No later than 180 days after the new Generating Facility is released for Commercial Operation. In the meantime, the Generator Owner will provide the best available model data supplied by the equipment manufacturer using the WECC approved models including commissioning reports.
  - c. No later than 180 days after an existing generating unit re-starts Commercial Operation with modified equipment, control settings, or software that influences its behavior with respect to the grid (e.g. excitation retrofit, additional control function within a controller, turbine modification, voltage regulator and power system



- stabilizer tuning modification, etc.), only those portions of the generating unit model that can be influenced by the modifications need to be tested and validated.
- d. No later than 180 days after the Generator Owner is notified by WECC that there is evidence that the modeled response of a Generating Facility does not correlate with the actual response, except in instances where the lack of correlation was caused by equipment problems that were subsequently corrected.
  - e. The Generator Owner should notify the Transmission Planner when generating unit re-testing and validation are required to maintain compliance with this guideline.

### Model Data Validation

1. The Generator Owner should perform model data validation for all units, and provide a report to its Transmission Planner at least once every five years. Schedule of model validation should be coordinated between the Generator Owner, Transmission Planner and Transmission Operator.
  - a. The Generator Owner should notify the Transmission Planner when their generating unit re-testing and validation are required to maintain compliance with this guideline.
  - b. The “Generating Facility Model Data Validation Requirements” document describes acceptable methods of model data validation by performance comparison.
2. Generator Owner should verify that generator control limiters, protection and equipment capabilities are consistent with those reported in the model(s).

### Transmission Planner Responsibilities

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#### Model Data Validation

1. The Transmission Planner should maintain a current list of all Generating Facilities in its planning area that are subject to testing and model data validation.
  - a. This list should be made available to WECC upon request.
  - b. For each Generating Facility, the list should include the status of compliance with this Generating Unit Model Validation Guideline, including report dates.
2. Disturbance data recorded either at the generator or at the point of interconnection can be used for model data validation.
  - a. If the Transmission Planner has performance monitoring equipment at the point of interconnection, the data should be made available to the Generator Owner, upon request.

### Facility Data and Validation Reports

1. Upon receipt of model data validation reports from Generator Owners, the Transmission Planner should verify that the WECC approved model parameters provided by the Generator Owner are adequately validated by comparing the simulated response of the unit against either the recorded baseline tests or a disturbance response as the case may be, and follow the data checking procedures as provided by WECC, within 30 calendar days after receipt from the Generator Owner.
  - a. The Transmission Planner will work with the Generator Owner on resolving the differences between the simulated response of the unit against either the recorded baseline tests or actual responses of the Generating Facility to grid disturbances. The Transmission Planner will inform WECC if the differences cannot be resolved.
2. The Transmission Planner should submit the accepted validated models to WECC and should notify the Generator Owner that the models are accepted.
3. If a model data validation report is rejected, the Transmission Planner should inform the Generator Owner of the reason(s) for the rejection. The Transmission Planner will work with the Generator Owner to expedite resolution of any issues preventing acceptance of the model data validation report.
  - a. Issues preventing acceptance of the model data validation report that do not require additional testing should be resolved within 30 days of notification of the reason(s) for rejection.
  - b. Issues preventing acceptance of the model data validation report that require additional testing should be resolved within 90 days of notification of the reasons(s) for rejection.
  - c. The Generator Owner should provide a revised model data validation report to its Transmission Planner.
  - d. The Transmission Planner will refer issues to WECC if the issues cannot be resolved.

### WECC Responsibilities

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1. WECC should maintain a master data file with the current validated models.
2. WECC should review and approve the generator testing and model validation reports.
3. WECC should verify that the models are stable and that the modeled system responses reasonably match power system performance.
4. WECC should verify compliance with the certification requirements, issue certificates to the Generator Owners and notify Transmission Planner.
5. WECC has the final authority to determine the suitability of testing and validation of the models.



6. WECC periodically should audit the Generator Owners and Transmission Planners on the status of generator testing and model validation.
7. WECC periodically should review technical requirements listed in section A4. Any changes in the requirements will go through a WECC "due process."

### Exemptions

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1. WECC may grant exemptions to the Generator Owners in rare situations where a unique condition or equipment configuration exists that would preclude or delay testing and model data validation.
2. The Generator Owner may request an exemption by submittal to WECC through the Transmission Planner. The request should include justification for the exemption. WECC should respond to the request within 90 days after receipt.
  - a. The procedure is described in the "Procedure for Handling Requests for Exemption Regarding the WECC Generator Test Guideline" document.

### Definitions

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**Generator Owner** is defined in NERC Reliability Functional Model.

**Transmission Planner** is defined in NERC Reliability Functional Model.

**Commercial Operation** is defined in FERC 2003-A Standardization of Generator Interconnection Agreements and Procedures.

**Generating Facility** is defined in FERC 2003-A Standardization of Generator Interconnection Agreements and Procedures.

**Validation.** Within the context of this guideline and associated documents, Validation is used synonymously with verification and refers to the process of selecting parameters for the appropriate WECC-approved models for generating units and demonstrating that the model behavior is consistent with the generating unit behavior by comparison of simulation to test recording.

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## Additional Resource Information

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- WECC Generating Facility Data, Testing and Model Validation Requirements [NERC Reliability Guideline Power Plant Dynamic Model Verification using PMUs](#).

## Version History

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Modified Date	Modified By	Description
4/23/2020	MVWG	Changed from Policy to Guideline