NASPI SAR PROPOSAL
FOR REAL-TIME STABILITY MONITORING

CRSTT MEETING WINTER 2025

Outline

- Review of SAR Proposal
- IRO-002-7 WECC Variance
- NASPI SAR Task Team Activities
- NERC SAR Process
- Discuss potential NERC requirements and issues
- Next Steps

Review of SAR Proposal

Background

The next major blackout may be the result of instability as we are not required:

- to monitor in real-time
- to have an operating plan
- to communicate to each other during these situations

Main Drivers:

- Complexity in the power system resulting from:
  - DERs
  - Retired system inertia
  - Increased penetration of IBRs (battery, wind, solar, etc.)
  - Grid forming devices
  - Reduced frequency response
- Changes to NERC FAC-011-4 requirements
- WECC Variance IRO-002-7
- Potentially unclear or lack of enforceable real-time stability monitoring requirements in NERC standards

Purpose

To propose the creation of a NASPI task team to investigate the development of a NERC Standard Authorization Request (SAR) to accomplish the following:

- Update required RC's and TOPs NERC standards to ensure these entities monitoring stability in real-time operations and have an operating plan to address these events
- Updates the RTA definition to recognize the requirements for monitoring stability in the real-time assessment timeframe

Gap in Real-time Assessment Tools

Pre-Contingent – real-time	Post-Contingent – lookahead
– SCADA – State Estimator – WAMS • Island Detection • Oscillation Monitoring – Magnitude/Damping – Location • Angular Separation	– RTCA – VSA – TSA – CA Cascade – N-1-1 – Etc.

NOTE: This is not an exhaustive list. Many companies leverage other in-house applications and other advanced power system applications.

FAC-011-4

Significant changes to FAC-011 pertaining to monitoring of pre and post contingent system voltages and stability.

R4.1 Specify stability performance criteria, including any margins applied. The criteria shall, at a minimum, include the following: **steady-state voltage stability; transient voltage response; angular stability; and System damping**.

Monitor in RTA for 6.1.4. Instability, Cascading or uncontrolled separation that adversely impact the reliability of the Bulk Electric System does not occur.

NOTE: SDT added confusion with the following footnote:

- "Stability evaluations and assessments of instability, Cascading, and uncontrolled separation can be performed using real-time stability assessments, predetermined stability limits or other offline analysis techniques."

SAR Proposal

Form a NASPI task team to help lead the effort on the requirements for monitoring stability in real-time as discussed in the previous slides.

This task force will develop and propose a SAR that makes stability monitoring in real-time a requirement by suggesting changes within existing or potentially new NERC standards and definitions.

Review what other jurisdictions from other parts of the world are required to do? Utilities in other areas already rely exclusively on WAMS technology for monitoring stability, inertia, and corrective action (Iceland, Brazil, UK, etc). Task force to investigate and report on these instances

IRO-002-7 WECC Variance

IRO-002-7 WECC Variance

WECC is ahead of the curve in North America

- Variance requires a common Western Interconnection-wide methodology, addressing modeling and monitoring, in coordination with other Reliability Coordinators

Most WECC RC/TOPs monitor for oscillations in their footprint using a wide area monitoring system and PMUs.

A great start, but this too can benefit from the proposed changes in this SAR.

IRO-002-7 WECC Variance

- Each West RC's monitoring approach must address:
  - Alarming for low damping conditions of inter-area modes.
  - Alarming for inter-area mode oscillations.
  - Provide visualization of inter-area oscillations via mode shape.
- Mandate started in April 2020.
- The standard does not direct RC's to take specific actions. It only requires monitoring.
- For SPP, RC's/Shift Engineers communicate oscillation information with TOs and other West RCs.

IRO-002-7 WECC Variance

How has this variance changed SPP's treatment of PMU data in the West?

I. SPP has formalized procedures for operator actions

II. SPP upgraded to a more highly-available dual-site PMU system

III. SPP has alerting and PMU displays set up for operator monitoring in the control room

IV. SPP monitors West PMU data quality and availability more closely

What has changed for TO's/data providers?

I. Data providers are requested to follow up on data outages, especially for PMUs used to monitor critical system modes. This happens outside of business hours if necessary.

IRO-002-7 WECC Variance

What benefits have come from this requirement?

I. RCs in the West have more focus on system dynamics
II. RCs in the West communicate about dynamic concerns and low damping conditions
III. Better awareness across the interconnect of system issues
IV. Better data quality as a result of more focus on the results
V. Easier justification for support and resources

IRO-002-7 WECC Variance

What hasn't changed as a result of this variance?

I. SPP's PMU data is still treated as non-CIP critical

II. SPP does not require data providers to protect PMU data under CIP

III. SPP has not required data providers to install new PMU devices

NASPI SAR Task Team Activities

WHAT CAN NASPI DO …

NASPI Task Team Activities

Create a Terms of Reference including goals and timeline

Meet virtually on a periodic basis (monthly)

Research and determine potential requirements for the NERC SAR

Develop the NERC SAR document and determine internal support/approval to proceed.

Present to the NERC EMS Working Group to gain RC and TOP support.

Present to NERC RTOS

Participate in the NERC SAR process

Opportunity to participate in the NERC Standard Drafting Team

NASPI can help facilitate the development of implementation guidelines

NERC SAR Process

WHAT'S INVOLVED IN DEVELOPING AND SUBMITTING THE SAR?

NERC SAR Process

Information from NERC website:

A SAR is the form used to document the scope and reliability benefit of a proposed project for one or more new or modified Reliability Standards or definitions, as well as document the benefit of retiring one or more approved Reliability Standards.

Any entity or individual, including NERC committees or subgroups and NERC Staff, can propose the development of a new or modified Reliability Standard, or propose the retirement of a Reliability Standard (in whole or in part).

Submit completed SARs via the NERC Helpdesk by selecting “Standards” from the “Service drop-down menu then “Standards Authorization Request” under “Category”.

NERC SAR Process

NERC Reliability Standards Staff will review each SAR and work with the submitter to verify that all required information is provided and that the submitter wishes to continue the process.

All properly completed SARs are submitted to the Standards Committee (SC) for action. The SC has the authority to approve the posting of all SARs for projects that propose (i) developing a new or modified Reliability Standard or definition or (ii) propose retirement of an existing Reliability Standard (or elements thereof).

The SC will determine if the SAR is sufficiently complete to guide Reliability Standard development and whether the SAR is consistent with the SPM.

NERC SAR Process

The Standards Committee shall take one of the following actions:

- Accept the SAR;
- Remand the SAR back to the requestor or to NERC Reliability Standards Staff for additional work;
- Reject the SAR. If rejected, the SC must provide a written explanation for rejection to the submitter within 10 days of the decision; or
- Delay action on the SAR pending one of the following: (i) development of a technical justification for the proposed project; or (ii) consultation with another NERC Committee to determine if there is another approach to addressing the issue raised in the SAR.
- If the SC accepts a SAR, the project will be added to the list of approved projects and assigned a priority relative to all other projects under development identified in the Reliability Standards Development Plan.

NERC SAR Process

NERC Document FINAL - ROP Appendix 3A SPM v5

STEP 1: Standard Authorization Request Submitted Standards Committee Accepts SAR, Authorizes Posting, Authorizes Solicitation of Nominees for a Drafting Team

STEP 2: Post SAR for 30-day Informal or Formal Comment Period

STEP 3: Standards Committee Appoints Drafting Team, Team Responds to Comments (as required)

STEP 4: Standards Committee Authorizes Standards Drafting

NERC SAR Process

STEP 5: Develop Draft of Standard, Implementation Plan and VRFs and VSLs If needed, conduct Field Test of Requirements Conduct Quality Review Collect Informal Feedback

STEP 6: Obtain Standards Committee Approval to Post for Formal Comment and Ballot

STEP 7: Formal 45-day Comment Period and Ballot: Form Ballot Pool During First 30 days of 45-day Comment Period, Conduct Ballot During Last 10 Days of Comment Period, Conduct Non-Binding Poll of VRFs and VSL

NERC SAR Process

STEP 8: Post Response to Comments

STEP 9: Conduct 10-day Final Ballot Alternative: Conclude the Standards Action, if criteria are met

STEP 10: Submit Reliability Standard and Implementation Plan to BOT for Adoption

STEP 11: Submit all BOT-approved documents to Applicable Governmental Authorities for approval

Discuss potential NERC requirements and issues

Potential NERC Requirements

How prescriptive or not should the requirements be?

Potential changes to NERC requirements:

- Updates to the RTA/OPA definitions to require monitoring of stability as per FAC-011-4 requirements
- Update required standards for RC's and TOPs to perform the following:
  - Develop an operating plan that outlines actions to be taken when instability situations occur, including: Monitoring requirements, Communication, Mitigation plans
  - Add potential requirements to Monitor for undamped oscillations and source location, the formation of islands, angular separation, etc.

Potential Issues

Does this require additional PMU installations?

Would this require WAMS systems?

Would this require entities to protect their data under CIP?

Next Steps

Next Steps

Create the NASPI Task Team

Develop TOR for approval by NASPI leadership

Research existing stability monitoring requirements from external jurisdictions

Develop SAR document and initiate SAR process with NERC

Present at NERC EMS WG and NERC Real-time Operating Subcommittee (RTOS)

Thank You!