

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

Tuesday February 8, 2022 1:00PM - 5:00PM (CPT)  
Wednesday February 9, 2022 8:30AM - 12:00PM (CPT)  
Net Conference

## 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 Angland (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 Exploder. 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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## SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES 2/8-9/2022

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

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.

## 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**

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**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 McMenamini (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

PRE-APPROVAL

## 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	

PRE-APPROVAL

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## **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.

## SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES 11/9-10/2021

### 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.

## SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES 11/9-10/2021

### *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.*

## SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES 11/9-10/2021

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 8<sup>th</sup> – 9<sup>th</sup>, 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 10<sup>th</sup> 2022 for himself and other SPCAG members. An update will be communicated to the SPCAG following the PRS meeting the week of November 15<sup>th</sup> 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

**SYSTEM PROTECTION AND CONTROL ADVISORY GROUP MINUTES**  
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)

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

**November 9, 2021 1:00PM - 5:00PM CDT**  
**November 10, 2021 8:00AM - 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 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 Meeting .....Bob 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 Monitor .....Steve Wadas (30 min)
  - o Broken Bow 1104 Bushing Failure .....Steve 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.	<p>7/15/20: Redline of minimum design standards doc to be presented at July 2020 SPCWG meeting.</p> <p>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.</p> <p>5/12/21: SPCAG to provide feedback to Doug or Trey on latest redline. Trey to send to the group following the meeting.</p> <p>8/11/21: The group reviewed RR460 to the MTDS</p>	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.	<p>The ORWG delayed taking action on the Thunderhead RAS, negating the need for an ad-hoc meeting.</p> <p>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.</p> <p>5/12/21: Trey to send out relay settings to the SPCAG as soon as received. New motion approved 5/11.</p> <p>8/11/21: Thunderhead RAS approved by MOPC in July 2021. Still waiting on relay settings from Invenergy.</p> <p>8/25/21: Relay settings shared with SPCAG.</p>	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.	<p>10/14/20: Jonathan Hayes identified several members of the drafting team including: Al McMeekin, Robert Okeefe and Harry Singh.</p> <p>8/11/21: Al rendered moot after review of additional data specs provided by Invenergy regarding redundancy.</p>	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	