

1. Welcome, Call to Order

Bill Middaugh, Protection and Control Subcommittee (PCS) Chair, called the meeting to order at 8:02 a.m. MT on March 6, 2025. A quorum was present to conduct business. A list of attendees is attached as Exhibit A.

2. Review WECC Antitrust Policy

James Hanson, Operations Analysis Manager, read aloud the WECC Antitrust Policy statement. The policy can be found on wecc.org.

3. Approve Agenda

B. Middaugh introduced the proposed meeting agenda.

The 2025-03-06 PCS Agenda was amended as follows:

- Items 11 and 12, “Large Load Disturbance/Industry Efforts—Rich Bauer, NERC” and “Update on NERC Standards—Rich Bauer, NERC,” became Items 7 and 8;
- Item 13, “Breaker Restrikes due to Lightning—Kevin Damron, AVA,” became Item 11;
- Item 9, “Digital Fault Recorder Discussion—Group,” became Item 13.

By consensus, the PCS approved the agenda.

4. Review and Approve Previous Meeting Minutes

B. Middaugh introduced the minutes from the meeting on December 5–6, 2024.

By consensus, the PCS approved the minutes from December 5–6, 2024.

5. Review Previous Action Items

Maya Brimhall, Administrative Coordinator, reviewed action items carried over from the PCS meeting on December 6, 2024. Action items that are not closed and will be carried forward can be found in the Quick Links section of the PCS page on the WECC website.

6. Standing Committee Updates

Curtis Holland, Senior Reliability Specialist, reported on the Event and Performance Analysis Subcommittee (EPAS).

Gene Henneberg, NV Energy, reported on the Remedial Action Scheme Reliability Subcommittee (RASRS).

G. Henneberg reported on the IEEE Power System Relaying Committee.

B. Middaugh and David Beach, Portland General Electric Company (PGE), reported on the System Protection and Control Working Group (SPCWG).

D. Beach reported on the Short-circuit Modeling Work Group (SCMWG).

J. Hanson reported on the Event Analysis Subcommittee (EAS).

7. Large Load Disturbance/Industry Efforts

Rich Bauer, NERC, presented the background, effects, and analysis of a recent large load loss event. He also covered the industry's efforts to minimize future large load disturbances, including a call with the Data Center Coalition, considerations and critical questions to resolve for simultaneous voltage-sensitive load reductions, and next steps for NERC.

The presentation can be found on the WECC website.

8. Update on NERC Standards

R. Bauer provided the PCS NERC Standards updates. He shared FERC Order 901 milestones and encouraged PCS participants to review NERC's recent incident review "Considering Simultaneous Voltage-Sensitive Load Reductions."

The presentation can be found on the WECC website.

9. Broken Conductor Protection

Joe Livingston, Great River Energy (GRE), presented on two broken conductor events that occurred in the GRE area. He shared GRE's transmission system, events analyses, GRE's corrective action plan, transmission line relays, and detectable broken conductor specs.

The presentation can be found on the WECC website.

10. Broken Conductor Protection

Nathanial Thompson, NorthWestern Energy (NWE), shared NWE's broken conductor philosophy. He discussed NWE's evaluation of lines; broken conductor reach; considerations for no comm assisted relaying; current NWE implementations for both comm assisted relaying schemes and no comm assisted relaying or loss of comm; NWE's process following a trip; NWE-observed VAR flows; real line loading examples; and next evolution for lines.

The presentation can be found on the WECC website.



11. Breaker Restrikes due to Lightning

Kevin Damron, Avista Corporation (Avista), and Emma Clawson, Schweitzer Engineering Laboratories, Inc., shared how lightning caused Avista to restrike their breaker. He presented Avista's service territory demographics; the background information for the day of the event; the substation layout; the event analysis of the fault; and the lessons learned from the breaker failure.

The presentation can be found on the WECC website.

12. Line Impedance Testing

Bryan Diemer, Sacramento Municipal Utility District (SMUD), presented SMUD's line impedance testing process. He reviewed SMUD's impedance testing due to faulty cable models; discussed a 20kA 115kV cable fault that occurred on February 25, 2025; and shared overhead transmission line zero sequence mutual impedance testing results, analysis, and next steps.

The presentation can be found on the WECC website.

13. Digital Fault Recorder (DFR) Discussion

The PCS shared their utilities' experiences and history with DFRs.

14. De-energized Lines Can Still Cause Fires

Robert James, Pacific Gas and Electric Company (PG&E), shared PG&E's experience with de-energized lines causing fires. He explained how de-energized lines cause fires, went over the basic physics for electric field and mutual capacitance and magnetic field and mutual inductance, discussed the shortcomings of Kirchhoff's Voltage Law, and argued that transmission line grounding can reduce electrical energy and fire ignition risk.

The presentation can be found on the WECC website.

15. Closed Session

The PCS reviewed Q4 2024 misoperation submissions and conducted a roundtable discussion in their Closed Session meeting.

16. Public Comment

No comments were made.

17. Review New Action Items

- Reach out to Eric Udren to present at the June 2025 PCS meeting.
 - Assigned To: James Hanson



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- Due Date: June 6, 2025

18. Upcoming Meetings

June 5–6, 2025.....Salt Lake City, Utah
September 4–5, 2025.....Salt Lake City, Utah
December 4–5, 2025.....Salt Lake City, Utah

19. Adjourn

J. Hanson adjourned the meeting without objection at 11:41 a.m. MT on March 6, 2025.



Exhibit A: Attendance List

Members in Attendance

David Beach..... Portland General Electric Company
Dean Bender Bonneville Power Administration—Transmission
Kevin Damron..... Avista Corporation
Bryan Diemer Sacramento Municipal Utility District
Jason Hall..... Puget Sound Energy, Inc.
James Hanson..... WECC
Gene Henneberg NV Energy
Luke Hoffmann..... PacifiCorp
Lucy Lin Alberta Electric System Operator
Donald Loftis..... Colorado Springs Utilities
Bill Middaugh Tri-State Generation and Transmission—Reliability
Rafael Pineda..... Pacific Gas and Electric Company
Nick Podany U.S. Bureau of Reclamation
Curtis Sanden..... Southern California Edison Company
Harjinder Sidhu AltaLink Management Ltd.
Tyler Smith Idaho Power Company
Masahiko Taniguchi..... Los Angeles Department of Water and Power
Jonathan Trejo El Paso Electric Company

Members not in Attendance

Alejandro Castro..... El Paso Electric Company
Orion Chan British Columbia Hydro and Power Authority
Xing Chen British Columbia Hydro and Power Authority
Ryan Chun..... Los Angeles Department of Water and Power
David Heffernan..... PacifiCorp
Kawika Lawlor..... San Diego Gas and Electric
Pamela Mendoza Public Service Company of Colorado (Xcel Energy)



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Josh Moyers Western Area Power Administration
Claire Patti Portland General Electric Company
Blake Peck Idaho Power Company
Stephen Smith Salt River Project

Others in Attendance

Rich Bauer NERC
Chris Benally Burns & McDonnell (1898 and Co.)
Maya Brimhall WECC
Emma Clawson Schweitzer Engineering Laboratories, Inc.
Adrian Dominguez Salt River Project
Benjamin Fritz NV Energy
Dave Grover WECC
Emily Hernandez Medina NV Energy
Robert James Pacific Gas and Electric Company
Joseph Livingston Great River Energy
Tyler Pham California State University, Sacramento
Jose Ramirez Martinez California State University, Sacramento
Nathanial Thompson NorthWestern Energy

