<Public>

SRS RAS Workshop

October 2, 2024

Logan G. Affleck, Staff Engineer

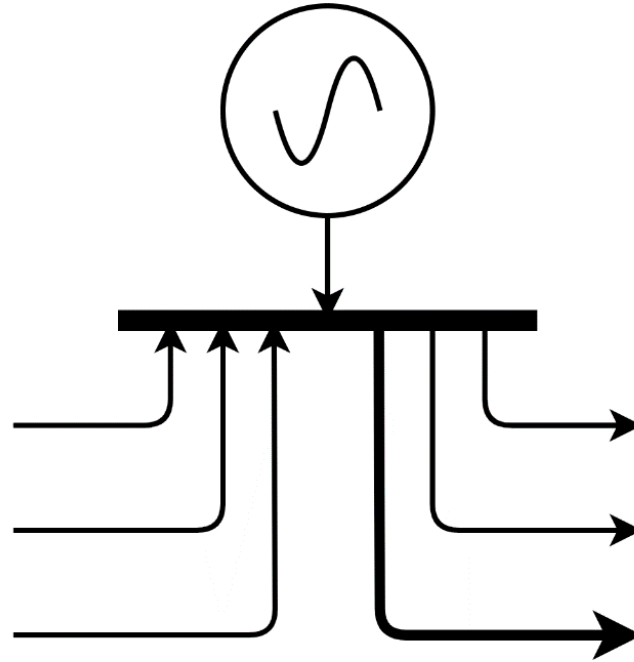<Public>

What is a RAS?

- RAS = Remedial Action Scheme

- "A scheme designed to detect predetermined System conditions and automatically take corrective actions…"

  - Things that **do not** individually constitute a RAS:

    - Protection Systems

    - UFLS/UVLS

    - See NERC Glossary of Terms for full definition and exceptions

- Also called Special Protection System, or SPS

- WECC RASRS

<Public>

RASRS

- The purpose of the RASRS is to assist the RCs in their review of planned, modified, and retiring RAS consistent with PRC-012-2 or its successor

- PRC-012-2 purpose: Ensure that RAS do not introduce unintentional or unacceptable reliability risks to the BES

  - R1: New/modified/retired RAS must be reviewed by RCs

  - R4: Each PC, at least once every five calendar years, shall evaluate each RAS within its planning area

- WECC RAS Design Guide, Western Interconnection RAS Review Guideline

<Public>

RAS Example

Loss of the bold line would cause others to become overloaded → reduce generation

<Public>

RAS Modeling Considerations

- Pro: more accurate N-1, N-1-1, etc. analysis

- Pro: more accurate dynamic simulations

- Con: many details required for accurate modeling

  - Also requires sophisticated knowledge of system behavior to judge accuracy

- Con: if base case topology changes, RAS models may need updating

  - Examples: from/to bus number changes, ID changes, midpoint bus number changes, generator or load removed from case

<Public>

WECC's RAS Process

- RAS files are posted to wecc.org for Operations base cases

  - 2024: 25HW3, 25LW1, 25HSP1, 25HS4, 25LS1

- DPM requirements:

1. All models should be provided upon request by PCs in their preferred format until the WECC common format is available in the provider's preferred software.

2. RAS models should be provided if the affected elements are modeled in the case.

3. All models should identify the data owner by naming the models with the member system abbreviation and an underscore at the front. (e.g., "member system abbreviation_descriptive model name")

4. RAS models must be provided for all operations base cases. These are denoted by an "-OP" in the base case compilation schedule. New models must be provided when the RAS are placed in use by the Operations department of each member, while existing models need only be updated when changes occur. PCs must notify WECC staff if any already provided models are no longer online and should be removed.

5. RAS data will be available on the WECC website. Only those users who are logged in and authorized may access it.

<Public>

WECC's RAS Process

1. Start with most recently published RAS dataset

2. Add new RAS submissions to RAS list files

3. Apply seasonal updates to RAS list files—generally applies to winter and summer cases

4. Load all RAS files into the base case via the RAS list file and look for errors

5. If PowerWorld and PSLF both report errors for the same RAS, reach out to the data submitter for a correction

<Public>

RAS Process Pain Points

- Error in one software but not the other—should I contact the data submitter?

- Three-winding transformers, multi-section lines—each software has a different approach

- Each software is on a different schedule for updates—functionality may exist in one software but not the others

- Timeliness and accuracy—historically, RAS models have not received the same level of attention as other data

- Model condition names should be unique

- Data submitter may not be the RAS expert at their entity—leads to delays updating RAS files

<Public>

Demo

- PSLF files: C:\upslf23\samples\SSTOOLSV6

- **Note** Entity RAS are considered CEII, confidential/proprietary

- Documentation:

  - PSLF: C:\upslf23\pdf\PSLF_RAS_QuickStart.pdf

  - PW: https://www.powerworld.com/files/RAS_Modeling_PowerWorld.pdf

  - PSSE: C:\Program Files\PTI\PSSE35\35.6\DOCS\POM.pdf

- Loading RAS files

- Creating RAS files

<Public>

Open Discussion

- Who is using WECC RAS models in their studies?

  - Study process.

  - Possible software enhancements.

- RAS in dynamics.

- Observations from entity perspective with respect to RAS modeling, submitting data to WECC.

<Public>

www.wecc.org