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7/9/2026

Measurement-Based Interpretation of Oscillation Severity and Reliability Impact

SMWG Work Plan Item

NASPI EATT Quarterly Task Team Meeting

Kat Sico

NERC Synchronized Measurement Working Group (SMWG)

SMWG Purpose:

- To provide technical guidance and support for the use of synchronized and high-resolution measurements to enhance the reliability and resilience of the bulk power system (BPS) across North America.
- The use of such synchronized, high-resolution measurements helps BPS planners and operators to enhance their models, situational awareness, and capabilities to assess complex electrical system interactions, identify unique system behaviors, and aid in the day-to-day roles of NERC's Registered Entities.
- The SMWG serves as the body of technical experts who seek to continually improve the adoption and use of new synchronized measurement technologies and leverage their capabilities to improve the reliability of the BPS.

NERC Synchronized Measurement Working Group (SMWG)

- New Work Items:
  - **Measurement-Based Interpretation of Oscillation Severity and Reliability Impact (Volunteers Needed)**
    - ✓ **Looking for RC/ISO SMEs and Experts in the analysis of power system oscillations to collaborate on this work item.**
  - **IBR-Driven Inertia Risk Awareness Using Synchronized Measurements**
- Some of the Work Plan items wrapping up soon.
  - **Roadmap for Integrating Synchrophasors into Real-time Operations**
  - **PMU Data Accuracy Maintenance Manual**
  - **Role-Based Synchrophasor Training**
- Interested in Joining/Contributing?
  - Contact Kat Sico (kat.sico@duke-energy.com) or Nadia Smith (nadia.smith@nerc.net)

Want to be added to the SMWG Meeting Distribution List?

Seen an oscillation?

Find out if it meets the criteria for SMWG reporting.

Measurement-Based Interpretation of Oscillation Severity and Reliability Impact

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Goal: Enhance Bulk Power System reliability by developing synchronized-measurement-based methods to interpret the severity and reliability impact of oscillatory behavior, enabling operators and planners to distinguish benign oscillations from those requiring operational awareness, coordination, or corrective action.

Question: Should operator be worried about a particular oscillation or not?

Measurement-Based Interpretation of Oscillation Severity and Reliability Impact

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Scope:

This work develops interconnection-wide and Reliability Coordinator–level guidance for interpreting oscillation severity using synchronized measurements. Individual utility data and experiences inform the analysis, but findings are presented as measurement-based, non-prescriptive industry guidance (not compliance thresholds and not vendor/tool specific).

Measurement-Based Interpretation of Oscillation Severity and Reliability Impact

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The RC/Operator wants to know:

1. Is the oscillation growing or sustained?
2. Is it widespread or localized?
3. Is it interacting with limits, controls, or protection?
4. Is it affecting reliability outcomes (flows, stability margin, control action, alarms, operator burden)?
5. Do we need to coordinate or take action, or simply monitor?

Measurement-Based Interpretation of Oscillation Severity and Reliability Impact

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Measurement-Based Interpretation of Oscillation Severity and Reliability Impact (Suggested High-Level Work Plan)

1. Define “Severity” and “Reliability Impact” in Practical, Measurable Terms
2. Build a Measurement-Based Severity Interpretation Framework (Not a Single Metric)
3. Validate and Calibrate Using Real Events and “Benign” Examples
4. Develop Operator/Planner Use Cases and Recommended Practices (Non-Prescriptive)
5. Publish SMWG Guidance

Measurement-Based Interpretation of Oscillation Severity and Reliability Impact

1) Define “Severity” and “Reliability Impact” in Practical, Measurable Terms

Establish a common vocabulary and measurement framing so different entities interpret oscillations consistently using PMU/synchronized data.

Key outputs:

- A short set of severity dimensions (e.g., amplitude, damping/growth, persistence, geographic extent, affected interfaces/assets, proximity to limits/controls).
- A clear distinction between oscillation detection and oscillation concern (i.e., “found it” vs. “it matters”).

Measurement-Based Interpretation of Oscillation Severity and Reliability Impact

2) Build a Measurement-Based Severity Interpretation Framework (Not a Single Metric)

Create a tiered interpretation approach that combines multiple measurement features into an overall “operator concern” characterization.

What this looks like:

- A simple decision framework (e.g., Low / Moderate / High concern) driven by observable attributes from PMUs.
- Guidance for separating common oscillation categories (e.g., local plant/control, inter-area, forced oscillation–like signatures) in measurement terms—without requiring model details.

Key outputs:

A draft severity rubric and “what to look for” guidance using synchronized measurements.

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3) Validate and Calibrate Using Real Events and “Benign” Examples

Use a curated set of anonymized case examples to test whether the framework aligns with operator intuition and known system impacts. Include both:

- Events that were serious (required coordination/corrective action), and
- Events that were noticeable but benign (no reliability impact).

Key outputs:

- A compact case library (sanitized) with consistent measurement summaries.
- Refined severity interpretation criteria based on what consistently differentiates “benign vs. concerning.”

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4) Develop Operator/Planner Use Cases and Recommended Practices (Non-Prescriptive)

- Translate the framework into practical workflows for:
- Real-time / near-real-time awareness (RC/operator perspective)
- Post-event analysis (planning and engineering perspective)
- Cross-entity communication (what to share, how to describe it consistently)

Key outputs:

- A short “When to worry” playbook: what indicators suggest escalation, coordination, or deeper analysis.
- Suggested communication template for oscillation notifications (frequency, mode estimate, affected area, confidence, observed impacts).

Measurement-Based Interpretation of Oscillation Severity and Reliability Impact

5) Publish SMWG Guidance and Coordinate with Related Groups

Package results into an SMWG deliverable and align terminology with related NERC/industry efforts to avoid conflicting interpretations.

Key outputs:

- SMWG technical guidance report (or white paper)
- Optional: training/webinar for operators and planners highlighting the framework and case examples