

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

**Tuesday May 10, 2022 1:00PM - 5:00PM (CPT)  
Wednesday May 11, 2022 8:30AM - 12:00PM (CPT)**

**Net Conference**

## **SUMMARY OF MOTIONS AND ACTION ITEMS**

### **MOTIONS:**

- Ken Zellefrow (SPRM) motioned to approve the *February 8-9, 2022 SPCAG Meeting Minutes*. Shawn Jacobs (OKGE) seconded the motion. The motion carried without opposition or abstention.

### **ACTION ITEMS:**

- #165: SPCAG to explore SPP roadmap for short circuit modeling program purchase
- #166: SPCAG to participate or send delegates to the MDAG Focus Group meeting in the June/July timeframe

## SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES 5/10-11/2022

# MINUTES

### AGENDA ITEM 1 – ADMINISTRATIVE ITEMS

SPCAG Chair John Anderson (Evergy, Inc.) called the meeting to order at 1:04 PM on 5/10/2022 and introduced Michael Fleck (ITC) and Spencer Riddle (WAPA) as new SPCAG members. The meeting was reconvened at 8:36 AM on 5/11/2022.

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

Brett Springfield (SPP) read the SPP Antitrust Statement.

Chairman John Anderson (Evergy, Inc.) reviewed the agenda and made an addition to include a brief update on the upcoming Rapid City RAS retirement at 2c. A record of the Agenda is an attachment to these minutes.

**Ken Zellefrow (SPRM) motioned to approve the February 8-9, 2022 SPCAG Meeting Minutes. Shawn Jacobs (OKGE) seconded the motion. The motion carried without opposition or abstention.**

### AGENDA ITEM 2 – REMEDIAL ACTION SCHEMES

#### *THUNDERHEAD*

Brett Springfield (SPP) gave a verbal update on the status of the proposed Thunderhead RAS. Multiple upgrade options are under evaluation and selection of an upgrade is anticipated by Invenergy in the June timeframe. SPP RC final approval remains pending a GIA revision with an appropriate upgrade timeline and agreement on compliance responsibilities. Approval and subsequent implementation remains deferred until estimated upgrade completion is within two years.

#### *CROSSROADS SAGAMORE*

Brett Springfield (SPP) provided an update that the Crossroads Sagamore RAS remains on schedule for retirement in the June timeframe. Planned equipment outages over the next month may reactivate the RAS to address system constraints. The April MOPC approved the RAS retirement, all that remains is the RC final approval.

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### RAPID CITY

Jeremy Severson (BEPC) gave an update on the upcoming Rapid City RAS Retirement. After re-evaluation of the RAS, it was determined that it is no longer needed due to the protection that exists at the DC tie. They are currently working with Schweitzer on the analysis.

### AGENDA ITEM 3 – SPP SYSTEM PLANNING SHORT CIRCUIT MODEL - MODEL CHECKS

Eric Sullivan (SPP) presented on the system planning short circuit model checks and software survey noting that over 50% of respondents prefer a software other than PSSE. SPP is currently working with Aspen to run a short circuit model conversion for the ITP with a subsequent effort with CAPE. SPP intends to present difficulties in the conversion process at the May ERAG. SPCAG members encourage to participate in the model build process.

Lynn Schroeder (SECI) asked if there was any thoughts on purchasing an ASPEN license. That purchase request was identified as needing to go through the SPP roadmap process.

**Action item #165 was added for SPCAG to explore SPP roadmap for short circuit modeling program purchase.**

SPCAG members are requested to review the current short circuit model checks in place and suggest additional checks. SPP is scheduled to commence with the next annual short circuit model build around the August – September time frame.

Lynn Schroeder (SECI) notified the group that the Short-Circuit paper was approved at NERC SPCWG and is going to the September RSTC.

Steve Wadas, Lynn Schroeder, Chris Angland, and John Anderson agreed to participate or send delegates to the MDAG Focus Group meeting in June/July timeframe.

**Action item #166 was added for SPCAG to participate or send delegates to the MDAG Focus Group meeting in the June/July timeframe.**

### AGENDA ITEM 4 – THREE TERMINAL LINE WHITEPAPER

John Anderson (Evergy, Inc.) presented the questions that were posed by SPP on the Three Terminal Line Whitepaper. The questions and SPCAG responses are as follows:

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Question #1: If the goal is to stay high-level, I would consider moving some of the detailed protection scheme discussion to an appendix-it gets pretty deep in places for a casual reader. SPCAG response: leave as-is for the paper.

Question #2: I'd also consider whether there are any other options in addition to the two proposed. SPCAG response: white paper edits were made during the meeting with Jeff Beasley tasked to updated option 1 picture in paper to display a ring bus.

Question #3: Are there situations where the benefits of constructing a switch station are not worth the cost and what are those? SPCAG response: situationally dependent, leave as-is for the paper.

Question #4: Does voltage level enter into the calculus at all? i.e. would the recommendation be the same for 69 kV as for 345 kV? SPCAG response: leave as-is for the paper.

### AGENDA ITEM 5 – FERC 881 AMBIENT ADJUSTED RATINGS

Charles Cates (SPP) gave an update on FERC 881 and the current impacts to the TOs and SPP. RR490 was approved at ORWG and MOPC, the compliance filing is due 7/12/2022, there is an upcoming task force to help mitigate the challenges. Charles asked the group to assess potential impacts to protection systems, documents under the SPCAG, and on-going NERC efforts. Plan to bring back the topic at the Q4 2022 SPCAG meeting.

### AGENDA ITEM 6 – CMEP PRACTICE GUIDE CONSIDERATIONS FOR TPL-001-4

Jeff McDiamid (SPP) presented an update on the NERC TPL-001-4 standard to request feedback on coordination between system protection and control on development of contingencies.

### AGENDA ITEM 7 – RELIABILITY GROUPS

#### *NERC SPCWG AND LESSONS LEARNED*

Lynn Schroeder (Sunflower) provided an update on the February and April NERC SPCWG meeting and NERC Lessons Learned. The February agenda items included: IEEE and IRPWG liaison reports, data modeling and assessment, cold weather recommendations, large transformer backup protection. The April agenda items included: IEEE and IRPS liaison reports, cold weather recommendations, short circuit model paper *Inter-Entity Short Circuit Model*

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*Technical Report* was approved by the NERC SPCWG, and compliance implementation guidance for PRC-024-3 and PRC-025-2 on Hybrid plants.

### *SPP NERC*

Shannon Mickens (SPP) gave updates from the NERC SPIDERWG Analysis and Coordination Sub-Groups. Topics included: Distributed Battery Energy Storage Modeling Guideline, DER Impacts to UVLS Programs, BPS Planning under Increasing DER, Simulation Improvements and Techniques, Beyond Positive Sequence RMS Simulations for High Penetration Conditions, Draft report on Inter-Entity Short Circuit Model (NERC SPCWG), NERC Standards Review and DERs, BPS Perspectives on the DER Aggregator, Standards Committee Engagement, & Security Related Topics from Aggregate DER.

### *MRO PRS MEETING*

David Wheeler (SPS) gave an update from the 5/3/2022 MRO PRS meeting. The PRS reviewed the charter, discussed retaining membership at 19, and reviewed action items. Updates were provided by the NERC SPCWG as presented by Lynn, NERC MIDAS UG which discussed the absence of a fault type column and cap bank misoperation categorization, Commissioning Program with an MRO focused webinar in July, and TADS with an August 15<sup>th</sup> 2022 deadline for Q1 2023. Misoperation review yielded a higher 2021 Q4 rate due to fewer overall operations and included a review of 6 NERC lessons learned. The group reviewed all summer 2021 BES category 1 events. Discussion of FERC Order 881 Ambient Adjusted Ratings and the FERC Notice of Inquiry on dynamic line rating requirements and application by PJM. Next meetings are expected on August 16<sup>th</sup> 2022 and December 6<sup>th</sup> 2022.

### **AGENDA ITEM 8 – PROTECTION IN YOUR SHOP**

J.V. (John) Kelley (SPS) presented the MRO PRS topic on misoperation of Crossroads capacitors from voltage differential from a ferroresonant condition from missing loading resistors.

### **AGENDA ITEM 9 – CLOSING ADMINISTRATIVE DUTIES**

Brett Springfield (SPP) reviewed new, open and closure pending action items. Action items 163 & 164 were marked as Closed. Action Item 152 remained as Closure pending until RC Final approval and implementation of Thunderhead RAS. Action Item 157 remained as Closure pending to allow SPCAG discussion following publication of NERC whitepaper on short circuit models. Action item 161 remains as In Progress with Jeff Beasley tasked to update a diagram. Action item 162 remains marked as In Progress with SPP modeling staff to provide Short Circuit

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build update and any quality checks to be discussed. A record of action items is an attachment to these minutes. Action item 165 was added for SPCAG to explore SPP roadmap for short circuit modeling program purchase. Action item 166 was added for SPCAG to participate or send delegates to attend the MDAG Focus Group meeting in the June/July timeframe.

John Anderson (Evergy, Inc.) led a discussion on potential topics for the August 8<sup>th</sup> – 9<sup>th</sup>, 2022 SPCAG meeting, including:

- Short Circuit Models (standing agenda item): update on short circuit build and any quality checks to be discussed following the forthcoming MDAG Focus Group meeting
- Audit experience: Chris Angland (OPPD) to share feedback on the process
- Coordination of FAC-008, Thermal ratings including secondary side and CT circuits, with other standards such as relay load-ability (Michael Fleck (ITC))
- Protection in your shop:
  - Automation of Wide Area Coordination, SARA (Jeff Beasley (GRDA), Q3 2022)
  - Traveling Wave Relays (future topic, no users to date)
  - Pole failure experienced on a 345kV breaker (Steve Wadas (NPPD), Q3 2022)
  - Fire on line failure event (Steve Wadas (NPPD), Q3 2022)

John Anderson (Evergy, Inc.) led a discussion on potential Face-to-Face location options for the August 9<sup>th</sup> – 10<sup>th</sup>, 2022 and November 8<sup>th</sup> – 9<sup>th</sup> SPCAG meetings, including:

- A SPCAG member hosted location
  - David Wheeler (SPS) offered an Xcel location in Denver, CO for August
- Evergy; 1200 Main Street; Kansas City, MO 64105
- GRDA; 9933 East 16th Street; Tulsa, OK 74128
- SPP Campus; 201 Worthen Drive; Little Rock, AR 72223
- Tri-State; 1100 West 116th Avenue; Westminster, CO 80234 (November only)

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The SPCAG elected to transition the August meeting to Face-to-Face at the Xcel location in Denver, CO and move the November meeting to the Evergy location in Kansas City, MO.

SPCAG Chair John Anderson (Evergy, Inc.) recessed the SPCAG at 4:52 PM on 5/10/2022 and adjourned the SPCAG and at 9:10 AM on 5/11/2022.

System Protection And Control Advisory Group

Respectfully Submitted,

William Holden SPCAG Staff Secretary with assistance from Brett Springfield as acting SPCAG Staff Secretary

**SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES  
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**SUMMARY OF ATTACHMENTS:**

SPCAG 5/10-11/2022 Agenda (pg. 9)

SPCAG 5/10-11/2022 Member Attendance (pg. 10)

SPCAG Action Item Tracking (pg. 11-12)

SPCAG Approved *February 8-9, 2022 SPCAG Meeting Minutes*



**SOUTHWEST POWER POOL, INC.**

**SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MEETING**

May 10, 2022 1:00PM - 5:00PM CDT  
 May 11, 2022 8:30AM - 12:00PM CDT

**Net Conference**

**AGENDA**

1. Administrative Items:
  - a. Call to Order and new members ..... John Anderson
  - b. Attendance ..... Brett Springfield
  - c. Antitrust Statement ..... Brett Springfield
  - d. Agenda Review ..... John Anderson
  - e. Review minutes of February 8-9, 2022 meeting (Approval) ..... John Anderson
2. Remedial Action Schemes: [https://spp.org/documents/62226/spp\\_prc-012-2\\_process\\_ei.pdf](https://spp.org/documents/62226/spp_prc-012-2_process_ei.pdf)
  - a. Proposed Thunderhead RAS (Update) ..... Brett Springfield (5m)
  - b. Sagamore RAS Retirement (Update) ..... Brett Springfield (5m)
  - c. Rapid City RAS Retirement (Update) ..... Jeremy Severson (5m)
3. SPP System Planning Short Circuit Model - Model Checks (Discussion) ..... Eric Sullivan (15m)
4. Three Terminal Line Whitepaper (Discussion) ..... John Anderson (45m)
5. FERC 881 Ambient Adjusted Ratings (Update) ..... Charles Cates (15m)
6. CMEP Practice Guide Considerations for TPL-001-4 (Discussion) ..... Jeff McDiarmid (30m)
7. Reliability Groups (Update):
  - a. NERC SPCWG and Lessons Learned ..... Lynn Schroeder (20m)
  - b. SPP NERC ..... Shannon Mickens (30m)
  - c. MRO PRS Meeting ..... David Wheeler (5m)
8. Protection in your shop (Discussion) ..... John Anderson (5m)
  - a. Misoperation of Crossroads capacitors ..... J.V. (John) Kelley (15m)
9. Closing Administrative Duties:
  - a. Review of New, Open and Closure Pending Actions ..... Brett Springfield
  - b. Discuss upcoming meeting topics and location ..... John Anderson
    - 8/9-10/2022 (Net Conference)
    - 11/8-9/2022 (SPP Campus)
  - c. Adjourn meeting ..... John Anderson

## SPCAG MEMBER ATTENDANCE:

Name	Company	Role	5/10/2022	5/11/2022
John Anderson	Evergy, Inc	Chair	✓	✓
Chris Angland	Omaha Public Power District	Vice Chair	✓	✓
Jeff Beasley	Grand River Dam Authority	Member		
Michael Fleck	ITC Great Plains	Member		✓
Ryan Godwin	American Electric Power	Member		
Shawn Jacobs	Oklahoma Gas & Electric	Member	✓	✓
David Oswald	Liberty Utilities	Member	✓	
Spencer Riddle	Western Area Power Administration Upper Great Plains Region	Member		
Lynn Schroeder	Sunflower Electric Power Corp	Member	✓	
Steve Wadas	Nebraska Public Power District	Member	✓	✓
David Wheeler	Xcel Energy	Member	✓	✓
Ken Zellefrow	City Utilities of Springfield MO	Member	✓	✓
Brett Springfield	Southwest Power Pool	Acting Secretary	✓	✓

## SPCAG ACTION ITEMS

Action Item	Origin Date	Action Item	Update Summary	Status	Owner	Date Closed
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. 2/9/22: Closure pending implementation of RAS 5/11/22: Closure pending implementation of RAS	Closure pending	Zachary Sharp	
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. 5/11/22: Closure pending review of NERC paper, Q2 2022.	Closure pending	Trey Rosel	
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 2/9/22: SPP to revise draft whitepaper and pursue posting. 5/11/22: Chair and Secretary to revise draft whitepaper and pursue posting.	In progress	Jeff Beasley Lynn Schroeder Chris Angland	

Action Item	Origin Date	Action Item	Update Summary	Status	Owner	Date Closed
162	11/10/21	SPP Planning Modeling staff to present requested topics during SPCAG discussion of Short Circuit Models and analysis	2/9/22: SPP solicited members for topics, survey being conducted for preferred fault model software with review of results at the May 22' meeting. Zach Sabey committed to provide updates on external Short Circuit data collection efforts. 5/11/22: Eric Sullivan (SPP) shared MDAG survey results on short circuit model software and other preferences. The topic for discussion at the August meeting was selected to be update on short circuit build and any quality checks to be discussed.	In progress	Zach Sabey	
163	02/09/22	Staff Secretary to solicit MOPC for new member nominations and review with the chair to seek approval from COO and President.	5/11/22: Michael Fleck (ITC) and Spencer Riddle (WAPA) were welcomed as new members	Closed	William Holden	05/11/22
164	02/09/22	SPCAG members to review and provide feedback to the RAS Criteria document prior to the March 22' TWG.	5/11/22: the feedback period has concluded	Closed	Adam Bell	05/11/22
165	05/11/22	SPCAG to explore SPP Roadmap for Short Circuit modeling program purchase.		In progress	William Holden	
166	05/11/22	SPCAG to create sub-group for coordination with MDAG.		In progress	John Anderson	

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## SUMMARY OF MOTIONS AND ACTION ITEMS

### MOTIONS:

- Steve Wadas (NPPD) motioned to approve the *November 9-10, 2021 SPCAG Meeting Minutes* with correction to agenda item 8 regarding action item 157. Chris Angland (OPPD) seconded the motion. The motion carried without opposition or abstention.
- Lynn Schroeder (Sunflower) motioned to approve a SPCAG recommendation for the *Crossroads Sagamore RAS* retirement. Ken Zellefrow (CUS) seconded the motion. The motion carried without opposition or abstention.

### ACTION ITEMS:

- #164: SPCAG members invited to review and provide feedback on the draft RAS Criteria document to Adam Bell (SPP) for discussion and approval at the March TWG (2/28/2022-3/1/2022) prior to seeking MOPC approval at the April meeting.
- SPCAG members requested to forward information about the Grid Notice exploder to entities operating behind-the-meter generation and entities with non-firm load shed capabilities.
- William Holden (SPP) to request by email SPCAG member review of the three terminal line whitepaper.
- William Holden (SPP) and John Anderson (Evergy, Inc.) to coordinate on options for improvements to meeting invitations.
- #163: William Holden (SPP) to solicit nominations for new members through MOPC.
- William Holden (SPP) to evaluate feasibility and logistics of May meeting locations and poll SPCAG members on preferences.

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## MINUTES

### AGENDA ITEM 1 – ADMINISTRATIVE ITEMS

SPCAG Chair John Anderson (Evergy, Inc.) called the meeting to order at 1:02 PM on 2/8/2022 and at 8:30 AM on 2/9/2022.

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 adjustments were made to durations. A record of the Agenda is an attachment to these minutes.

**Steve Wadas (NPPD) motioned to approve the *November 9-10, 2021 SPCAG Meeting Minutes* with correction to agenda item 8 regarding action item 157. Chris England (OPPD) seconded the motion. The motion carried without opposition or abstention.**

### AGENDA ITEM 2 – REMEDIAL ACTION SCHEMES

#### *CRITERIA*

Adam Bell (SPP) gave a verbal update on the status of the *SPP Remedial Action Scheme Criteria*. The effort was MOPC directed, the latest draft received partial agreement at the TWG which was revised and approved by the ORWG. This draft was shared by email to the SPCAG Explorer. SPCAG members were invited to review and provide feedback to Adam Bell (SPP) for discussion and approval at the March TWG (2/28/2022-3/1/2022) prior to seeking MOPC approval at the April meeting.

#### *REQUIRED DATA SPECIFICATION*

Ryan Jones (SPP) presented on RAS status over ICCP requesting feedback on removal of *Available* status as RTCA and EMS only consider *Armed* and *Tripped*. Member discussion

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highlighted that a RAS may be armed only while above a threshold but would remain available. Also that a RAS could be armed while *Available* indicates an issue with a redundant system. These ICCP point changes may be more applicable towards operational groups though at some entities settings and controls groups may be involved in sending data points.

Ryan Jones (SPP) to provide SPCAG with an update once SPP has received consensus on an action plan.

### *THUNDERHEAD*

William Holden (SPP) gave a verbal update on the status of the proposed Thunderhead RAS. Multiple upgrade options are under evaluation and selection of an upgrade is anticipated by Invenergy in the June timeframe. SPP RC final approval remains pending a GIA revision with an appropriate upgrade timeline and agreement on compliance responsibilities. Approval and subsequent implementation remains deferred until estimated upgrade completion is within two years.

### *CROSSROADS SAGAMORE*

David Wheeler (SPS) presented on the Crossroads Sagamore RAS seeking SPCAG recommendation to approve the retirement in the June timeframe. The RAS is currently disabled as the identified upgrade of a 2<sup>nd</sup> 345/230 kV transformer is now in-service. Planned equipment outages over the next few months may reactivate the RAS to address system constraints.

**Lynn Schroeder (Sunflower) motioned to approve a SPCAG recommendation for the Crossroads Sagamore RAS retirement. Ken Zellefrow (CUS) seconded the motion. The motion carried without opposition or abstention.**

### AGENDA ITEM 3 – GRID NOTICE EXPLODER: BEHIND-THE-METER GENERATION OWNERS

William Holden (SPP) shared a request from SPP Communications to forward information about the Grid Notice exploder to entities operating behind-the-meter generation and entities with non-firm load shed capabilities.

### AGENDA ITEM 4 – LOAD CUSTOMER PARTICIPATION IN UFLS

Kyle McMenamin (SPS) shared recent experiences of challenges with new load customers (10-100 MVA loads) participation in UFLS and non-overlapping manual load shed. These customer

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facilities, typically a line tap without transmission line sectionalizing equipment, are exempt from mandatory participation through local Public Utility Commission (PUC) policy. The SPP OATT Attachment AQ has been referenced as the only binding agreement. Without customer participation, load shed activities would be implemented through opening transmission circuits at the risk of additional load shedding and reduction of system reliability due to associated topology adjustments.

SPCAG members were requested to share methods to encourage UFLS participation. Prior feedback received included various degrees of tap configurations each including transmission owner owned facilities that facilitates participation as local PUC policy allows these requirements.

Discussion identified the NERC compliance responsible entity maintains responsibility. The SPP PC UFLS Plan, [https://www.spp.org/documents/65486/spp%20pc%20ufls%20plan\\_rev\\_4.7.pdf](https://www.spp.org/documents/65486/spp%20pc%20ufls%20plan_rev_4.7.pdf), indicates criteria for a responsible entity to be removed from the plan though the subject customers would likely not be compliance entity. It was suggested that other sources of load shed, those under direct control of the transmission owner, be considered for compliance.

### AGENDA ITEM 5 – SPP SYSTEM PLANNING SHORT CIRCUIT MODEL - MODEL CHECKS

Zach Sabey (SPP) shared a compilation of discussion topics provided from an email solicitation to SPCAG members. The topics for later discussion included:

- Conversion challenges of short circuit models from PSS/E to ASPEN
- Updates on activities (e.g. NERC standards) to correct model issues with zero sequence data
- Zero sequence data issues with two winding vs three winding transformer representation
- Incorporation of protection engineers in the SPP model development process
- Update on the short circuit data collection with EIPC - MCWG
- MDAG survey results on short circuit model software and other preferences (to be presented during the May SPCAG meeting)

Lynn Schroeder (Sunflower) provided an update on the NERC SPCWG Inter Entity Short Circuit Modeling Whitepaper draft. The comment period by NERC SPCWG members should begin after the 2/10/2022 meeting, followed by publication process with posting to the NERC website. The draft report contains sections detailing data validation and possible variance issues post update.

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## SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES 2/8-9/2022

Conclusion and recommendations in the current draft (subject to change) include short circuit model to be provided in an industry standard format (such as ASPEN/CAPE) and converted models from a power flow software requiring a vetting process due to known and unknown errors.

Following publication of the NERC SPCWG whitepaper, the SPP SPCAG short circuit model discussion topics above may be revised to incorporate additional items identified during review of the paper.

### AGENDA ITEM 6 – THREE TERMINAL LINE WHITEPAPER

Lynn Schroeder (Sunflower) shared the proposed edits to the conclusion and recommendation section of the three terminal line whitepaper that were developed by the subgroup team.

Creation of three terminal lines (three sources) should be avoided due to the complexities associated with protecting them. When Independent Power Producers request interconnection within the SPP transmission system, three terminal lines should be disallowed through the interconnect process or the Generator Interconnect Agreement. When tapping an existing two-terminal line, acceptable alternatives to the creation of a three terminal line include creation of a switching station at the tap or creation of a hair-pin tap.

Discussion centered around challenges to updating the PowerPoint, available in prior meeting materials, to maintain consistency with the whitepaper. No updates to the presentation are being pursued at this time.

William Holden (SPP) will incorporate the proposed edits into the latest draft with an internal SPP review followed by email request for SPCAG to perform a final review prior to posting the whitepaper, without an accompanying presentation, prior to May SPCAG meeting.

### AGENDA ITEM 7 – RELIABILITY GROUPS

#### *NERC SPCWG AND LESSONS LEARNED*

Lynn Schroeder (Sunflower) provided an update that the next NERC SPCWG meeting is on 2/10/2022. Agenda items include: IEEE and IRPWG liaison reports, data modeling and assessment, cold weather recommendations, large transformer backup protection, short circuit model paper, compliance implementation guidance for PRC-019-2 & PRC-024-3, and Hybrid plants.

## SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES 2/8-9/2022

There have been some organizational changes, particularly Lynn Schroeder (Sunflower) has been elected as vice-chair for a 2-year term which is followed by chair for a subsequent 2-year term.

### *SPP NERC*

Shannon Mickens (SPP) gave updates from the NERC SPIDERWG Sub-groups and associated work plans. Modeling, verification, and studies sub-groups were merged into an Analysis sub-group. Work plans comprised of evaluation for various aspects of Distributed Energy Resources.

Discussion ensued on the importance of entities implementing Reliability Guidelines as well as the relevance of whitepapers and technical documents for compliance with NERC standards.

### *MRO PRS MEETING*

David Wheeler (SPS) gave an update from the 11/16/2021 MRO PRS meeting. The charter was updated to ensure wider representation. NERC updates were provided by SPCWG, MIDAS users group, Protection System Commissioning Program, and TADS working group. Technical discussions included misoperation at the SPS Crossroads capacitors from voltage differential from a ferroresonant condition from missing loading resistors and an Evergy CCVT failure. Static output driving high impedance inputs MRO whitepaper was discontinued due to overlapping effort with NERC lessons learned.

The chair and vice-chairs became vacant, David Wheeler is the vice chair elect to the MRO PRS committee and has agreed to provide updates to the SPCAG following the resignation of Bob Soper (WAPA).

The next MRO PRS meeting is scheduled for 2/22/2022. The subsequent meeting in May previously conflicted with the SPCAG on 5/10/2022 is now listed as 5/3/2022 but tentatively scheduled for 5/24/2022.

## AGENDA ITEM 8 – PROTECTION IN YOUR SHOP

John Anderson (Evergy, Inc.) inquired with the group on desire to continue and solicited for presentation topics. Steve Wadas (NPPD) shared his experience that they are beneficial to others with requests for information months later when another entity experiences a similar issue. Lynn Schroeder (Sunflower) agreed that sharing issues has value.

Steve Wadas (NPPD) volunteered to present a future topic of a pole failure experienced on a 345kV breaker, sharing that having spare parts onsite is very important especially with ongoing supply chain issues and coordination efforts with manufacturer regarding equipment warranty.

*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.*

## SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES 2/8-9/2022

Root cause of the event may not be known for months partially due to staffing. John Anderson (Evergy, Inc.) shared a similar pole failure during fault, no root cause identified yet by manufacturer.

Steve Wadas (NPPD) volunteered to present in the future on a fire on line failure event, reactor was in-service and ring down of capacitance at 57 Hz resulted in 2.5 pu voltage resulting in current spikes across contacts.

David Wheeler (SPS) volunteered to present the MRO PRS topic on misoperation of Crossroads capacitors from voltage differential from a ferroresonant condition from missing loading resistors.

### AGENDA ITEM 9 – 2021 ORGANIZATIONAL EFFECTIVENESS SURVEYS

John Anderson (Evergy, Inc.) led a discussion on the survey results for the SPCAG and review of the SPCAG scope.

William Holden (SPP) and John Anderson (Evergy, Inc.) will coordinate on options to send SPCAG Members a direct WebEx invite (for virtual meetings) or meeting reminders a month prior to the meeting.

Lynn Schroeder (Sunflower) suggested that the group investigate the potential to transition from an advisory group to a working group. The NERC SPCWG is also exploring a transition back to a subcommittee. John Anderson (Evergy, Inc.) recalled the transition to an advisory group was, in part, to reduce groups reporting directly to the MOPC. Steve Wadas (NPPD) shared a presentation by Lanny Nickel from the July 2020 MOPC materials highlighting the purpose of the organizational group transitions. Chris Angland (OPPD) stated that the SPCAG would be more effective with stronger ties to other working groups; three terminal line whitepaper and feedback on short circuit models are examples of value that the SPCAG brings to SPP.

Steve Wadas (NPPD) suggested that the SPCAG perform a review of effective dates of NERC requirements such as PRC-002 or PRC-027 which may have individual requirements with delayed implementation.

### AGENDA ITEM 10 – SPCAG MEMBER NOMINATIONS

John Anderson (Evergy, Inc.) led a discussion on seeking nominations for new members through the MOPC.

## SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES 2/8-9/2022

William Holden (SPP) will proceed with soliciting nominations through MOPC, review candidates with the chair, and seek approval from both the SPP COO and SPP President.

### AGENDA ITEM 11 – CLOSING ADMINISTRATIVE DUTIES

William Holden (SPP) reviewed new, open and closure pending action items. Action Item 160 was marked as Closed. Action Item 152 remained as Closure pending until RC Final approval and implementation of Thunderhead RAS. 157 remained as Closure pending to allow SPCAG discussion following publication of NERC whitepaper on short circuit models. Action items 161 & 162 were marked as In Progress with SPP to take actions. Action item 163 was added as Not started to solicit new members. Action item 164 was added as In progress for SPCAG members to provide feedback on the draft RAS Criteria document. A record of action items is an attachment to these minutes.

John Anderson (Evergy, Inc.) led a discussion on potential topics for the May 10<sup>th</sup> – 11<sup>th</sup>, 2022 SPCAG meeting, including:

- Short Circuit Models (standing agenda item): discuss software survey results
- Audit experience: Chris Angland (OPPD) to share scope review
- TPL-001-5 discussion with planning group on identification of single points of failure
- Coordination of FAC-008, Thermal ratings including secondary side and CT circuits, with other standards such as relay load-ability
- FERC 881 Ambient Adjusted Ratings
  - SPP overview, expectations, impacts to operations
  - Dynamic Line Ratings
  - Considerations of relay settings such as PRC-023
- Protection in your shop:
  - Crossroads misoperation
  - Automation of Wide Area Coordination, SARA (Jeff Beasley, Q3 2022)
  - Traveling Wave Relays (future topic, no users to date)

## SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES 2/8-9/2022

William Holden (SPP) relayed that the SPP return to office has been deferred until at least March 8<sup>th</sup> 2022. SPCAG Chair John Anderson (Eversource, Inc.) indicated that members will be polled by email by March 14<sup>th</sup> with results shared by March 22<sup>nd</sup> in regards to the May meeting transition to remote, or (if retained as in-person) the preferred location.

- Southwest Power Pool Campus; 201 Worthen Drive; Little Rock, AR 72223
- Tri-State; 1100 West 116th Avenue; Westminster, CO 80234
- Tenaska Power Services; 300 East John Carpenter Freeway; Irving, TX 75062;

William Holden (SPP) is tasked with evaluate feasibility and logistics for the above options prior to the poll.

SPCAG Chair John Anderson (Eversource, Inc.) recessed the SPCAG at 4:29 PM on 2/8/2022 and adjourned the SPCAG and at 10:58 AM on 2/9/2022.

Respectfully Submitted,

William Holden, SPCAG Staff Secretary

**SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES  
2/8-9/2022**

**SUMMARY OF ATTACHMENTS:**

SPCAG 2/8-9/2022 Agenda (pg. 11-12)

SPCAG 2/8-9/2022 Member Attendance (pg. 13)

SPCAG Action Item Tracking (pg. 14-15)

SPCAG Approved *November 9-10, 2021 SPCAG Meeting Minutes*

**SOUTHWEST POWER POOL, INC.**  
**SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MEETING**

February 8, 2022 1:00PM - 5:00PM CDT  
February 9, 2022 8:30AM - 12:00PM CDT

**Net Conference**

**AGENDA**

1. Administrative Items:
  - a. Call to Order..... John Anderson
  - b. Attendance .....William Holden
  - c. Antitrust Statement.....William Holden
  - d. Agenda Review ..... John Anderson
  - e. Review minutes of November 9-10, 2021 meeting (Approval) ..... John Anderson
2. Remedial Action Schemes: [https://spp.org/documents/62226/spp\\_prc-012-2\\_process\\_ei.pdf](https://spp.org/documents/62226/spp_prc-012-2_process_ei.pdf)
  - a. Criteria (Update)..... Adam Bell (15m)
  - b. Required Data Specification (Discussion) ..... Ryan Jones (30m)
  - c. Proposed Thunderhead RAS (Update)..... William Holden (5m)
  - d. Sagamore RAS Retirement (Approval)..... David Wheeler (30m)
3. Grid Notice exploder: behind-the-meter generation owners..... William Holden (5m)
4. Load Customer Participation in UFLS (Discussion) .....Kyle McMenamain (30m)
5. SPP System Planning Short Circuit Model - Model Checks (Discussion) .....Zach Sabey (15m)
6. Three Terminal Line Whitepaper (Discussion) ..... Jeff Beasley (15m)
7. Reliability Groups (Update):
  - a. NERC SPCWG and Lessons Learned .....Lynn Schroeder (5m)
  - b. SPP NERC ..... Shannon Mickens (30m)
  - c. MRO PRS Meeting .....David Wheeler (5m)
8. Protection in your shop (Discussion) ..... John Anderson (15 min)

9. 2021 Organizational Effectiveness surveys (Discussion)..... John Anderson (15 min)

10. SPCAG member nominations (Discussion)..... John Anderson (15 min)

SPP Bylaws: [https://www.spp.org/Documents/13272/Current Bylaws and Membership Agreement Tariff.pdf](https://www.spp.org/Documents/13272/Current%20Bylaws%20and%20Membership%20Agreement%20Tariff.pdf)

SPCAG Scope: [https://www.spp.org/Documents/64083/SPCAG Scope.pdf](https://www.spp.org/Documents/64083/SPCAG%20Scope.pdf)

11. Closing Administrative Duties:

- a. Review of New, Open and Closure Pending Actions.....William Holden
- b. Discuss upcoming meeting topics and location ..... John Anderson
  - 5/10-11/2022 (in-person, email poll 1<sup>st</sup> week of April)
- c. Adjourn meeting ..... John Anderson



## SPCAG MEMBER ATTENDANCE:

Name	Company	Role	2/8/2022	2/9/2022
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	✓	✓
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	Secretary	✓	✓

## SPCAG ACTION ITEMS

Action Item	Origin Date	Action Item	Update Summary	Status	Owner	Date Closed
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. 2/9/22: Closure pending implementation of RAS	Closure pending	Zachary Sharp	
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	
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 2/9/22: closed out, item #162 will continue topic as a standing agenda item	Closed	Zach Sabey	02/09/22

Action Item	Origin Date	Action Item	Update Summary	Status	Owner	Date Closed
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 2/9/22: SPP to revise draft whitepaper and pursue posting.	In progress	Jeff Beasley Lynn Schroeder Chris Angland	
162	11/10/21	SPP Planning Modeling staff to present requested topics during SPCAG discussion of Short Circuit Models and analysis	2/9/22: SPP solicited members for topics, survey being conducted for preferred fault model software with review of results at the May 22' meeting. Zach Sabey committed to provide updates on external Short Circuit data collection efforts.	In progress	Zach Sabey	
163	02/09/22	Staff Secretary to solicit MOPC for new member nominations and review with the chair to seek approval from COO and President.		Not started	William Holden	
164	02/09/22	SPCAG members to review and provide feedback to the RAS Criteria document prior to the March 22' TWG.		In progress	Adam Bell	