

**NERC**

NORTH AMERICAN ELECTRIC  
RELIABILITY CORPORATION

# Project 2010-05.2 – SPS

Phase 1 – Definition of Remedial Action Scheme

SPS Standard Drafting Team

Industry Webinar

September 23, 2014

**RELIABILITY | ACCOUNTABILITY**



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## NERC Antitrust Guidelines

- It is NERC's policy and practice to obey the antitrust laws and to avoid all conduct that unreasonably restrains competition. This policy requires the avoidance of any conduct that violates, or that might appear to violate, the antitrust laws. Among other things, the antitrust laws forbid any agreement between or among competitors regarding prices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that unreasonably restrains competition.

## Disclaimer

- Participants are reminded that this meeting is public. Notice of the meeting was posted on the NERC website and widely distributed. The notice included the number for dial-in participation. Participants should keep in mind that the audience may include members of the press and representatives of various governmental authorities, in addition to the expected participation by industry stakeholders.
- Wording in this presentation is used for illustrative purposes and may not reflect the exact draft of the posted standard.

- One-hour webinar
  - Presentation
    - Project Scope and Background
    - Definition Overview
    - Identify changes from Draft 1 of the proposed RAS definition
  - Informal Question and Answer Session
    - You may submit questions at any time via the chat feature
    - Presenters will attempt to address each question
    - Some questions may require SDT discussion

Member	Entity
Gene Henneberg (Chair)	NV Energy / Berkshire Hathaway Energy
Bobby Jones (Vice Chair)	Southern Company
Amos Ang	Southern California Edison
John Ciufu	Hydro One Inc.
Alan Engelmann	ComEd / Exelon
Davis Erwin	Pacific Gas and Electric
Sharma Kolluri	Entergy
Charles-Eric Langlois	Hydro-Quebec TransEnergie
Robert J. O'Keefe	American Electric Power
Hari Singh	Xcel Energy

- Industry Stakeholders
  - SDT Members
- NERC Staff
  - Al McMeekin, Standards Developer – Standards
  - Bill Edwards, Counsel, Standards – Legal



# Project Scope and Background

Al McMeekin, NERC Standards Developer



## Phase 1

- The SDT will revise the NERC Glossary of Terms definition for a Remedial Action Scheme (RAS) or Special Protection System (SPS)

## Phase 2

- The SDT will address the six existing SPS-related standards:
  - PRC-012-0 Special Protection System Review Procedure
  - PRC-013-0 Special Protection System Database
  - PRC-014-0 Special Protection System Assessment
  - PRC-015-0 Special Protection System Data and Documentation
  - PRC-016-0.1 Special Protection System Misoperations
  - PRC-017-0 Special Protection System Maintenance and Testing

- NERC Project 2010-05.2 Special Protection Systems is phase 2 of Protection Systems
  - Standards Authorization Request (SAR) posted for a 30-day informal comment period February 18–March 19, 2014
  - The SPCS/SAMS straw-man definition of SPS posted for a 30-day informal comment period March 11–April 9, 2014
  - The first draft of the revised definition of RAS posted for a 45-day formal comment and ballot period June 11–July 25, 2014
    - 58.9% approval
  - The second draft of the revised definition of RAS posted for a 45-day formal comment and ballot period August 29 – October 14, 2014



# **RAS Definition Overview**

Gene Henneberg, SDT Chair

- Provides the clarity and specificity needed to consistently identify what equipment or schemes qualify as RAS
- Promotes the consistent application of the RAS-related NERC Reliability Standards

- The SDT is recommending to retain the term Remedial Action Scheme (RAS) and retire the term Special Protection System (SPS).
- The reasons for RAS:
  - A single term will promote consistency
  - RAS is a more descriptive term for the installation
  - Eliminates the confusion associated with the three defined terms “Special Protection System,” “Protection System,” and “System”
    - Protection System components are often used to build RAS

- Kept basic framework of SAMS/SPCS
  - Corrective actions that a RAS may take
  - Schemes potentially considered as RAS
  - List of objectives of why a RAS is installed
  - List of exclusions for individual schemes that are not considered RAS
- Did not include the classification “Types” listed in the SAMS/SPCS definition
  - SDT decided the classification “Types” would be more appropriately addressed during the standards development phase of the project

## ***Remedial Action Scheme (RAS)***

A scheme designed to detect predetermined System conditions and automatically take corrective actions that may include, but are not limited to, ~~curtailing~~ adjusting or tripping generation ~~or other sources, curtailing or~~ (MW and Mvar), tripping load, or reconfiguring a System(s). RAS accomplish ~~one or more of the following~~ objectives such as:

- Meet requirements identified in the NERC Reliability Standards;
- Maintain Bulk Electric System (BES) stability;
- Maintain acceptable System BES voltages;
- Maintain acceptable BES power flows;
- Limit the impact of Cascading or extreme events.
- ~~Address other Bulk Electric System (BES) reliability concerns.~~

~~These schemes are not Protection Systems; however, they may share components with Protection Systems.~~

The following do not individually constitute a RAS:

## ***Remedial Action Scheme (RAS)***

A scheme designed to detect predetermined System conditions and automatically take corrective actions that may include, but are not limited to, **adjusting** or tripping generation (**MW and Mvar**), **tripping** load, or reconfiguring a System(s). RAS accomplish objectives **such as**:

- Meet requirements identified in the NERC Reliability Standards;
- Maintain **Bulk Electric System (BES)** stability;
- Maintain acceptable **BES** voltages;
- Maintain acceptable **BES** power flows;
- Limit the impact of Cascading or **extreme events**.

The following do not individually constitute a RAS:





# Proposed Definition: Exclusions

SDT Members

## Exclusions

List of 14 exclusions – the following changes were made in response to comments:

- 7 exclusions remain unchanged
- 4 exclusions edited to enhance clarity of intent
- 2 exclusions (UFLS and UVLS) merged/edited into one
- 2 new exclusions added for clarity – (a) and (n)

## Exclusions Consistent with Existing SPS/RAS Definition

- a. Protection Systems installed for the purpose of detecting Faults on BES Elements and isolating the faulted Elements
- b. Schemes for automatic underfrequency load shedding (UFLS) and automatic undervoltage load shedding (UVLS) comprised of only distributed relays
- c. Out-of-step tripping and power swing blocking
- d. ~~Autoreclosing~~ Automatic Reclosing schemes

e. Schemes applied on an Element for non-Fault conditions, such as, but not limited to, generator loss-of-field, transformer top-oil temperature, ~~high-voltage~~ overvoltage, or overload to protect the Element against damage by removing it from service

f. Controllers that switch or regulate **one or more of the following:** series or shunt reactive devices, FACTS devices, phase-shifting transformers, variable-frequency transformers, **or** tap-changing transformers, ~~or generation excitation~~; and, that are located at and monitor quantities solely at the same station as the Element being switched or regulated

**g.** FACTS controllers that remotely switch static shunt reactive devices located at other stations to regulate the output of a single FACTS device

**h.** Schemes or controllers that remotely switch shunt reactors and shunt capacitors for voltage regulation that would otherwise be manually switched

i. Schemes that automatically de-energize a line for a non-Fault operation when one end of the line is open



**j.** Schemes that provide anti-islanding protection (e.g., protect load from effects of being isolated with generation that may not be capable of maintaining acceptable frequency and voltage)

k. Automatic sequences that proceed when manually initiated solely by ~~an operator~~ a System Operator

I. Modulation of HVdc or FACTS via supplementary controls such as angle damping or frequency damping applied to damp local or inter-area oscillations

**m.** Sub-synchronous resonance (SSR) protection schemes that directly detect sub-synchronous quantities (e.g., currents or torsional oscillations)

**n.** Generator controls such as, but not limited to, automatic generation control (AGC), generation excitation [e.g. automatic voltage regulation (AVR) and power system stabilizers (PSS)], fast valving, and speed governing



# Implementation Plan and Impacts

Bill Edwards, NERC Counsel



# Project Timeline

Al McMeekin, NERC Standards Developer

The timeline for the remainder of the development process is as follows:

- Second posting – 08/29 – 10/14
- Post for final ballot – 10/31 – 11/10
- Present to NERC Board of Trustees for adoption – 11/13
- File with applicable regulatory authorities for approval – 12/15
- Begin standards development – January 2015





# Questions and Answers

- We encourage stakeholders to follow our effort, attend outreach events, and provide constructive feedback.
- Project information is available on the [Project 2010-05.2 SPS \(Phase 2 of Protection Systems\)](#) project page.
- Please contact AI with any questions and to be added to the project's email distribution list.
  - Email: [al.mcmeekin@nerc.net](mailto:al.mcmeekin@nerc.net)
  - Telephone: (404) 446-9675



**Thank you!**