

**SOUTHWEST POWER POOL
SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MEETING**

**Tuesday November 9, 2021 1:00PM - 5:00PM (CPT)
Wednesday November 10, 2021 8:00AM - 12:00PM (CPT)
Net Conference**

SUMMARY OF MOTIONS AND ACTION ITEMS

- Ken Zellefrow (CUS) motioned to approve the *August 10-11, 2021 SPCAG Meeting Minutes*. Jeff Beasley (GRDA) seconded the motion. The motion carried without opposition or abstention.
- Action item #162 was added for SPP Planning Modeling staff to present requested topics during SPCAG discussion of Short Circuit Models and analysis

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MINUTES

AGENDA ITEM 1 – ADMINISTRATIVE ITEMS

SPCAG Chair John Anderson (Evergy, Inc.) called the meeting to order at 1:03 PM on 11/9/2021 and at 8:31 AM on 11/10/2021.

William Holden (SPP) took attendance and established a meeting quorum. A record of member attendance is an attachment to these minutes.

William Holden (SPP) read the SPP Antitrust Statement.

Chairman John Anderson (Evergy, Inc.) reviewed the agenda and made adjustments to accommodate presenter schedules. Jeff Beasley (GRDA) commented there was no progress to report on the *Three Terminal Line Whitepaper* and the agenda item was then removed. A record of the Agenda is an attachment to these minutes.

Ken Zellefrow (CUS) motioned to approve the *August 10-11, 2021 SPCAG Meeting Minutes*. Jeff Beasley (GRDA) seconded the motion. The motion carried without opposition or abstention.

AGENDA ITEM 2 – REMEDIAL ACTION SCHEME CRITERIA UPDATE

Adam Bell (SPP) gave a verbal update on the status of the *SPP Remedial Action Scheme Criteria*. MOPC directed, latest posted version of the document may be found in the October 2021 ORWG meeting materials. Edits from the ORWG meeting are not currently posted. SPCAG invited to review and provide feedback for discussion at the December ORWG.

Adam and William will coordinate on SPCAG review of the document prior to SPP issuing an RR in 2022.

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AGENDA ITEM 3 – PROPOSED REMEDIAL ACTION SCHEMES

William Holden (SPP) gave a verbal update on the status of the Sagamore RAS retirement and Thunderhead RAS.

- Sagamore RAS Retirement: SPP RC review is pending submittal of retirement request anticipated Q1 2022 coinciding with the associated upgrade completion.
- Thunderhead RAS: Per the May 2021 SPCAG minutes, relay setting files were shared with SPCAG members on 8/25/2021. SPP RC approval is pending a GIA revision with an appropriate upgrade timeline and agreement on compliance responsibilities.

AGENDA ITEM 4 – FAULT-INDUCED SOLAR PV TRIPPING (ODESSA) EVENTS IN TEXAS

William Holden (SPP) presented on the joint NERC and Texas RE report on inverter based resource events near Odessa TX and related ongoing SPP efforts.

AGENDA ITEM 5 – RELIABILITY GROUPS

NERC SPCWG AND LESSONS LEARNED

Lynn Schroeder (SECI) gave an update on the NERC SPCWG meetings held on 9/29/2021 and 11/4/2021. Lynn also covered the NERC Lessons Learned on Relaying and Protection Systems - *Multiple Faults in Rapid Succession Contribute to Relay Misoperations Leading to Loss of Load* posted on 8/6/2021.

Louis Guidry (CLECO) communicated by email that he initially represented the SPP RE as a voting member on the NERC System Protection Control Sub-committee (SPCSC), now SPCWG an advisory committee of the NERC Reliability and Security Technical Committee, providing updates to the SPP SPCAG. Lynn Schroeder (SECI) formerly held this position and transitioned to a similar position representing cooperatives. In consideration of the SPP RE dissolution and Cleco no longer having membership in SPP, Louis inquired on whether to continue as a representative for SPP.

John Anderson (Evergy, Inc.) and William Holden (SPP) will coordinate with the NERC SPCWG to determine the appropriate representation of SPP. If appropriate, SPCAG members will be polled to gauge interest in members becoming a SPP representative.

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SPP NERC

Shannon Mickens (SPP) gave updates from the NERC SPIDERWG Sub-groups and the RSTC status reports for Reliability Assessments Subcommittee (RAS) and System Protection and Control Working Group (SPCWG).

MRO PRS MEETING

Bob Soper (WAPA) gave an update on the MRO PRS meeting from 8/17/2021 and reviewed a summary of misoperations. The next PRS meeting is on 11/16/2021.

AGENDA ITEM 6 – SPP SHORT CIRCUIT MODELING DISCUSSION

Zach Sabey (SPP) presented on SPP's short circuit modeling processes, completing Action Item #160. Presentation included a detailed list of checks and value ranges that are used in the Short-Circuit DocuCheck and a list of items reviewed during the Preliminary Fault Current Checks. SPP Staff is anticipating a poll to MDAG around late November on Short Circuit Model software preferences and QA checks.

SPCAG members suggested that QA checks may be improved by including checks for high impedance values (i.e. 9999). Concerns were expressed on mapping facilities between varying model sources (i.e. 5 digit vs 6 digit bus numbers). A poll was conducted that indicated that SPCAG members utilize Aspen or Cape with a 2:1 ratio for performing relaying analysis. It was also stated that PSS/E was used for breaker duty and planning analysis by some members.

SPCAG members agreed to a standing agenda item, for at least the next few meetings, to discuss short circuit models and analysis. Action item #162 was added for SPP Planning Modeling staff to present requested topics during SPCAG discussion of Short Circuit Models and analysis.

Lynn Schroeder (SECI) recalled to the group a prior discussion of the SPCWG to develop a whitepaper on short circuit modeling, NERC had a coinciding effort and took precedence. The NERC whitepaper is currently in a "rough" draft, not ready for release, targeted for NERC working group member comment in January 2022. The communicated goal of the paper pertains to inter-entity updates, in contrast to individual entity model updates.

The NERC paper discusses various topics including: mapping bus numbers, duplications, mutual impedance, IBR modeling and validation, boundary equivalent (impact from IBRs), change management, data validations, fault value comparison, model comparison, calculated vs actual faults, model data from neighbors, acceptable tolerances. Recommendations include models in

Antitrust: SPP strictly prohibits use of participation in SPP activities as a forum for engaging in practices or communications that violate the antitrust laws. Please avoid discussion of topics or behavior that would result in anti-competitive behavior, including but not limited to, agreements between or among competitors regarding prices, bid and offer practices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that might unreasonably restrain competition.

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compatible format, validation following model conversions, inclusion of neighboring data is essential, IBR modeling is evolving, consider full system rather than boundary external data to accommodate Inverter Based Resources. Publishing target Q2 2022.

Action Item 157 remained as Closure pending to allow SPCAG discussion of follow-up following publication of NERC whitepaper on short circuit models.

AGENDA ITEM 7 – PROTECTION IN YOUR SHOP

John Anderson (Evergy, Inc.) presented on *Misoperation of a Protection System for an Oil Filled Reactor*.

Shawn Jacobs (OG&E) presented on the *Use of Synchrophasor Technology at OG&E*.

Steve Wadas (NPPD) presented on *SF6 breakers - Tank Heaters and Density Monitor and Broken Bow 1104 Bushing Failure*.

AGENDA ITEM 8 – CLOSING ADMINISTRATIVE DUTIES

William Holden (SPP) reviewed new, open and closure pending action items. Action Items 149, 155, 156, 158 and 159 were marked as Closed. Action Items 152 and 160 were marked as Closure Pending. Action Item 157 remained as Closure pending to allow SPCAG discussion of follow-up following publication of NERC whitepaper on short circuit models. Action item 161 remained as Not started. Action item 162 was added for SPP Planning Modeling staff to present requested topics during SPCAG discussion of Short Circuit Models and analysis. A record of action items is an attachment to these minutes.

The group discussed potential topics for the February 8th – 9th, 2022 SPCAG meeting, including:

- Short Circuit Models (standing agenda item)
- Protection in your shop:
 - Automation of Wide Area Coordination, SARA (Jeff Beasley, Q1 2022)
 - Traveling Wave Relays (future topic, no users to date)

Bob Soper (WAPA) identified a conflict with the MRO PRS meeting on May 10th 2022 for himself and other SPCAG members. An update will be communicated to the SPCAG following the PRS meeting the week of November 15th on whether the PRS meeting is rescheduled.

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William Holden (SPP) relayed that the SPP Officer Team has communicated that in-person stakeholder meetings are allowed to resume beginning in January 2022. The criteria includes: up to 50% of planned meetings, 10+ attendees, 6+ Hrs duration, and location at either the SPP Corporate Campus or an approved Member Company Facility. These locations include:

- Southwest Power Pool Campus; 201 Worthen Drive; Little Rock, AR 72223
- Tri-State; 1100 West 116th Avenue; Westminster, CO 80234
- Kansas Power Pool (KPP); 100 North Broadway; Wichita, KS 67202
- Grand River Dam Authority (GRDA); 9933 East 16th Street; Tulsa, OK 74128
- Oklahoma Municipal Power Authority (OMPA); 2701 West I-35 Frontage Road; Edmond, OK 73013
- Golden Spread Electric Cooperative (GSEC); 905 South Fillmore; Amarillo, TX 79101
- Golden Spread Electric Cooperative (GSEC); 4717 South Loop 289; Lubbock, TX 79424
- Tenaska Power Services; 300 East John Carpenter Freeway; Irving, TX 75062;
- Evergy; 1200 Main Street; Kansas City, MO 64105

SPCAG Chair John Anderson (Evergy, Inc.) indicated that members may be polled by email in regards to the May meeting date and time, transition to remote, or (if retained as in-person) the preferred location.

SPCAG Chair John Anderson (Evergy, Inc.) recessed the SPCAG at 4:37 PM on 11/9/2021 and adjourned the SPCAG and at 12:15 PM on 11/10/2021.

Respectfully Submitted,

William Holden, SPCAG Staff Secretary

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11/9-10/2021

SUMMARY OF ATTACHMENTS:

SPCAG 11/9-10/2021 Agenda (pg. 8-9)

SPCAG 11/9-10/2021 Member Attendance (pg. 10)

SPCAG Action Item Tracking (pg. 11-13)

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AGENDA

1. Administrative Items:
 - a. Call to Order..... John Anderson
 - b. AttendanceWilliam Holden
 - c. Antitrust Statement.....William Holden
 - d. Agenda Review John Anderson
 - e. Review minutes of August 10-11, 2021 meeting (Approval)..... John Anderson
2. Remedial Action Scheme Criteria (Update) Adam Bell (15m)
3. Proposed Remedial Action Schemes (Update).....William Holden (15m)
4. Fault-Induced Solar PV Tripping (Odessa) Events in Texas (Discussion)...William Holden (60m)
5. Reliability Groups (Update)
 - o NERC SPCWG and Lessons Learned Lynn Schroeder (30m)
 - o SPP NERC Shannon Mickens (30m)
 - o MRO PRS MeetingBob Soper (15m)
6. SPP System Planning Short Circuit Model - Model Checks (Discussion)Zach Sabey (60m)
7. Protection in your shop:
 - o Evergy Misoperation..... John Anderson (30 min)
 - o OG&E PMUs.....Shawn Jacobs (30 min)
 - o SF6 breakers - Tank Heaters and Density MonitorSteve Wadas (30 min)
 - o Broken Bow 1104 Bushing FailureSteve Wadas (30 min)

8. Closing Administrative Duties:

- a. Review of New, Open and Closure Pending Actions.....William Holden
- b. Discuss upcoming meeting topics..... John Anderson
 - 2/8-9/2022 (Net Conference)
- c. Adjourn meeting John Anderson

SPCAG MEMBER ATTENDANCE:

Name	Company	Role	11/9/2021	11/10/2021
John Anderson	Evergy, Inc	Chair	✓	✓
Chris Angland	Omaha Public Power District	Vice Chair	✓	✓
Jeff Beasley	Grand River Dam Authority	Member	✓	✓
Ryan Godwin	American Electric Power	Member		
Shawn Jacobs	Oklahoma Gas & Electric	Member	✓	✓
David Oswald	Liberty Utilities	Member		✓
Lynn Schroeder	Sunflower Electric Power Corp	Member	✓	✓
Bob Soper	Western Area Power Administration	Member	✓	✓
Steve Wadas	Nebraska Public Power District	Member	✓	✓
David Wheeler	Xcel Energy	Member	✓	✓
Ken Zellefrow	City Utilities of Springfield MO	Member	✓	
William Holden	Southwest Power Pool	Member	✓	✓

SPCAG ACTION ITEMS

Action Item	Origin Date	Action Item	Update Summary	Status	Owner	Date Closed
149	04/15/20	John Anderson to provide updates to the Minimum Transmission Design Standards for Competitive Upgrades, and follow up with Doug Bowman to discuss who owns the document and what the approval process should be.	7/15/20: Redline of minimum design standards doc to be presented at July 2020 SPCWG meeting. 7/23/20: John discussed the current version of the redline during today's meeting. He is taking feedback offline and will bring back to October SPCWG meeting. 5/12/21: SPCAG to provide feedback to Doug or Trey on latest redline. Trey to send to the group following the meeting. 8/11/21: The group reviewed RR460 to the MTDS	Closed	John Anderson	11/10/21
152	07/22/20	Zachary Sharp to collect additionally requested material from Invenergy concerning the Thunderhead RAS (relay settings and control schematics), and provide to the SPCWG members for review. Zachary Sharp will set up an ad-hoc meeting for the SPCWG to discuss the material and comments from the ORWG and TWG prior to the scheduled October meeting.	The ORWG delayed taking action on the Thunderhead RAS, negating the need for an ad-hoc meeting. 10/14/20: Tom Kay gave an update to the group. Tom is going to research the open protection response time of the DC supply at the Thunderhead station and clarify what the response will be. 5/12/21: Trey to send out relay settings to the SPCAG as soon as received. New motion approved 5/11. 8/11/21: Thunderhead RAS approved by MOPC in July 2021. Still waiting on relay settings from Invenergy. 8/25/21: Relay settings shared with SPCAG.	Closure pending	Zachary Sharp	
155	10/14/20	Zachary Sharp to work with Bob Soper and Steve Wadas to contact individuals on the PRC-012-2 drafting team to inquire as to the intent of 4.1.5.	10/14/20: Jonathan Hayes identified several members of the drafting team including: Al McMeekin, Robert Okeefe and Harry Singh. 8/11/21: Al rendered moot after review of additional data specs provided by Invenergy regarding redundancy.	Closed	Bob Soper Zachary Sharp	11/10/21

Action Item	Origin Date	Action Item	Update Summary	Status	Owner	Date Closed
156	10/15/20	Zachary Sharp to work with Jeff Beasley in contacting the staff secretaries of the ORWG, TWG, and GIUF to get on upcoming agendas and present on the Three Terminal Line Whitepaper.	5/11/21: 5/26 - GIUF meeting, ORWG and TWG will have Jeff back for further discussion and feedback. Focus on the working group's suggestions for recommendations. Trey to follow-up with ORWG and TWG to verify dates of next meeting and ensure Jeff is on the agenda. 30 minutes needed, at minimum. 8/11/21: Jeff presented to ORWG and TWG. The group has decided to leave the whitepaper as a SPCAG position document and is not pursuing an RR at this time. A presentation to the GIUF is not necessary.	Closed	Jeff Beasley Zachary Sharp	11/10/21
157	02/10/21	SPP Staff to reach out to SPCAG to determine interest in developing PSSE/ASPEN/CAPE Conversion Whitepaper.	5/12/21: Trey to send list to Lynn, and resend the request for participation. 8/11/21: There's a current NERC effort to develop a whitepaper, and the SPP action is on hold until that paper is developed. 11/10/21: Closure pending review of NERC paper, Q2 2022.	Closure pending	Trey Rosel	
158	05/12/21	Trey to reach out to Zach Sabey and Sunny Raheem to see if they can join us at our next meeting to discuss SPP's short circuit modeling process. Review how MOD standards play into this process. Demo of PSSE model, converting to ASPEN or CAPE.	8/11/21: Zach Sabey and Sunny Raheem presented at August 2021 meeting. Follow up Action Item 160	Closed	Trey Rosel	11/10/21
159	05/12/21	Trey to poll the group if one day is more appropriate than two days, also poll on ability to travel to determine feasibility of in person meeting in November	8/11/21: Zachary Sharp presented the results of a poll. Majority of SPCAG members would like to keep it at two days.	Closed	Trey Rosel	11/10/21

Action Item	Origin Date	Action Item	Update Summary	Status	Owner	Date Closed
160	08/11/21	SPP Engineering Modeling Planning Staff to compile a detailed list of checks and value ranges that are used in the Short-Circuit DocuCheck and provide a list of items reviewed during the Preliminary Fault Current Checks. This information is planned to be presented at the November SPCAG meeting.	11/10/21: Zach Sabey presented the requested information	Closure pending	Zach Sabey	
161	08/11/21	SPCAG to replace the Recommendation section at the end of the Three Terminal Line Whitepaper with a SPCAG Position section, and post to spp.org.	11/9/21: No progress to report	Not started	Jeff Beasley Lynn Schroeder Chris England	
162	11/10/21	SPP Planning Modeling staff to present requested topics during SPCAG discussion of Short Circuit Models and analysis		Not started	Zach Sabey	