POWER SYSTEM RELAYING AND CONTROL COMMITTEE
of the IEEE POWER AND ENERGY SOCIETY
MINUTES of the MEETING in Nashville, TN

September 12-15, 2022, Hybrid In-Person and Virtual Meeting

I. Call to order / Introductions: Murty Yalla

Chair Murty Yalla, called the meeting to order at 7:30 am (CDT) on Thursday, September 15, 2022.

In-person attendees followed the tradition of introducing themselves, but the introduction of the virtual attendees via webex was skipped. Similarly, the tradition of having all first time in person attendees reintroduce was followed. A quorum check was conducted and verified (83 of 131 Main Committee voting members). Attendance was recorded via webex report and in-person check list. Attending this Main Committee meeting were also 139 guests for a total attendance of 222.

The meeting agenda was approved (motion by Steve Turner, second by Fred Friend).

Meeting registration statistics for both PSCCC and PSRC:

Committee	Returning	New Attendees	In-Person	Virtual	Total
Both	108	6	48	66	114
PSCCC	14	2	6	10	16
PSRC	201	17	110	108	218
Total	323	25	164	184	348

Meeting registrants came from the following 15 countries:
Australia, Canada, China, Colombia, France, Germany, India, Ireland Japan, New Zealand, Republic of Korea, Saudi Arabia, Spain, UK, USA

II. Approval of Minutes / Financial Report: Gene Henneberg

A motion to approve the minutes of the May 2022 hybrid meeting of the PSRC Committee was made and seconded (Russ Patterson and Gary Kobet). The motion was approved unanimously.

In person registration for both PSCC and PSRC increased from May to September from 111 to 164, and total registration also increased from 321 to 348.

The PSRC committee financial status is healthy. Expenses for the May meeting in Reno were modest. Expenses for the hybrid meetings have been more difficult to predict due primarily to the uncertainty of in-person attendance numbers.

Thanks to sponsors

- PSRC committee expresses thanks to

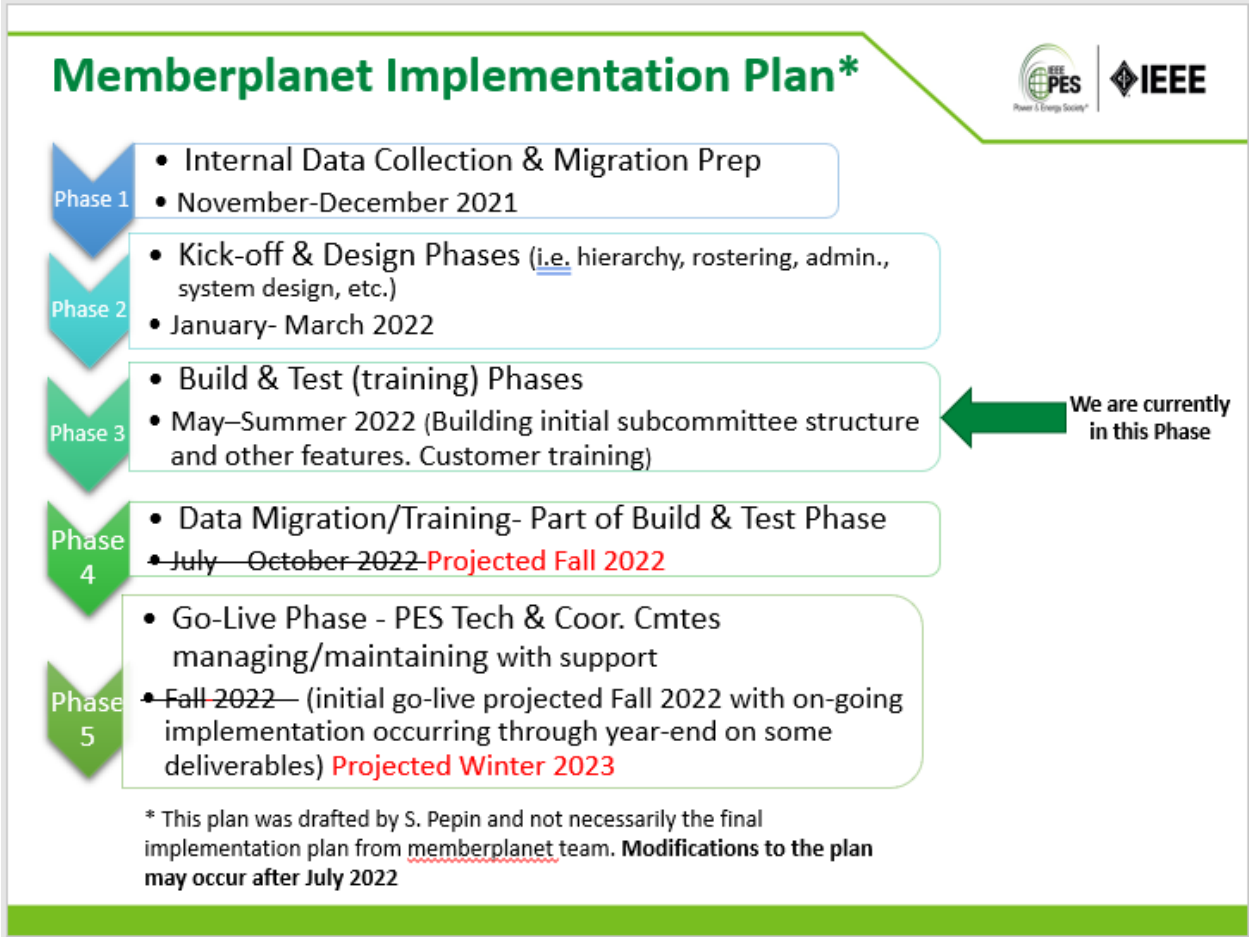
for sponsoring Tuesday afternoon break

PSRC committee also expresses thanks to

for donating the shirts for the awards ceremony

Association Management System

New system to replace 123Signup Supplied by memberplanet



Next Steps

- Email will be sent to all Committee Members, Working Group Members, Task Force Members, etc asking them to complete a new profile with their primary email address
- Committee Structure capability built by memberplanet
- Each Committee Chair (Admin) will be provided access to pull in existing member records via an email upload or via manual selection from existing member records

Future Meeting Plans

- Strive to eventually move back to mainly face-to-face meetings
- JTCM 2022 had been a scramble to sort out how to execute a hybrid (simultaneous F2F and Remote) meeting. May 2022 seemed to go more smoothly.
- We will continue to refine our hybrid meeting execution
- Hybrid meetings entail greater financial risk so plans will evolve

How Meetings are Paid For

- Many have expressed dismay at having to register and pay for virtual vs F2F participation
- The same number of meeting rooms are required whether 100% F2F vs hybrid
- Hotels provide meeting space in exchange for sales
  - Room block (heads in beds), food and beverage (F&B)
  - Virtual participants do not pay for rooms and F&B sales to support the cost of the meeting
  - The committee has to make up the difference via registration fees

Partial Meeting Attendance

- The PSRC and PSCC officers, and to some degree the larger membership, has had conversations regarding what price individuals should pay who want to attend a single WG meeting (or a few).
- The future policy has not yet been agreed upon.

III. Reports of Interest

A. Technical Paper Coordinator's Report: Michael Thompson

A reminder for all Main Committee members. *Reviewing papers for IEEE Transactions and Conferences is one of the responsibilities of all Main Committee Members.*

- **2023 Grid Edge Technologies Conference (April 10 to 13, San Diego, CA)**

- **3 Papers require technical review**
- **Call for reviewers will come out shortly**
- **Reviews and revision requests due October 10th**

IMAGINE NEW POSSIBILITIES AT THE EDGE

What happens when city planners, utility leads, and EV charging station developers engage in face-to-face conversations about distributed generation? Or when policymakers and design consultants align on how to maximize resources for the greatest impact?

The answer is we get closer to creating the more efficient, sustainable environments of tomorrow.

The new IEEE PES Grid Edge Technologies Conference & Exposition provides a much-needed forum for this kind of collaboration between stakeholders actively working at the edge.

- 2023 PES GM (July 16 to 20, Orlando, FL)
  - Call for panel session proposals due October 1st
  - Highlight important current topics in Power System Protection and Control
  - Two or four hour panel session proposals are requested
  - Send proposals to vice_chair@pes-psrc.org.
  - Provide an email with:
    - ✓ A title and summary
    - ✓ Proposed session chair
    - ✓ Possible speakers
    - ✓ We have one proposal already
    - ✓ CTF47 Integrating Relay Models with RMS Dynamic Simulations

- The IEEE PES invites proposals for tutorials in conjunction with the following 2023 PES Conferences: Due September 20 (Next Tuesday)
  - IEEE Innovative Smart Grid Technologies – North America (ISGT-NA) – 16 to 19 January – Washington, DC, USA - “Moving to a Self-Driving Grid” - https://ieee-isgt.org/
  - IEEE PES Grid Edge Technologies Conference and Exposition - 10 to 13 April - San Diego, CA, USA – “Transform the Edge” - https://pes-gridedge.org/
  - IEEE PES General Meeting – 16 – 20 July - Orlando, FL, USA – “Meeting the Energy Needs of a Dynamic World” - https://pes-gm.org/

- Proposals must be approved by the relevant Technical Committee (PSRC), Contact vice_chair@pes-psrc.org for application form.
- Length must be half day (4 hours) or full day (8 hours).

Event	Draft Presentation Due	Final Presentation	Dates of Conference
ISGT - NA	10 December 2022	7 January 2023	16 – 19 January 2023
Grid Edge	28 January 2023	19 March 2023	10 – 13 April 2023
General Mtg	5 May 2023	5 June 2023	16 – 20 July 2023

Future Meetings
Jan 8-12, 2023 - JTCM Jacksonville, FL
May 8 – 11, 2023 - Las Vegas, NV
Sept 18-21, 2023 - Myrtle Beach, SC

New Officers starting from Jan 2023
New PSRC Committee chair
-- Michael Thompson

New PSRC Committee Vice Chair
-- Gene Henneberg

New PSRC Committee Secretary
-- Jim Niemira

B. CIGRE Report - Mladen Kezunovic
(US Rep., B5, Protection and Automation)

The SC B5 meeting in Paris was a full day meeting with a long list of Agenda items, so below are perhaps most interesting items:

- Each of the existing SC B5 WG gave an update on their activities: The active WGs and their TOR (SOW) are listed at: https://b5.cigre.org/GB/technical-activities/working-groups-list
- Three new WG were voted for further Technical Council coordination and approval, namely (tentative titles):
  - Obsolescence management for PACS
  - Education, Qualification and Continuing Professional Development of Engineers in Protection, Automation and Control
  - Protection Principles to be applied in Distribution Networks in the Future
- Each WG has a placeholder for a US representative, so if someone is interested in participating and is a CIGRE member should let me know, and I will coordinate with the WG Conveners
- Preferential subjects for the next Paris meeting in 2024 that got most of the votes are (tentative titles):
  - Process bus: practical experiences, new developments, and possible synergies with virtualization and hardware consolidation
  - Acceptance, Commissioning, and Field Testing for Protection and Automation Systems: Challenges and Perspectives for a New era of Digital Substations
- The Technical Reports published since the last SC Paris meeting in 2020 are:
  - B5.62 (TB 843): Life Cycle Testing of Synchrophasor Based Systems used for Protection, Monitoring and Control

  - B5.52 (TB 854): Analysis and comparison of fault location systems in AC power networks
  - Green Book: IEC 61850 Principles and Applications to Electric Power Systems
- Instead of regular SCB5 Colloquium, a Symposium in Cairns, Australia will take place 4-7 Sept 2023. Synopsys deadline is Nov 4. Further details are at: https://cigrecairns23.com.au/
- Several proposals for Tutorials were suggested for the 2023 Symposium. Since 10 CIGRE SCs are participating in the symposium, further coordination is needed to make a decision

Besides the events in Paris, the US National Committee is organizing a regular **Grid of the Future** conference to be held Nov. 7-10, 2022 in Chicago. Further details are posted at: https://cigre-usnc.org/grid-of-the-future-2022/.

C. IEEE PES Report – Murty Yalla

- First in-person PES GM in two years – Denver, CO
- Technical Council met at the PES GM and a brief summary of items discussed which are relevant to PSRC are as follows:
  - Areas of focus from the PES Governing Board - Improve industry engagement by increasing industry-focused panels at the GM.
  - Increase industry focused papers, Improve global participation.
  - Engage Young Professionals in technical activities
  - IEEE SA Staff & Volunteer Leadership Updates
    o New Program manager, A. Altvater will begin role on 8/8, and Shana Pepin will be transitioning to a new role with Standards
  - 2022 – PES Tech Council Strategic Planning Retreat Nov. 18 - 19, 2022, I will be attending the retreat.
  - PES website rebuild will be completed by the end of the calendar year
  - PES is putting together a formal operations manual for all aspects of the Society. All content will be streamlined into one big operations manual.

D. IEC Report for September 2022: Eric A. Udren

IEC Technical Committee 95, *Measuring relays and protection systems*

- Chair – Dr. Murty Yalla, US
- Secretary – Thierry Bardou, France
- 22 participating member nations

US Technical Advisory Group to USNC for TC 95

- Eric Udren, Technical Advisor to US Natl. Cmte. of IEC (hosted by ANSI) & Chair of PSRC I4 that hosts TAG reviews of IEC docs
- Normann Fischer, Deputy TA and Vice Chair of I4

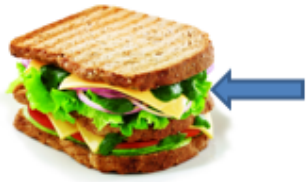
Financial & admin support for US & USNC work in TC 95 standards:

- US DOE - Pacific Northwest National Laboratories (PNNL)
- Jeff Dagle, PNNL, TAG Administrator
- PNNL covers ANSI fees and keeps US engaged in IEC TC 95 standards.

Standards Projects 1

Three most important ***relay product design and type test*** standards under revision with new requirements including configuration of relays under test:

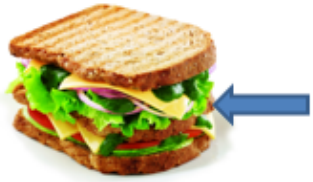
- 60255-1 Ed 2 - *Common Requirements* – CDV approved; await FDIS.
- 60255-26 Ed 4 - *EMC requirements* – CDV approved; await FDIS.
- 60255-27 Ed 3 - *Safety requirements* – CDV approved; await FDIS.
- 60255-21-1,2,3 – *Mechanical tests* – merged into one CD - early 2023.
- These impact product designers and manufacturers.
- We set up PSRC WGs working on IEEE equivalents to align with IEC.
- Our IEEE–IEC alignment initiatives since 2000:
  - Align requirements – avoid conflicts.
  - Comparable type tests should have the same test setups and procedures.
  - Align test levels and values – differences only as clearly justified.
  - Result – vendors and labs can run one set of compliance tests for both IEC and IEEE standards – *huge cost, efficiency, and product reliability benefits.*



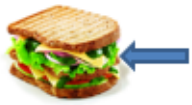
Standards Projects 2

Functional and product performance standards:

- 60255-187-3 – *Functional standard for line differential relays* – CD soon.
  - PSRC will restart D34 to review and comment.
  - Splitting out channel issues in the separate project TR 60255-216-3.
- 60255-187-2 – *Functional standard for busbar differential relays* – work restarted as 187-3 CD approaches.
- 60255-132 – Functional standard for directional power relays – *new project*, CD in 2022.
- 60255-167 - Functional standard for directional relays – *new project*, CD in 2022. Directional functionality only; overcurrent covered in published 60255-151.



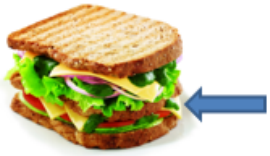
Standards Projects 3



- TC 95 - PSRC JWG for 60255-24/C37.111 dual logo COMTRADE in process.
- 60255-216-1 – *Digital Interface - Requirements for relays with digital I/O* (e.g., merging units) – Technical Report already issued as CD is proposed to become a Technical Standard with its voting sequence.
- 60255-216-3 - Digital Interface - Test specification for protection data communication of Line Current Differential Protection
  - Line Current Differential Protection with TDM or Ethernet, e.g. T1 or MPLS. Specify tests to verify correct operation in support of 87L function during healthy or faulted power system conditions considering comms problems of data loss, corrupt data bits, changes of latency, asymmetric latency, path interruptions and re-routing, and jitter or packet delay variation (PDV).
  - Split out from 187-3 development of protection function performance.
  - Revised New Project (NP) proposal issued for vote by 9/23.
  - Topic of shared interest with PSCC.
  - **Soliciting more volunteers with expertise in teleprotection data channels.**

TC 95 Plenary Meeting

- October 6, St. Petersburg, FL.
- Hybrid meeting
- Registered delegations from participating TC 95 nations.
- US delegation to include those involved in TC 95 standards developments and process.
- Agenda available for review.
  - Standards project status and program of work.
  - Maintenance team and working group reports.
  - Voting items including making 216-1 a technical specification.
  - Membership and participation review.
  - TC 95 leadership, project team leadership, and liaison updates.
  - IEC-level and horizontal activities reports.



E. Standards Coordinators Report: Don Lukach

This report summarizes the status of PAR related projects as of the September 2022 meeting.

All PARs that needed actions were individually addressed before and during the PSRC meeting week.

New Participant Slides required from SA. See IEEE-SA Website Participant-Behavior-Individual-Method.pdf (ieee.org)

New mandatory SA training for all PSRC Officers, Subcommittee Officers, and Working Group Officers that was discussed in May is still not finalized from IEEE SA. The understanding is that the following training is still required but implementation details from SA have not been received.

IEEE SA Standards Group Chair Fundamentals Training
Understanding IEEE SA's Antitrust, Competition, and Commercial Terms Policies
Implementation June 1, 2022
Due December 31, 2022
https://standards.ieee.org/content/ieee-standards/en/about/policies/index.html

Two motions were made by the Standard's Coordinator associated with Joint Committee work for 1547 and to move K10 which was SCC21 Coordination into a B working group due to scope change and that SCC21 is now SC21.

Motion 1

PSRC Standard Coordinator motions for the PSRC to establish a Joint Committee project in a Non-Lead Role under the B Subcommittee in a Liaison relationship for the revision of IEEE 1547-

2018: Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces.

Motion by Don Lukach, second by Russ Patterson, following a fair amount of discussion, motion passes. Vote: Unanimous

Motion 2

PSRC Standard Coordinator motions for the PSRC to establish a new standing B Subcommittee Working Group for coordination with the SC21 IEEE Distributed Generation, Energy Storage and Interoperability Standards Committee.

Assignment: To interface with SC21 and related standards in order to proactively provide PSRC input into the SC21 working group's development efforts.

Chair: Benjamin Kazimier

Vice Chair / Secretary: Mathew Garver

Note: This new B group takes the place of the old K10 and provides the group to provide the liaison to 1547.

Motion by Jim Niemira, second by Craig Pruess. Following lots of discussion, the vote was: approve= 46, no=6, abstain=7 motion passes

Main Committee PAR Submissions:

Please refer to the Main Committee minutes for specific Subcommittee PAR motions.

Completed PAR projects in 2022:

C37.106	Guide for Abnormal Frequency Protection for Power Generating Plants (SASB Approved 16JUN22. Awaiting publication.)

Joint Committee PAR projects that PSRC is in a Non-Lead Role:

P1854	Guide for Smart Distribution Applications
P0018	Standard for Resilient Positioning, Navigation and Timing (PNT) End-User Equipment
PC37.431.20	Guide for Modern Protection System for Static Var Compensators
P1547	Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces
P1547.10	Recommended Practice for DER Gateways

PAR Expiration dates and their Status:

A total of 12 PARs expire at the end of 2022. All have either been submitted or plan to be submitted to NesCom by the October 13 submission date.

Project Number	Project Title	Expiration PAR Date	Project Status
PC37.1.2	Guide for Databases Used in Utility Automation Systems	31 Dec 2022	Draft Development
P1613	Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus	31 Dec 2022	SA Ballot: Comment Resolution
PC37.90	Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – General Requirements and Tests	31 Dec 2022	Draft Development
PC37.249	Guide for Categorizing Security Needs for Protection, Automation, and Control Related Data Files	31 Dec 2022	SA Ballot: Comment Resolution
PC37.92	Standard for Low-Energy Analog Interfaces between Protective Relays and Power System Signal Sources	31 Dec 2022	SA Ballot: Recirculation
PC37.2	Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations	31 Dec 2022	RevCom Agenda(19 Sep 2022)
PC37.233	Guide for Power System Protection Testing	31 Dec 2022	SA Ballot: Comment Resolution
PC37.251	Standard for Common Protection and Control Settings or Configuration Data Format (COMSET)	31 Dec 2022	Draft Development
PC37.102	Guide for AC Generator Protection	31 Dec 2022	SA Ballot: Comment Resolution
PC37.300	Guide for Centralized Protection and Control (CPC) Systems within a Substation	31 Dec 2022	Draft Development
P2030.100.1	Monitoring and Diagnostics of IEC 61850 Generic Object Oriented Status Event (GOOSE) and Sampled Values Based Systems	31 Dec 2022	Draft Development
P2030.12	Guide for the Design of Microgrid Protection Systems	31 Dec 2022	SA Ballot: Comment Resolution
PC37.90.2	Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – Radiated Electromagnetic Interference Withstand Capability Requirements and Tests	31 Dec 2023	SA Ballot: Comment Resolution
PC37.110	Guide for the Application of Current Transformers Used for Protective Relaying Purposes	31 Dec 2023	SA Ballot: Comment Resolution

P1646	Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation	31 Dec 2023	Draft Development
PC37.252	Guide for Testing Automatic Voltage Control Systems in Regional Power Grids	31 Dec 2023	Draft Development
PC37.1.3	Recommended Practice for Human Machine Interfaces (HMIs) used with Electric Utility Automation Systems	31 Dec 2023	Draft Development
PC37.109	Guide for the Protection of Shunt Reactors	31 Dec 2023	Draft Development
PC37.99	Guide for the Protection of Shunt Capacitor Banks	31 Dec 2023	Draft Development
PC37.431.20	Guide for Protecting Transmission Static Shunt Compensators	31 Dec 2023	Draft Development
PC37.90.3	Standard Electrostatic Discharge Tests for Protective Relays	31 Dec 2024	SA Ballot: Comment Resolution
PC37.114	Guide for Determining Fault Location on AC Transmission and Distribution Lines	31 Dec 2024	Draft Development
PC37.90.1	Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus-Surge Withstand Capability (SWC) and Electrical Fast Transient (EFT) Requirements and Tests	31 Dec 2024	Draft Development
PC37.113	Guide for Protective Relay Applications to Transmission Lines	31 Dec 2024	Draft Development
PC37.95	Guide for Protective Relaying of Utility-Consumer Interconnections	31 Dec 2024	Draft Development
P1854	Guide for Smart Distribution Applications	31 Dec 2024	Draft Development
PC37.101	Guide for Generator Ground Protection	31 Dec 2024	Draft Development
PC37.96	Guide for AC Motor Protection	31 Dec 2025	Draft Development
PC37.243	Guide for Application of Line Current Differential Protection Using Digital Communications	31 Dec 2025	Draft Development
PC37.239	Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems	31 Dec 2025	Draft Development
P2800.2	Recommended Practice for Test and Verification Procedures for Inverter-based Resources (IBRs) Interconnecting with Bulk Power Systems	31 Dec 2025	Draft Development

PC37.232	Standard for Common Format for Naming Time Sequence Data Files (COMNAME)	31 Dec 2025	Draft Development
PC37.119	Guide for Power System Circuit Breaker Failure Protection	31 Dec 2026	Draft Development
P1547	Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces	31 Dec 2026	Draft Development
P1547.10	Recommended Practice for Distributed Energy Resources (DER) Gateway Platforms	31 Dec 2026	Draft Development

All PSRC Lead Committee PAR Projects:

Project Number	Co-Standards Committee	Project Title	Project Status
PC37.90.3	EMC/SDCom	Standard Electrostatic Discharge Tests for Protective Relays	SA Ballot: Comment Resolution
PC37.114		Guide for Determining Fault Location on AC Transmission and Distribution Lines	Draft Development
PC37.90.1	EMC/SDCom	Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus-Surge Withstand Capability (SWC) and Electrical Fast Transient (EFT) Requirements and Tests	Draft Development
PC37.113		Guide for Protective Relay Applications to Transmission Lines	Draft Development
PC37.95		Guide for Protective Relaying of Utility-Consumer Interconnections	Draft Development
P1854	PE/PSCC, PE/PSRCC	Guide for Smart Distribution Applications	Draft Development
PC37.1.2		Guide for Databases Used in Utility Automation Systems	Draft Development
P1613	PE/T&D, EMC/SDCom	Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus	SA Ballot: Comment Resolution
PC37.90		Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – General Requirements and Tests	Draft Development
PC37.90.2	EMC/SDCom	Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – Radiated Electromagnetic	SA Ballot: Comment Resolution

		Interference Withstand Capability Requirements and Tests	
2800	PE/EM, PE/PSRCC	Standard for Interconnection and Interoperability of Inverter-Based Resources (IBR) Interconnecting with Associated Transmission Electric Power Systems	Completed
PC37.96		Guide for AC Motor Protection	Draft Development
PC37.243	PE/PSCC	Guide for Application of Line Current Differential Protection Using Digital Communications	Draft Development
PC37.239		Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems	Draft Development
P2800.2	PE/PSRCC, PE/AMPS, PE/T&D, PE/EM	Recommended Practice for Test and Verification Procedures for Inverter-based Resources (IBRs) Interconnecting with Bulk Power Systems	Draft Development
PC37.249		Guide for Categorizing Security Needs for Protection, Automation, and Control Related Data Files	SA Ballot: Comment Resolution
PC37.232		Standard for Common Format for Naming Time Sequence Data Files (COMNAME)	Draft Development
PC37.92		Standard for Low-Energy Analog Interfaces between Protective Relays and Power System Signal Sources	SA Ballot: Recirculation
PC37.119		Guide for Power System Circuit Breaker Failure Protection	Draft Development
P1547	PEL/SC, PE/T&D, COM/PLC, PE/EDPG, PE/EM, PE/PSCC, PE/PSRCC	Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces	Draft Development
P1547.10	PE/T&D, PE/EDPG, PE/PSCC, PE/PSRCC, COM/PLC	Recommended Practice for Distributed Energy Resources (DER) Gateway Platforms	Draft Development
PC37.111		International Standard - Measuring relays and protection equipment – Part 24: Common format for transient data exchange (COMTRADE) for power systems	NesCom Agenda (19 Sep 2022)

PC57.13.3		Guide for Grounding of Instrument Transformer Secondary Circuits and Cases	NesCom Agenda (25 Oct 2022)
C37.90.3		Standard for Electrostatic Discharge Tests for Protective Relays	Completed
C37.109		Guide for the Protection of Shunt Reactors	Completed
C37.102		Guide for AC Generator Protection	Completed
C37.231		Recommended Practice for Microprocessor-based Protection Equipment Firmware Control	Completed
C37.111		Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems	Completed
C37.99		Guide for the Protection of Shunt Capacitor Banks	Completed
C37.96		Guide for AC Motor Protection	Completed
C37.90.1		Standard Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus	Completed
C37.95		Guide for Protective Relaying of Utility-Consumer Interconnections	Completed
C57.13.3		Guide for Grounding of Instrument Transformer Secondary Circuits and Cases	Completed
C37.241		Guide for Application of Optical Instrument Transformers for Protective Relaying	Completed
C37.243		Guide for Application of Digital Line Current Differential Relays Using Digital Communication	Completed
C37.114		Guide for Determining Fault Location on AC Transmission and Distribution Lines	Completed
C37.113		Guide for Protective Relay Applications to Transmission Lines	Completed
C37.245		Guide for the Application of Protective Relaying for Phase Shifting Transformers	Completed
1613.1	PE/T&D	Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Transmission and Distribution Facilities	Completed
C37.103		Guide for Differential and Polarizing Relay Circuit Testing	Completed
2030.100		Recommended Practice for Implementing an IEC 61850 Based Substation Communications, Protection, Monitoring and Control System	Completed

C37.237	PE/SUB	Standard Requirements for Time Tags Created by Intelligent Electronic Devices - COMTAG(TM)	Completed
2030.101		Guide for Designing a Time Synchronization System for Power Substations	Completed
C37.246		Guide for Protection Systems of Transmission to Generation Interconnections	Completed
60255-118-1		Measuring Relays and Protection Equipment - Part 118-1: Synchrophasor for Power System - Measurements	Completed
C37.119		Guide for Breaker Failure Protection of Power Circuit Breakers	Completed
C37.247		Standard for Phasor Data Concentrators for Power Systems	Completed
C37.116		Guide for Protective Relay Application to Transmission-Line Series Capacitor Banks	Completed
C57.13.1		Guide for Field Testing of Relaying Current Transformers	Completed
C37.230		Guide for Protective Relay Applications to Distribution Lines	Completed
C37.91		Guide for Protecting Power Transformers	Completed
C37.250		Guide for Engineering, Implementation, and Management of System Integrity Protection Schemes	Completed
PC37.2		Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations	RevCom Agenda(19 Sep 2022)
C37.235		Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes	Completed
PC37.110		Guide for the Application of Current Transformers Used for Protective Relaying Purposes	SA Ballot: Comment Resolution
C37.248	PE/SUB	Guide for Common Format for Naming Intelligent Electronic Devices (COMDEV)	Completed
C37.242		Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control	Completed
C37.108		Guide for the Protection of Secondary Network Systems	Completed
PC37.233		Guide for Power System Protection Testing	SA Ballot: Comment Resolution

PC37.251		Standard for Common Protection and Control Settings or Configuration Data Format (COMSET)	Draft Development
C37.112		Standard Inverse-Time Characteristic Equations for Overcurrent Relays	Completed
C37.234		Guide for Protective Relay Applications to Power System Buses	Completed
PC37.102		Guide for AC Generator Protection	SA Ballot: Comment Resolution
P1646		Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation	Draft Development
C37.120		Protection System Redundancy for Power System Reliability	Completed
PC37.101		Guide for Generator Ground Protection	Draft Development
PC37.300		Guide for Centralized Protection and Control (CPC) Systems within a Substation	Draft Development
P2030.100.1		Monitoring and Diagnostics of IEC 61850 Generic Object Oriented Status Event (GOOSE) and Sampled Values Based Systems	Draft Development
C37.104		Guide for Automatic Reclosing on AC Distribution and Transmission Lines	Completed
C37.106		Guide for Abnormal Frequency Protection for Power Generating Plants	Completed
P2030.12		Guide for the Design of Microgrid Protection Systems	SA Ballot: Comment Resolution
PC37.252		Guide for Testing Automatic Voltage Control Systems in Regional Power Grids	Draft Development
PC37.1.3		Recommended Practice for Human Machine Interfaces (HMIs) used with Electric Utility Automation Systems	Draft Development
PC37.109		Guide for the Protection of Shunt Reactors	Draft Development
PC37.99		Guide for the Protection of Shunt Capacitor Banks	Draft Development
PC37.431.20	PE/PSRCC	Guide for Protecting Transmission Static Shunt Compensators	Draft Development

F. IEEE P1547 and SCC21 – Ben Kazimier

General Disclaimer

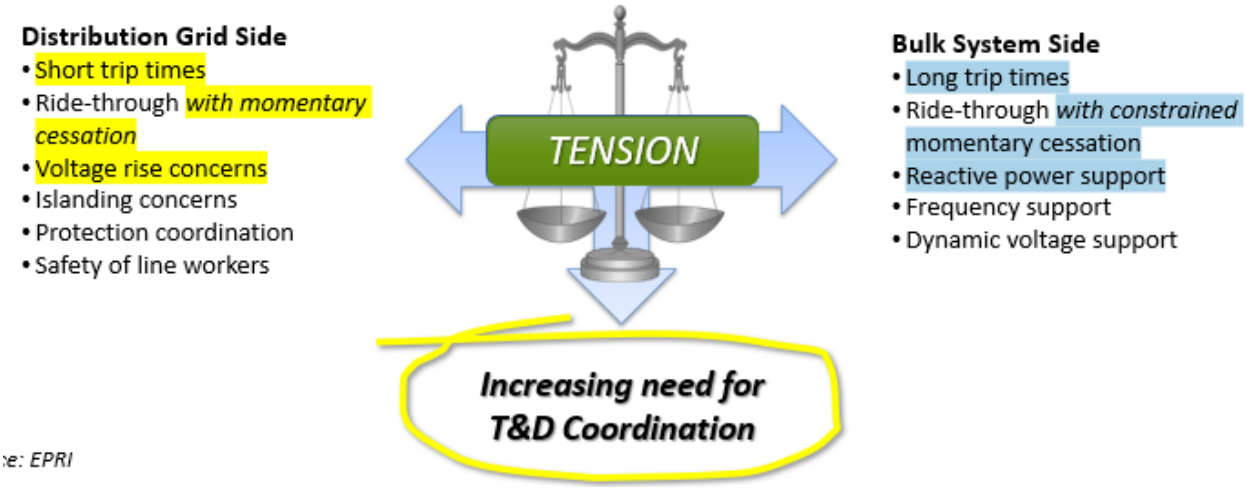
The views presented in this presentation are the personal views of the individuals presenting it and shall not be considered the official position of the IEEE Standards Association or any of its committees and shall not be considered to be, nor be relied upon as, a formal position of IEEE, in accordance with IEEE Standards Association Standards Board Bylaws 5.2.1.6.

Use of an IEEE standard is wholly voluntary.

Some content presented here is based on an unapproved proposed IEEE Standard (e.g., IEEE P1547.2). As such, the document is subject to change, any draft requirements and figures shown in this presentation may change.

The purpose of this presentation is intended to raise awareness and encourage PSRC-associated SA members in the P1547.2 ballot pool to carefully review and engage in the next recirculation of the draft standard.

Balancing Bulk & Distribution Grid Needs
Changing Paradigm



e: EPRI

IEEE Std C37.230™-2020, IEEE Guide for Protective Relay Applications to Distribution Lines
7.6 Distributed energy resources

Sub-clauses in 7.6:

- 7.6.1 Protective device coordination
- 7.6.1.1 DER transfer trip communications
- 7.6.1.2 Directional relays applied to DER
- 7.6.2 Islanding
- 7.6.3 Grounding

Word Count: 3x "ride through"

- Not DER related:
  - 7.3.3 Setting guidelines for abnormal frequency load shedding
  - 7.5.1 Traditional adaptive schemes
- DER related:
  - 7.6 Distributed energy resources

Great document overall!

Example language from 7.6:

Areas with very high penetrations of solar have had to operate what was once a radial distribution feeder as a network, following transmission operating guidelines. IEEE Std 1547-2018 [B59] provides capability, upon agreement of the utility, for the utility and the inverter PV solar to "ride through" voltage and frequency variations caused by remote system faults.

- **Not quite correct, more accurate to say, "to the degree determined by the utility," because IEEE 1547-2018™ requires DER ride-through in all cases but configuration of DER trip settings determine the degree to which the DER ride-through capability is utilized.**

IEEE P1547.2, Draft Guide for Application of IEEE Std 1547-2018

6.2.1.5 Considerations when Setting Protection Devices in Distribution Utility Equipment with DER Ride-Through

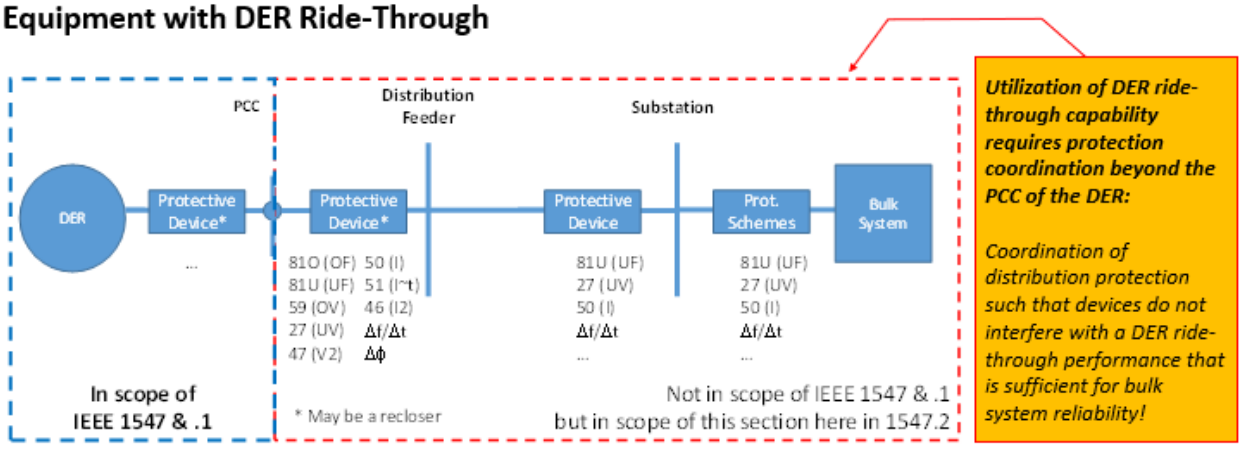
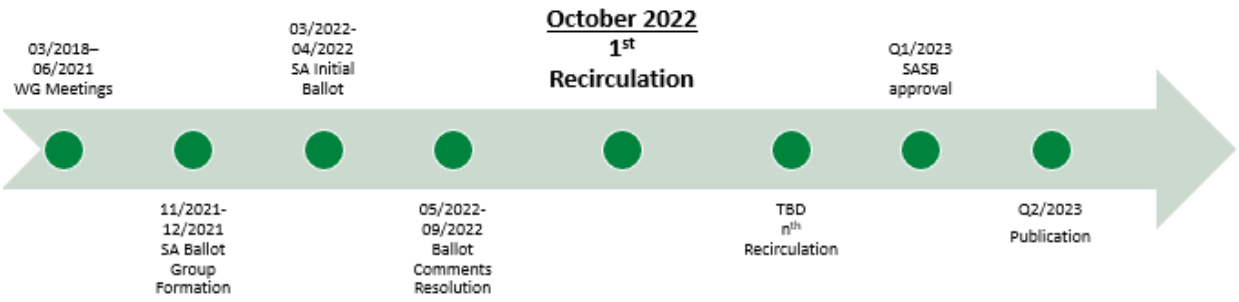


Figure 6 — Examples for distribution utility equipment that is not in the scope of IEEE 1547-2018 but may impact BPS reliability in areas with increasing DER deployment. Note: scope outside of IEEE 1547 is not necessarily covered by other IEEE standards like IEEE 2800-2022 [B29].

Next Steps

@All PSRC Members who are also members of the P1547.2 SA Ballot Pool: *please review the draft and submit your comments!*



G. PSCC Committee Report: Mark Benou, Secretary PSCCC

- PSCCC held 29 meetings this week including sub-group meetings of the P, S, and C subcommittees, a newcomers meeting on Monday, and 3 subcommittee meetings. We also had a PNNL presentation, A Cyber Risk-Informed Verification and Validation Framework and Tool, on Tuesday. At 11AM today, we will have our main committee meeting in this room.
- We will be announcing our new Secretary at the MC meeting. Craig Preuss will be completing his term as Chair at the end of the year. James Formea will be our new Chair.
- Benton Vandiver will be completing his term as Chair of P0 this year. The new P0 chair will be Tom Dahlin

- As always, we are appreciative of the close working relationship with the PSRC. I would like to thank Gene for all the hard work has put in during the last two years. He has done an amazing job, as have all the PSRC officers during these unprecedented times.
- The PSCCC has 5 active subcommittees, 3 of which meet with us during our three in-person meetings.
- These are the highlights

- **C0 - Power Line Carrier Subcommittee**
  - C2 – Study Group for IEEE C93.4 – Standard for Power Line Carrier Line-Tuning Equipment (30 kHz to 500 kHz) Associated with Power Transmission Lines, submitted their PAR this week.
  - PC93.5 – Standard for Power Line Carrier Transmitters/Receivers used to Transfer Discrete Teleprotection Signals – Corrigendum 1, successfully formed their ballot body, the document was approved and should be published by the end of the week.
  - PC57.13.9 - Standard for Power-Line Carrier Coupling Capacitors and Coupling Capacitor Voltage Transformers, co-sponsored with PES / Transformers Committee / Instrument Transformers Subcommittee is forming a ballot body

- **P0 – Protocols and Communication Architecture Subcommittee**
  - P21SG motion to form a Task Force was approved. They will provide a technical report on the impact of CPC systems as described in PC37.300 (H45) and related standards. For this scope, they will seek to meet jointly with the suitable PSRC WG
  - P18WG - Guide for Smart Grid interop of ET and ITO w/EPS, End-Use Apps and Loads (P2030-2011 revision), chair Tony Johnson has requested anyone interested in this revision to please participate.

- **S0 – Cybersecurity Subcommittee**
  - S1 - Revision of IEEE 1686 IED Cyber Security Capabilities, made a motion to request permission from PSCCC to submit Draft 1.4 (the draft from the most recent recirculation ballot) to RevCom for publication.
  - S9 - Study Group on Utility IT-OT Cybersecurity Challenges in Roles and Terminology, has completed its report and will be submitting it to S0 membership for review and comment.
  - S15 - Guide for Securing Generic Object Oriented System Events (GOOSE) and Sampled Values(SV) Protocols of IEC 61850 using IEC 62351-6 and IEC 62351-9, continues its work and notes that industry interest it eh subject matter (security of GOOSE and SV) has increased. Discussions in the meeting focused on attack vectors.

H. IEEE P1952 Resilient PNT UE Standard Working Group

Electricity Precision Timing Use Cases for IEEE P1952
Standard for Resilient Positioning, Navigation, and Timing (PNT) User Equipment
Liaison report to IEEE PSRC September 15, 2022
DJ Anand, Jay Anderson, Jeff Dagle, Ken Fodero, Marcel Geor, Terry Jones, Steve Klecker, Dean Ouellette

IEEE P1952 Scope: This standard specifies technical requirements and expected behaviors for resilient Positioning, Navigation, and Timing (PNT) User Equipment (UE). The scope is limited to the reception, ingestion, processing, handling, and output of PNT data, information, and signals. The scope does not include standards relating to the characteristics of PNT sources. Based on technical requirements, the standard defines different levels of resilience to enable users to select a level that is appropriate based on their risk tolerance, budget, and application criticality. This standard applies to UE that outputs PNT solutions, including PNT systems of systems, integrated PNT receivers, and PNT source components (such as Global Navigation Satellite System (GNSS) chipsets). P1952 is sponsored by the Virtualized and Software Defined Networks, and Services Standards Committee (IEEE Communication Society) and jointly sponsored by the IEEE Geoscience and Remote Sensing Society (PAR approved May 2021).

Electricity Use Case Team: Developed precision timing use cases for the following applications:

- Line current differential protection
- Traveling wave fault location
- Traveling wave protection
- Synchrophasors (IEC/IEEE 60255-118-1)
- Sampled values (IEC 61850-9-2) – Process Bus
- Disturbance monitoring and reporting (Sequence-of-Event (SOE) logging)

These electricity precision timing use cases have been presented to the Use Case team, which provided comments. The Electric Sector use case team will be meeting to address the received comments and formulate replies. When complete, the Electric Sector use cases will be combined with use cases from other sectors, and with consideration of potential threats, hazards, and disruptions to resilient PNT, will serve as an input to the newly emerging resilient PNT UE standard.

Primary interaction with the PSRC: This activity is closely aligned with the H50 working group: Requirements for Time Sources in Protection and Control Systems. H50 will produce a report on the requirements for time sources in protection and control systems.

Note:
Responses received seemed to focus on developing performance metrics (which would be tied to the specific use cases) including providing (testable) numbers and related performance thresholds. This could include minimum required vs desired performance level, etc., relationship to UTC, etc.

Among the concepts we will be discussing is in terms of categorization would be the expected impact to the Grid for improper operation of PNT timing assets in power systems. For example, a number of the use cases above are necessary for faster and more effective forensics following a power system event (fault location and post-event analysis are examples). Several of the other applications may be able to continue to operate even with a disruption to, for example, a global time reference. Depending on the attack or failure vector, PNT-involved disruptions may be local (or otherwise limited) in scope rather than system-wide.

H. J. NERC Report: Rich Bauer

- Standard Developments
- SARs on the horizon
- Disturbance Reports
- NERC SPCWG

PRC-005-6

- No new developments since May report
- Standard Drafting Team debating on change to Protection System definition in NERC Glossary (add protective function)

PRC-019-2

- No new developments since May report
- Standard Drafting Team leaning towards not including transmission connected stand alone FACTS devices (SVC/STATCOM) and HVDC terminal equipment (VSC/LCC) in the Standard

PRC-023 SAR

- Draft 1 going to Standards Committee for approval to post
- Draft retires R2 (Each Transmission Owner, Generator Owner, and Distribution Provider shall set its out-of-step blocking elements to allow tripping of phase protective relays for faults that occur during the loading conditions used to verify transmission line relay loadability)

PRC-002 SARs accepted by Standards Committee

- Draft 1 of PRC-002 Version 4 posted for comment 6/9/2022 thru 7/25/2022
- 66.9% Approval

	Ballots	Non-binding Poll
	Quorum / Approval	Quorum / Supportive Opinions
PRC-002-4	86.94% / 66.90%	85.3% / 69.1%
Implementation Plan	87.85% / 75.89%	N/A

- Only Glencoe Light SAR is addressed in Draft 1

Notify other owners of BES Elements, *for which the Transmission Owner does not record SER or FR data,* connected *directly* to those BES buses *that they are responsible for recording the SER or FR data*. This notification is required, if any, within 90 -calendar days of completion of Part 1.1, that those BES Elements require SER data and/or FR data. If the owner of a BES Element is no longer required to have SER or FR data, notify the owner within 90 -calendar days

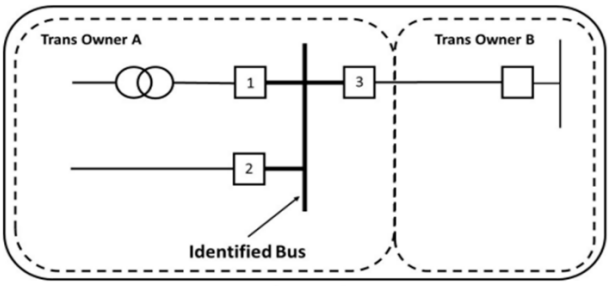


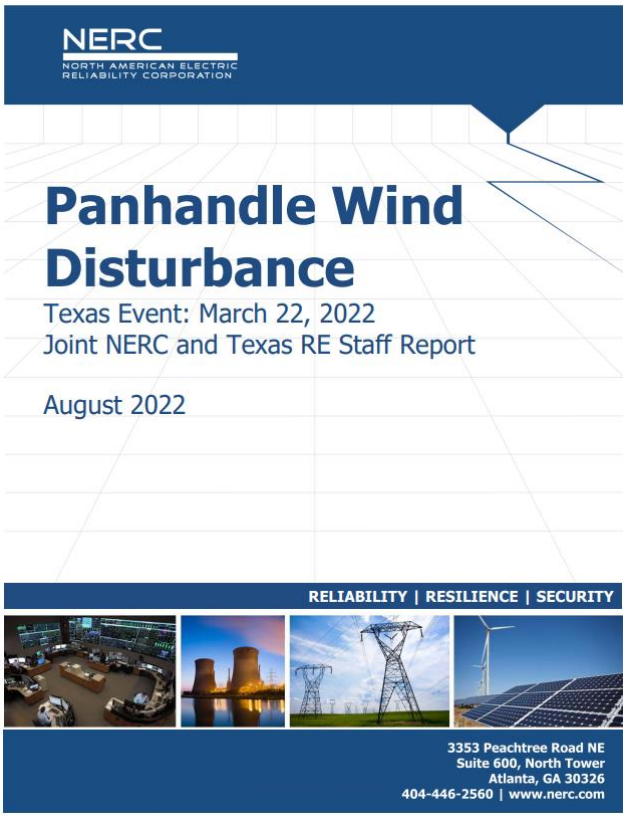
Figure 3

PRC-024 SAR posted for comment 5/31/2022 thru 7/14/2022

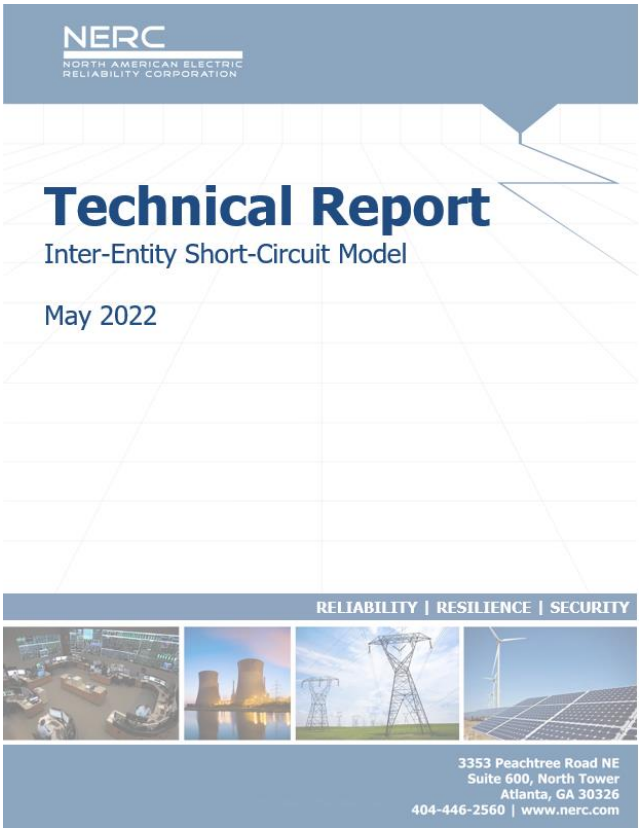
- 66% did not agree with the scope of the SAR

PRC-004 SAR coming…still

- Clarify requirements for IBR analysis (interrupting device)
- > 20MVA

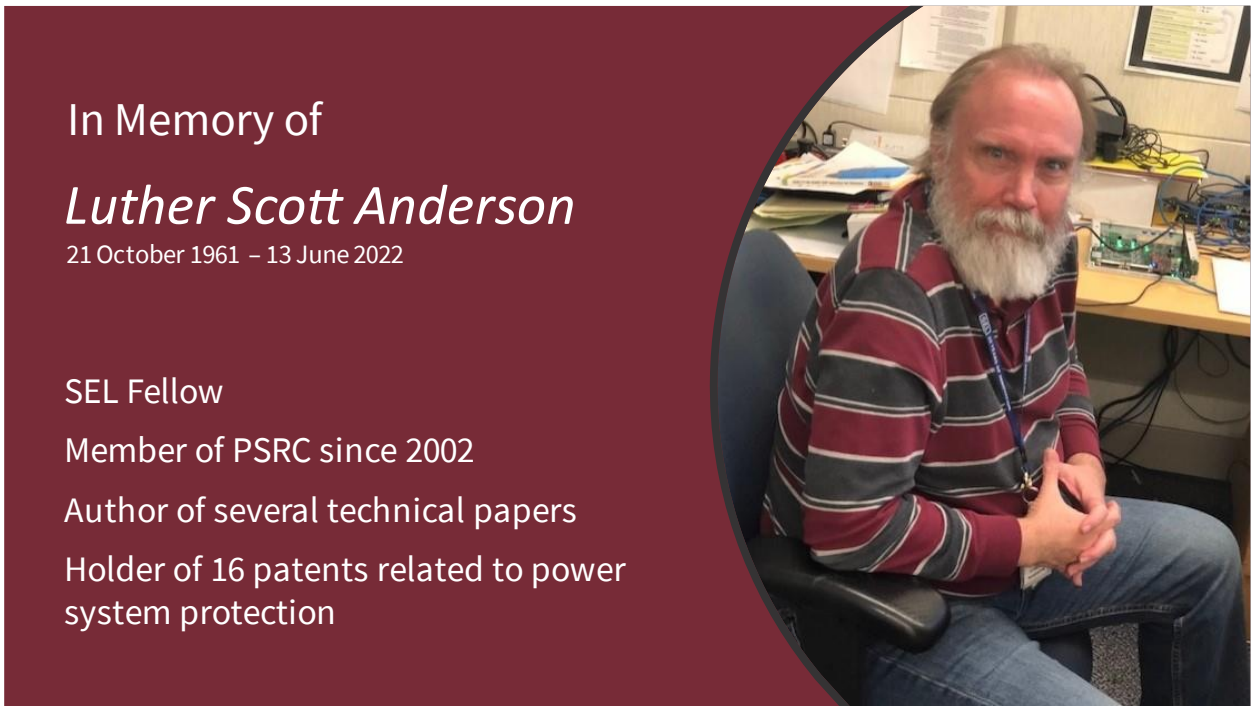


Two normally cleared 345 kV line faults result in significant wind generation reduction.
765MW (492MW non-consequential) and 457MW, total loss, respectively.



NERC SPCWG Short-Circuit Model Coordination
Approved yesterday [September 14, 2022]

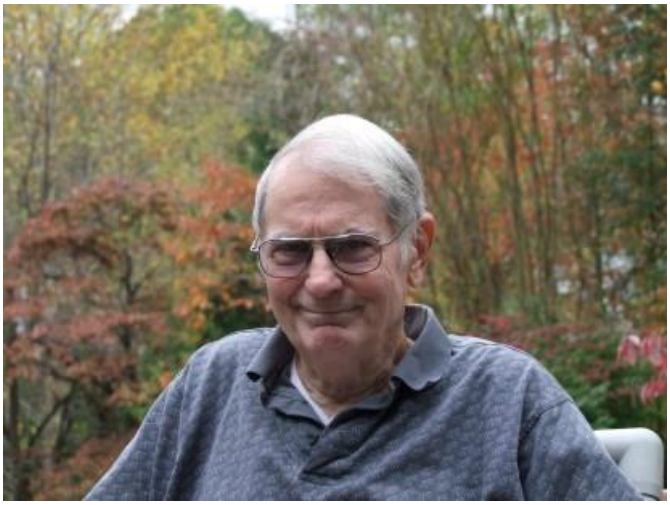
I. Other Reports of Interest



George D. Rockefeller

1927 – July 2022

- Former PSRC Chair
- Inventor of the computer-based protective relay, 1967.
- Top Westinghouse relay expert to 1973.
- Manager of System Protection at Con Edison Company of NY, 1973-1979.
- Industry consultant 1979-

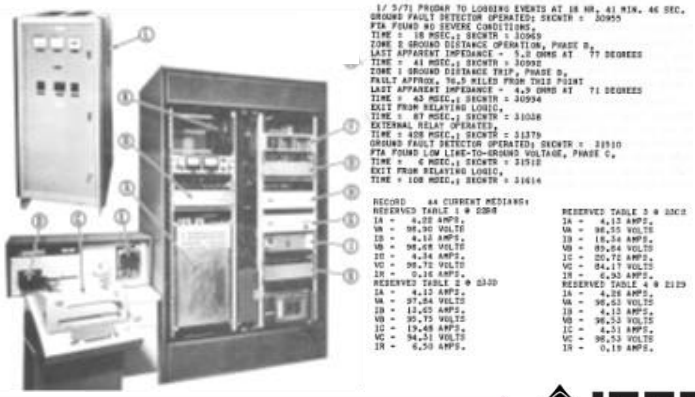


George's work transformed P&C

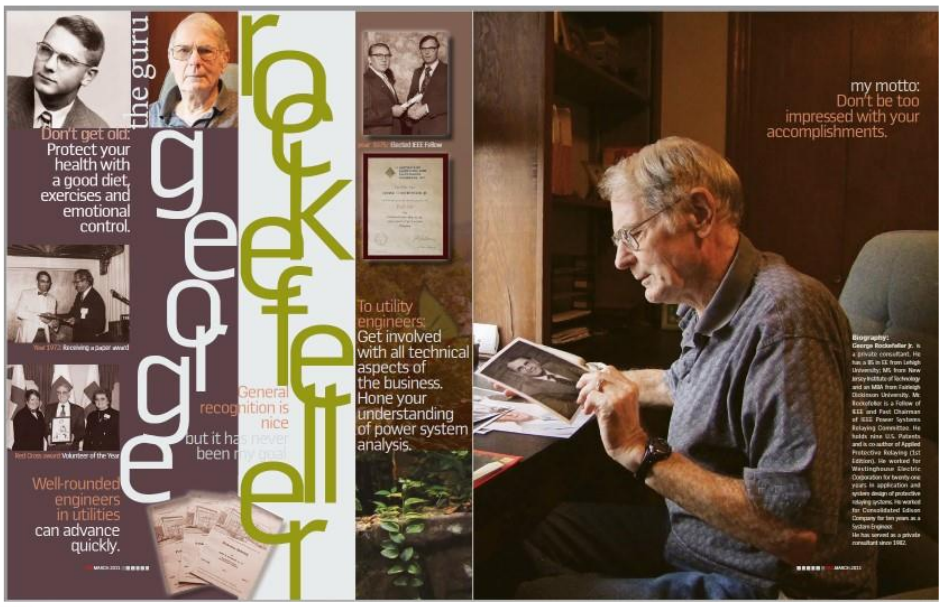
- Led development of world's first transmission line relay based on a digital computer - installed at PG&E Tesla Substation in February 1971.
- Recipient of 2016 IEEE PES IEEE Herman Halperin Electric Transmission and Distribution Award "for invention, development, and practical field demonstration of protective relaying of electric power systems with digital computer techniques"

In EM era, his relay demonstrated:

- Sampling A/D conversion and algorithms
- Event logging and oscillography data stream
- Full system in one relay
- Self-monitoring



PACWorld Industry Guru - March 2011



IEEE PES Power & Energy Society®

IEEE

J. Advisory Subcommittee Reports - Murty Yalla

- PSRC committee will set up a section on the website to include pictures of award certificate presentations for various awards during May and September meetings.
- PSRC committee will be adding a memorial page on the website to honor PSRC committee past contributors who passed away. If you know some one who passed away, please email name with a brief information to chair@pes-psrc.org so that it can be placed on the PSRC committee website.

K. Administrative Working Groups

B1: <u>Awards and Technical Paper Recognition Working Group</u>
Chair: Hugo Monterrubio
Vice Chair: Mal Swanson

PSRC Awards Ceremony

- The PSRC/PSCC Awards Ceremony took place this Monday during our welcome reception chaired by **Hugo Monterrubio**
- Individual and WG awards were given including:
  - PSRC Service Awards for 25, 40 and 50 years of service
  - PSRC Career Awards
  - Completed WG Awards

- Awards announced or presented included:
  - IEEE SA Awards
    - IEEE C37.104-2022
    - IEEE C37.230-2020

REMINDER

Standards WG Awards/Certificates

- The IEEE Standards Association Working Group Awards procedure to request certificates of appreciation for completed (Approved Standard) work has to be initiated online by the WG Chair or Vice Chair
- IEEE SA Awards website:

http://standards.ieee.org/develop/awards/wgchair/wgawards.html

- You may ask for these awards to be shipped directly to each member if you provide individual shipping addresses or to you at the hotel where we will meet next

PSRC Distinguished Service Awards

- 2019 – Charlie Henville
- 2020 – Russ Patterson

PSRC Individual Awards

- Outgoing SC Chair
  - D 2018-2020 – Karl Zimmerman
  - I 2018-2020 – Brian Mugalian
  - C 2018-2020 – Gene Henneberg
  - H 2019-2021 – Galina Antonova
  - J 2019-2021 – Dale Finney

PSRC Outgoing Chair

- Russ Patterson (2019-2020)

PSRC WG of the Year Awards -- FY 2019, 2020 & 2021
For:

- Outstanding Standard or Guide
- Outstanding Technical Report
- Prize Paper

Announcements

1. Reminder – Awards ceremonies take place in the May and September meetings so NO AWARDS ceremony in January
2. May/September uncollected awards will be brought one more time to Jacksonville in January

Please Save the Date!!

Our next PSRC/PSCC Awards Ceremony will be in:

Monday May 8, 2023

at:

Flamingo Hotel and Casino

During our Monday Reception starting at 6:30PM

IEEE Standards Awards

- Address to Ship Award:
  Flamingo Hotel and Casino
  3555 S Las Vegas Blvd
  Las Vegas, NV 89109
  c/o <Your Name Here> (Guest PSRC Meeting 5/8 ~ 5/11/2023)
  Cell: <Add your Cell #>
- Presentation Date (Allow six weeks for processing):
  Monday May 8, 2023

- **Hugo Monterrubio** will be completing his chair role of awards committee by Dec 31, 2022 – Thanks to Hugo for great service his for many years. Thanks also to Mal Swanson, Vice chair for supporting Hugo with career/service awards.
- The incoming chair is **Andre Uribe** from Jan 2023

B3: <u>Membership Working Group</u>

September 18, 2022

Membership Chair: Mal Swanson
Membership Vice Chair: Cathy Dalton

Established Date: Circa 1995

Expected Completion Date: On-going

Assignment: Assist in searching for new attendees.

Requesting support from attendees' employers.

Attendance during the September hybrid meeting was 348, of which 184 were remote attendees.

24 attendees were in our Newcomers Orientation meeting on Monday. Cathy Dalton sent follow up meeting emails to each newcomer, to support our retention program. In that way we are encouraging each of the newcomers to continue their attendance and participation.

No management support letters were sent. If any attendee or potential attendee needs stronger management support for PSRC participation, we encourage them to let us know.

B4: Long Range Planning Working Group
Chair: Pratap Mysore
No report.

B5: Publicity Working Group
Chair: Cathy Dalton
Vice Chair: Mal Swanson
Assignment:

- Promote IEEE PES PSRCC activities globally.
- Facilitate global outreach using tools such as webinars, tutorials, trade publications, and other similar methods.
- Strengthen PSRCC awareness by preparing technical articles as may be required for the promotion of technical committee working group activities about the art of relaying, and the work of the PSRCC.

B8: O&P Manual Revision and Working Group Chair Training Working Group
Chair: Don Lukach
No formal report.

B9: Web Site Working Group
Chair: Rick Gamble
No report.

L. Subcommittee and Working Group Reports to the Main Committee Meeting:

System Protection "C" Subcommittee Report on WG progress of note

System Protection Subcommittee Scope

Evaluate protection systems responses to abnormal power system states. Evaluate and report on special protection schemes, remedial actions schemes, monitoring and control systems and their performance during abnormal power system conditions. Recommend corrective strategies and develop appropriate standards, guides, or special publications. Evaluate and report on new technologies which may have a bearing on protection system performance during abnormal power system conditions.

Chair: Fred Friend fafriend@aep.com
Vice Chair: Michael Higginson Michael.Higginson@sandc.com

IV. Meeting Minutes

The System Protection Subcommittee of the PSRC met on September 14, 2022 at 1:00 PM Central Time in a hybrid meeting (both in person and via Webex).
In-person participants introduced themselves and indicated their affiliations. Online participants were displayed by the teleconferencing software tool. A quorum was achieved (43 of 56 members and 58 guests).

The Subcommittee reviewed the agenda. Don Ware made a motion to approve the agenda, Chris Walker seconded, and the agenda was approved with no opposition.
The May 2022 minutes were reviewed. Don Ware made a motion to approve the minutes, Chris Walker seconded, and the minutes were approved with no opposition.

The C Subcommittee welcomes new members: Amin Zamani, Gary Kobet, and Looja Tuladhar.

v. Advisory Committee Items of Interest

- Working group agendas are required to be posted at least two weeks prior to the meeting.
- Working group meeting minutes due to Mike and Fred by Friday, September 23. Please use the provided Word template and include your assignment.
- A custom web page is available for each WG, if the WG Chair wishes to use it. Contact Rick Gamble, webmaster@pes-psrc.org. A refresh of this web page is expected soon.
- There are plans to add memorials, update fellows and awards on the PSRC webpage.
- Working groups that complete their work are encouraged to present it to the IEEE community through WEBEX. Contact PSRC officers or Cathy Dalton (Publicity Chair) for further information.
- Working group chairpersons are required to have IEEE PES and IEEE SA memberships.
- Registration for this meeting was about 317, including about ½ on-site. There were 24 first time attendees.
- There will be a new member management system (Member Planet) to be used starting in 2023. Before this new system is implemented, please be sure to follow required confidentiality practices. Ensure the BCC is used so that email addresses of members are not shared for general correspondence.
- The IEEE SA style manual was revised in 2021. Working group reports should also follow word usage and other requirements described in this manual.
- Working groups with a PAR must show Copyright Policy, Patent Policy, and Participant Policy (new addition) slides at each meeting.
- New templates for the O&P will be voted I'm by the end of the year, and P&P will follow. These policies recommend a Chair, Vice Chair, and Secretary for each Working Group. Additional information is expected to follow.
- A file share application (Sharefield) for non-PAR working groups is available. If you are interested in using this, please request from Subcommittee Chair.
- The Awards Ceremony will take place during the Monday night reception for May and September meetings. Please consider this when making your travel plans.
- WG officers should request certificates for their members upon completion of their work. Hugo Monterrubio can address any open questions.
- All are reminded and encouraged to apply for Senior Membership in the IEEE if you are eligible.
- Emails with some attachments are blocked by some participants' firewalls. Please be aware of this when sending files via email.

VI. Working Group Reports

The minutes of the Working Groups are attached.

VII. Old Business

At the last C subcommittee meeting, two new task forces were created – CTF49 and CTF50. CTF49 was assigned to determine the best way for C Subcommittee to contribute to the joint sponsored standard. CTF50 was assigned to investigate interest in revising TR-87 (Protection of Wind Electric Plants) to include IBR was approved by email ballot.
These two new task forces were discussed.

VIII. New Business

There is interest in revisiting the now-withdrawn standard C37.117 IEEE Guide for the Application of Protective Relays Used for Abnormal Frequency Load Shedding and Restoration. Kevin Jones moved to create a task force investigating interest in revising this standard. Don Ware seconded the motion, and there was no opposition. A new task force CTF51 was formed for this purpose. Kevin Jones will chair the new task force.

CTF-49 has completed their work after one meeting and has decided to disband pending the creation of a B-subcommittee liaison to the new IEEE 1547 WG. Ben Kazimier made this motion, Amin Zamani seconded and there was no opposition.

CTF-50 has completed their work and would like to form a working group. The working group's assignment will be: Revise and expand PES-TR87 Protection of Wind Electric Plants to explicitly address other IBR plants (e.g., solar and battery energy storage). Amin Zamani moved to create the new working group, and the motion was seconded by Gene Henneberg. There was no opposition, and the new WG C50 was created. C50 will be chaired by Brandon Davies and vice chaired by Amin Zamani.

IX. General Discussion

There was no general discussion.

X. Adjourned

The subcommittee meeting adjourned at 2:30 PM Central Time.

XI. Working Group Minutes

A. C23: Coordination of Synchrophasor Related Activities

Chair: Allen Goldstein
Vice Chair: Gustavo Brunello
Secretary: N/A
Output: Discussion Forum
PAR and PAR expiration: N/A
Established Date: September 2013
Expected Completion Date: On Going
Draft: N/A
Assignment: The ongoing task force will provide three main functions: -Liaison with NASPI (North American Synchrophasor Initiative) (specifically the PRSVTT) to keep the PSRC in sync with the changes and needs in the industry with respect to the development and usage of PMU devices. Formalize transfer process of PRSVTT developed documents to PES PSRC including making recommendations which PRSVTT activities should be transferred to IEEE reports, guides and standards. -Make recommendations to PSRC for assignments that would require the creation of working groups in PSRC and also recommend what the output of those working groups might be (Guides, reports, etc.) based on the needs of the industry. -Coordinate related activities with other IEEE PES committees.

Meeting Date and Time: Hybrid meeting, On Sept 13, 2022 at 5:00 pm CDT

Attendance: 5 members out 15 attended. 6 guests also attended.
Call to order
Officer presiding: Allen Goldstein
Officer recording minutes: Allen Goldstein with help from Ken Martin

Quorum was not reached,

Call for Patents: Slides were not shown since the assignment is non-par. Guidance for attendees slide was shown

Summary of Activities and Discussions

- Overview of PMU related standards work was shown.
    - Removed asterisk indicating draft behind 60255-118-1
- IEEE PSRC ongoing PMU related activities were discussed and updated
- IEEE PSCC ongoing PMU related activities were discussed and updated
- NASPI past work and publications were discussed and updated
- NASPI current work was discussed and updated
- NASPI upcoming webinars and next work group meeting date were announced.
- Old Business:
    - None: no new work items to be carried from NASPI to IEEE or vice versa
- New Business:

- None

Adjourn at 4:50 PDT, moved by Ken Martin, second by Yi Hu

Next Meeting:
Next NASPI Work Group Meeting, October 18 - 20, 2022, Charlotte NC (if in-person)
Next C23 meeting will be during PSRC meetings January 8 – 12 2022, Jacksonville, Fl

B. C25: Summary Paper and Presentation on Protection of Wind Electric Plants

Chair: Amin Zamani
Vice Chair: TBD
Output: Summary Paper
Established Date: May 2021
Expected Completion Date: December 2022
Draft: 2.0
Assignment: Summarize the PES Technical Report TR-87 "Protection of Wind Power Plant" to generate a summary report/paper for presentation at a suitable conference or technical venue.

Working Group C25 met (**virtually** and in person) on May 10, 2022 at 08:00–09:10AM PST. There were total of 42 attendees in the meeting, 12 members and 30 guests.

Working Group C25 met (**virtually** and in person) on Tuesday - September 13, 2022 at 08:00–09:10AM CST. There were total of 34 attendees in the meeting, 9 members and 25 guests.

Meeting Agenda

- Introductions
- Review May 2022 meeting minutes
- Review Draft 2 updates
- General Discussion
- Adjourn

Summary of Meeting Discussion

a) Since the attendee list was available, no formal introduction was done for the remote attendees.
b) Meeting started with reviewing the minutes of the last meeting.
c) The meeting continued with addressing the comments from member (contributions from all members have been received).
d) Ritwik will revise Figure 1 to incorporate transformer vector group.
e) It was decided to use “neutral grounding impedance” instead of “neutral grounding reactance” to cover both resistance and reactance.
f) It was discussed that Section II.H does not differentiate the WEP voltage/frequency control capability from the ride-through capability. Amin will review this section (to compare with the original TR) and clarify the differences.

g) Aboutaleb H. will share his comments on Section II.H.
h) Any deviation from the original TR should be clarified by the presenter.
i) It was decided to remove the transformer mechanical protection from the summary paper and only cite the relevant standard/guide.
j) The Chair will set up conference calls between now and December 2022 to review the remaining comments on the paper and finalize the report. The goal is to vote on the summary paper in the next meeting (January 2023).
k) The meeting was adjourned at 9:08 AM CST.

For next meeting (expected to be the last meeting), we request a room for 30 people with a projector. Please avoid conflicts with C45, D43, CTF50, and D45.

C. C26: Revision to C37.233, Power System Protection Testing Guide

Chair: Don Ware
Vice Chair: Matt Black
Secretary: Zach Zaitz
Output: Revised Guide
Established Date: January 2016
Expected Completion Date: December 2022; expected to extend PAR for finish December 2023
Draft: 5.36
Assignment: Revise C37.233-2008 Power System Protection Testing Guide

The Chair started off the meeting by reviewing the scope of the working group.
Introductions were made but there was not a quorum with only 11 members in attendance (in person or virtually).
Number in attendance 25, 13 in-person and 12 virtually.
Requisite slides were displayed related to: copy write policy, IEEE patent slides, IEEE slides on participant behavior and code of conduct, and slides related to PAR word usage.
A PAR extension request (the very last possible PAR extension request) has been submitted to NesCom and is on their agenda for their 9/19/22. We expect that this extension request will be granted to 12/31/23 and realize that if this work is not published by that date, that we will have to reinitiate the PAR process all over again for this guide. We are properly motivated.
From the last meeting the subgroups were addressed:

- Status word smiting subgroup – work complete
- Status of bibliography and normative – work complete
- Status of section 1.6 and section 4 overhaul subgroup – work mostly completed – section 4 being reviewed by a member of the balloting body for a final quality review
- Status of graphics subgroup – This subgroup has the most work remaining. PSRC has put out a request for graphics experts and we will be approaching their recommendations as soon as possible. Our esteemed Secretary has been holding (roughly) bi-weekly sessions regarding resolution of the graphics and files associated (all graphics [not just those commented upon] are being examined).

The 61850 section is still outstanding. At the last meeting, the majority of the 61850 material was decided to be struck with some general observations & references to other guides or papers. This work is expected from the contributors within the next 2 weeks.
From an initial 436 comments, we now have 34 remaining comments to be worked off. If those comments pertaining to 61850 or figures/graphics are excepted there are a mere 5 comments remaining.
If pending contributions & reviews are completed in the next couple of weeks, we will begin doing our editorial review synching Bibliographical entries & figure numbers accordingly. Our goal is to recirculate the ballot by the end of the year.
Next meeting: room for 40, avoid conflicts with D47, H45, H46, K31, and I45

D. C29: Power System Testing Methods for Power Swing Blocking and Out of Step Tripping

Chair: Kevin W. Jones
Vice Chair: Mike Kockott
Secretary: N/A
Output: Tutorial
Established Date: May 2016
Expected Completion Date: May 2024
Draft: 1.09
Assignment: Create a report on test instructions/parameters to accompany the PSRC documents Application of Out-Of-Step Protection Schemes for Generators, and Tutorial for Setting Impedance Based Power Swing Relaying on Transmission Lines, to aid the users in quality testing of their settings and systems when following the working group outputs which recommend testing of complex relay settings and systems.

Working Group C29 met in a hybrid session with 4 voting members and 11 non-voting members (15 total) on Tuesday, September 13, 2022, 8:00-9:10 AM CDT.

Kevin welcomed all attendees.

Approval of May minutes - Kevin asked if there were any comments on or objections to approving the minutes. Hearing none, the minutes from May 2022 were approved.

Review of uncompleted assignments:

1) Section 1: Ratan to reply to comments, accept changes and clean up this section. Ratan to engage with Jason who made many of the review comments. Target date for completion of this is mid October.
2) Sections 2 and 3. Kevin to reach out to Mohit, Scott, Jun, and Deepak (section 2) and Benton, Scott, Jun, and Mohit (section 3) to get a committed date/s from them. Kevin to send these to Mike. Section 2: merge with the latest draft inclusive of editorial comments. Section 3: reply to comments, accept changes, clean up, add any additional content.

Kevin did some clean up of the document by removing material that had been copied into section 2 by Ritwik. Kevin updated the version to 1.09 after this clean up.

Kevin to reach out to Mike Benitez to see if he's still able to be involved.

Kevin noticed that the “Output” and “Assignment” were not aligned, with one showing that the deliverable from C29 is a Tutorial, and the other a Report. Gene stated that he was not aware of any specific direction for tutorial vs report, other than what best aligns with what the WG is trying to produce. With this being said, it appears that Tutorial may best fit the C29 objective. Kevin will raise this at the C-subcommittee meeting to get their guidance and approval to change the C29 deliverable to Tutorial.

C29 to still wait on D29 before continuing with section 6. Kevin will give an update on this at the January 2023 meeting.

With there being no further business Kevin thanked all for attending and adjourned the meeting.

E. C33: Support for WG-P2004 “Recommended Practice for Hardware-in-the-Loop (HIL) Simulation Based Testing of Electric Power Apparatus and Controls”

Chair: Dean Ouellette
Vice Chair: Sakis Meliopoulos
Secretary: Aaron Findley
Output: Recommended Practice
Established Date: September 2018
Expected Completion Date: December 2022
Draft: D2
Assignment: Support the development of this IEEE recommended practice in cooperation with PELS, IAS, and IES efforts

Hybrid Virtual and In Person, Nashville TN, 14 September 2022, 09:20 – 10:30 CST [14:20 – 15:30 GMT]. The working group Chair and Secretary were present. The chair presided over the meeting and the secretary recorded minutes.

A call to order of the meeting was made with 6 attendees, 3 members, and 3 guests in attendance.

A quorum was not achieved, minutes of the previous meeting were not approved.

Patent slides were shown, and all participants asked to speak up about any patent claims at this time. The participant behavior slides were shown to all attendees. The patent slides are always available on the IEEE P2004 collaboration website for review.

Dean Ouellette presided over the meeting and presented a summary of the writing assignments from the previous meeting. Several contributors to the writing assignments were absent; a meeting will be held on September 20, 2022 to address the outstanding writing assignments.

Aaron Findley's contributions were reviewed with the following items being added to the section on instrument transformers:

- The I26 work will be included as an additional reference to the instrument transformer section.
- A discussion of active and passive Ferroresonance suppression circuits should be included, noting the sensitivity of these models to any errors in the circuit parameters.
- Note the importance of accurate CT modeling for generator differential protection.

For section F.17, a short note was added regarding re-testing and detailed data collection when an issue is flagged during automated tests.

A future web meeting TDB before the January meeting is planned.

Action Items:
Dean to follow up with Norman, Dale, Ritwik, Ali, Aaron, and Dinesh.

Outstanding writing assignments:

- Internal Faults, Normann and Ali to review and revise
- Figure F.1, Ali, Dinesh, Norman to review. Replacing protective functions with more generic box, in addition to other comments.
- F.3.1: Normann suggests a re-write adding discussion of GCC and salient vs. cylindrical rotor.
- F.4: Normann suggested adding a note pointing to the software specific documentation for data entry format.
- F.5.1.1/F.5.1.2: Ali to provide an example and reference.
- F.6.1: Normann to add explanation of H and D constants.
- F.7.2: Dale Finney, Normann, Ali to expand this section discussing both overload and overexcitation.
- F.8: Dale, Ali, Normann, Deepak to provide content.
- F.2: Norman, Ritwik to provide better diagram from other standards.
- F.12: Aaron to include discussion of CCVT modeling.
- F.15: Dinesh, Normann, Dale to provide content
- Figure F.3 to be revised by Dinesh and Normann
- F.19: Normann to provide comments on this section including a discussion of which functions cannot bet tested via HIL.

New Business

Meeting was adjourned at 10:00 am CST.

F. CTF34: Inverter-Based Short Circuit Current Impacts

Chair: Kevin W. Jones
Vice Chair: Gary Kobet
Secretary: N/A
Output: N/A
Established Date: September 2017
Expected Completion Date: January 2024
Draft: N/A
Assignment: Coordinate/communicate the efforts of the PES/NERC Low Short Circuit Current Impacts Task Force and PSRC working groups addressing the issues of inverter-based resources.

Working Group CTF34 met via WebEx in a single session with 9-voting members and 31-guests (40-total). The Chair presided over the meeting and the Vice-Chair recorded the minutes. The meeting was called to order by Kevin Jones on Wednesday, September 14, 2022 at 0800 CDT. The minutes from the May 11, 2022 WebEx meeting were reviewed and approved.

The Chair reviewed action items for other PSRC working groups as noted in the document:

- C45 Protection and short-circuit modeling of systems with high penetration of inverter-based Resources – Manish Patel: Working on modeling, focused on modeling loads/traditional short circuit models for accurate fault current results; collective impact of IBR, frequency deviation; adding info on ROCOF; also power swings and how to analyze; critical clearing times for conventional generation; two sections on protection, impacts on transmission lines, transformers, capacitor banks, etc. Note D29 report already has some info on power swings, might refer to that report.
- D38 Impact of High SIR on Distance Relaying - Christopher Walker: Section added for impacts on IBR, working on draft 0.5.
- J18 Investigate the effect sub-synchronous oscillations due to inverter based resources (IBR) on rotating machinery protection and control- Gary Kobet, on behalf of Normann Fischer: There is no reliable commercially available EMTP model that can be used for SSCI studies. The proposal is to wrap up the report and state that at the present time no reliable transient model is available to draw any conclusive conclusions from.
- NERC – Rich Bauer – nothing to report.
    - Some discussion on material from C24 report to C45 report.
    - Also some discussion of UFLS C37.117 inactive guide. This will be discussed at the C-Subcommittee meeting to see if it should be revived and updated to include discussions and strategies to apply UFLS in high IBR, low system inertia systems.
    - Some discussion of PRC-025 and potential misapplication of that NERC standard, and forum for resolving issues. PRC-025 has not been identified as impacted due to IBR. Suggestion was to bring issues to NERC System Protection & Control Working Group.
    - PRC-002 – draft posted for comments closed July 25, 2/3 approval achieved. Only addresses “Glencoe Light SAR”.
    - PRC-019 – SDT may likely not include FACTS/HVDC. Some discussion that it should be included. It was subsequently clarified that any such equipment as part of an IBR facility would actually be included; it is those that are NOT part of an IBR facility (standalone) that are excluded from PRC-019.

- PRC-024 – SAR submitted/accepted, posted, closed July 14, recommended moving away from existing PRC-024 (voltage/frequency protection applied to generators must meet certain criteria) to require full ride-through. 2/3 negative votes, so will have to start again (some comments that some machines should not be subject to such a ride-through requirement).

It was pointed out that, regarding IBR SC modeling the focus is on negative sequence fault response. There have been some limitations of the C24 model identified.

Chair Kevin Jones adjourned the meeting at 0910 CDT.

G. C38: P2030.12 Guide for the Design of Microgrid Protection Systems

Chair: S. S. (Mani) Venkata
Vice Chair: Michael Higginson
Secretary: Geza Joos
Output: IEEE Guide, P2030.12
Draft: 1.0
Expected Completion Date: February 2022
PAR Expiration Date: December 2022
Assignment: To create P2030.12, Guide for the Design of Microgrid Protection Systems

Guide Scope
This guide provides for the design and selection of protective devices and coordination between them for various modes of operation of the microgrid. These include grid connected and islanded modes as transitions between modes.

Guide Purpose
To facilitate the deployment of protection systems, given the challenge of protecting equipment and assets in the different modes of operation of the microgrid, including grid connected or islanded modes and during transitions between modes. The guide proposes different approaches, centralized and decentralized, passive and active, to detect and take proper actions to dependably and securely protect the microgrid and its equipment.

September 13, 2022 Meeting Minutes Hybrid Meeting

Officer Presiding: Mani Venkata
Minutes Prepared By: Michael Higginson / Geza Joos

This meeting was a hybrid in-person (Nashville, TN) and online meeting (WebEx). It was chaired by Chair S. S. (Mani) Venkata.

The meeting commenced at 9:20 AM CST. There were 48 attendees, with 18 voting members, 7 non-voting members, and 23 non-members. Quorum was met.

The working group began with introductory remarks by the Chair.

The IEEE SA patent slides were reviewed, and no concerns or comments were raised.

Minutes for the January 2022 meeting was reviewed. No comments were raised. Sukumar Kamalasadan made a motion to approve the January 2022 minutes, with a second from Steve Klecker. The minutes were approved with no objections.

The working group reviewed the agenda was presented and approved by the working group. Ratan Das made a motion to approve the agenda, with a second from Nirmal Nair. The agenda was approved with no opposition.

Since our last meeting, the draft guide has been balloted at IEEE SA. The SA ballot had 110 members, with 75% returned and 85 percent approval. Commentors provided a total of 512 comments.

To resolve the IEEE SA ballot comments, a comment resolution group (CRG) was formed. The CRG is open to all WG members, and volunteers were requested. The following individuals volunteered to join the CRG:

- Mani Venkata
- Michael Higginson
- Geza Joos
- Steve Klecker
- Jim van de Ligt
- Michael Ropp
- Sukumar Kamalasadan
- Ward Bower
- Paul Nyombi
- Don Ware
- Rahim Jafari
- Nirmal Nair
- Adi Mulawaraman
- Farzad Khalilpour

A poll will be sent to determine a date for the first CRG kickoff meeting. Any WG members interested in joining the CRG are welcome to join. After the CRG completes resolution of all ballot comments, the Working Group members will be notified and asked to review the proposed revisions and comment dispositions.

Working group business for this meeting has been accomplished. Jim van de Ligt made a motion to adjourn, seconded by Ward Bower. There was no opposition to adjourning. The meeting was adjourned at 10:30 AM CST.

H. C39: IEEE PC 37.252 Guide for Testing Auto Voltage Control Systems in Regional Power Grids

Chair: Xiaopeng Li
Vice Chair: None
Secretary: Kai Liao
Output: Guide
Established Date: February 2019
Expected Completion Date: December 2022
Draft: Fourth edition draft.

1. **Call to Order**

- The meeting was called to order at 9:20 am (CDT).
- The chair introduced all attendees and declared their affiliations.
- Main WG meeting attendance was recorded.

2. **Roll call of participants**

- 13 representatives from 6 entities and 3 Individuals attended the meeting by Webex. The total number of the attendees present counts 16. The participants make a quorum.
- WG membership consists of State Grid Corporation of China (SGCC), University of Electronic Science and Technology of China (UESTC), Southwest Jiaotong University (SWJTU), Xi'an Jiaotong University (XJTU), Chongqing University (CQU), Sichuan University (SCU) and Tsinghua University (THU). The DRs of the above entities are Xiaopeng Li (SGCC), Zhenyuan Zhang (UESTC), Kai Liao (SWJTU), Lixiong Xu (SCU), Zaibin Jiao (XJTU), and Yongjie Luo (CQU). Qinglai Guo from Tsinghua University was absence from the meeting.

3. **Approval of agenda**

- Chair Xiaopeng Li presented the agenda.
- *Motion #1*
  Approve the agenda for the fourth WG meeting of PC37.252.
  Motion passed by voice vote without opposition.

4. **Approval of minutes of previous meeting**

- The minutes of the third WG meeting was sent to DRs in advance.
- *Motion #2*
  Approve the minutes of the third WG meeting of PC37.252.
  Motion passed by voice vote without opposition.

5. **Reelect the new secretary**
   The WG called for candidate of secretary at last meeting and received candidate currently. The candidate was Kai Liao from Southwest Jiaotong University.

- *Motion #3*
  Zaibin Jiao from Xi'an Jiaotong University (XJTU) made a motion to approve Kai Liao from Southwest Jiaotong University as WG secretary. The motion was seconded by Lixiong Xu from Sichuan University (SCU). There was no discussion.
  Motion passed by voice vote without opposition.

6. **Current Progress**

- Chair Xiaopeng Li introduced the current progress on the draft development.
- 1 preparatory meeting and 4 WG meeting have been held.
- Draft 4.0 has been completed. The WG have reached an agreement on the contents of technique。

7. **Approval of Draft 4.0 to IEEE SA ballot after MEC and Standard Committee Review**

- *Motion #4*

Kai Liao from Southwest Jiaotong University (SWJTU) made a motion to approve Draft 4.0 to IEEE SA ballot after MEC and Standard Committee Review. The motion was seconded by Lixiong Xu from Sichuan University (SCU). There was no discussion.
Motion passed by voice vote without opposition.

8. **Introduction of IEEE SA Ballot Process**

- Dr. Zhou Mu introduced the IEEE SA ballot process.

9. **Work Plan**

- Submit the final draft to MEC and Standard committee review by Nov. 2022.

10. **New Business**

- No new business was brought before the WG.

The WG adjourned at 10:07 am (CDT).

I. C40: Paper, Summary of C37.247 Standard for Phasor Data Concentrators for Power Systems

Chair: Vasudev Gharpure
Vice Chair: Mital Kanabar
Secretary: Mital Kanabar
Output: Tutorial planned (Paper, Presentation in future)
Established Date: January 2020
Expected Completion Date: December 2022
Draft: 1.01
Meeting date: 9/21/2021
Assignment: Develop a publication (transaction and/or conference), a tutorial and a presentation based on C37.247-2019: the standard for Phasor Data Concentrators for power systems.

Working group C40 did not meet at this meeting.

J. C41: Investigate performance requirements for Distribution PMUs

Chair: K. Martin
Vice Chair: N. Perera
Secretary: D. Gurusinghe
Output: Technical Report
Established Date: May 2021
Expected Completion Date: TBD
Draft: 0

Assignment: WG C41 will prepare a technical report on the measurement performance needs and requirements for PMUs that are intended for use in distribution systems. This will include examination of the measurement environment, detailing the data requirements of phasor based distribution applications, and supporting liaisons with other groups working with synchrophasors in the distribution environment including other IEEE TC's, NASPI, NERC, and IEC.

Working Group C41 met on Tuesday, Sept 13, 2022, at 10:40am CDT with 25 participants in person and via WebEx. Ken Martin (Chair) welcomed participants and briefed the objective of the WG, which is described in the assignment above. We did not have a quorum.

Ken reviewed the activity at the previous meeting. We have students Dahlia Saba and Ridvan Dogan analyzing the distribution data we have received, and a preliminary table of application requirements mostly based on the SDGE/Quanta report. We are extending this work to come to concluding recommendations.

Panos is leading a task group to more thoroughly describe the application requirements. He and Farnoosh gave a report on that effort. The WG discussed some details, such as the need for a broad measurement range up to 4000% (40x nominal) but at lower accuracy, maybe 10% TVE. The task group will provide a writeup of their recommendations which will be integrated into the final report.

Dahlia and Ridvan gave reports on their data analysis. Dahlia is estimating phasors using techniques similar to that given in the standard Annex D. her report showed low rate of change of amplitude and low ROCOF on all but some data samples from events. The hotel internet went out during this presentation and was not recovered until near the end of Ridvan's presentation. They have both provided copies of their reports. Ken will review and post them with author permission.
The next formal WG meeting is in January 2023 at the IEEE JCTM and will include PSCC, PSRC, and other committees. This is scheduled for Jacksonville, FL. We will continue with our monthly Webex meetings before then and Ken will propose a date for October.

K. C43: Artificial Intelligence and Machine Learning technologies for power system protection and control applications

Chair: Yi Hu
Vice Chair: Adi Mulawarman
Output: Report
Established Date: January 2021
Expected Completion Date: December 2022
Draft: 1.14
Assignment: Prepare a report summarizing existing and new practical applications and challenges to use Artificial Intelligence and Machine Learning technologies for power system protection and control.

Working Group C-43 met in a double-session on September 14, 2022 with 49 attendees (13 voting members). 29 attended remotely with 20 in-person. Yi Hu and Adi Mulawarman presided the in-person meeting. A round-the-table introduction of all attendees was taken for the first session, and only for those who joined at the second session. Yi reviewed the meeting agenda and WG C43 assignment at the beginning of both sessions.

Yi reported that the report drafting has been completed and the WG members have voted to approve the submission of the report for C-Subcommittee approval. The report has been submitted to the C-Subcommittee chair, who will distribute it to all C-Subcommittee members for their review and vote for approval shortly after the PSRC/PSCC meeting.

The session proceeded with the discussions of the expected next steps with the current report and plans after it is published.

- If C-Subcommittee approves WG C43 to submit the report for publication, WG members will work on addressing comments received from C-Subcommittee members before seeking a final approval from PSRC officers. Once approved, we will resubmit to MEC to IEEE for a final editorial review. The report will be published in the PES resource center after WG has accepted all editorial changes by IEEE editors.
- No weekly call will be scheduled after this WG meeting. We will schedule meetings as needed after we received comments from the C-Subcommittee and IEEE editors.
- Making proposal for 1-2 panel sessions based at next year's General Meeting on the report was discussed.
    - PSRC chair informed the WG that PSRC only has a 4-hour block that can have either one 4-hour panel or two 2-hour panels. All panel session proposal are submitted through PSRC.
    - Yi will follow up with PSRC officer to obtain panel application form.
    - Yi will discuss with WG members about panel session to be proposed.
- Prepare a tutorial was proposed
    - This may not belong to this WG. It will require a separate WG and probably not ready for it yet.
- Attendees had engaged in the following discussion regarding whether the WG should be disbanded or continue to work on the next revision of the report
    - Some suggested to disband the current WG after the output is complete, and create a new TF later to investigate the interest to do a revision of the current report, which is a normal process for PSRC.
    - Newcomers can easily join the new TF as members generally is considered as a benefit of forming a new TF instead of continuing the current WG. However, since current WG does not have a limitation to stop accept new WG members, forming a new TF would not provide added benefit.
        - Regarding starting a new WG may not be able to keep the same report ID – The WG was informed that revision of report can keep the same TR-nnn number and Title.
    - Reasons to keep the existing WG were also discussed
        - Some people had already expressed their interest to contribute new materials and improve on some sections of the current report.
        - This is a very active field and many new developments have been made in the last three years. The report should be updated more frequently to keep up with the development.
        - Going through the normal process may not be necessary.
    - PSRC chair suggested that WG could use the next WG meeting to investigate general interest and collect topics for continued work on the report revision. If there are sufficient interest and immediate topics to work on, WG chair could make a request to continue the current WG.
        - WG chair and vice chair will request those who have new topics to make presentations and/or suggest revisions of this current report at the next year's PSRC meetings.
        - Plan for do presentations at several future WG meetings to collect topics to be added in 3-4 years.

- Consider doing dataset collection by this WG was proposed by Dan Sabin. The purpose: for helping creating data resource for industry to use it in their research; could put in IEEE data portal.
  - There are national research labs that already doing similar data collection.
  - This should be a good topic for a new WG
  - Someone should bring this up as new business at C-Subcommittee to discuss the creation of a new TF. C-Subcommittee chair suggested to make this request at next PSRC meeting and the WG agreed.

Meeting adjourned at 10:30 AM CDT.

Next meeting: Single session to be held in conjunction with JTCM 2023. Room for 30 people.

Avoid PSRC B1, C23, C41, K18, D47/DTF47, D39, and D42, PSCC P9 and P10, and PSRC B2/PSCC A2TF

L. C44: Prepare a Summary Paper for IEEE Transactions on Power Delivery Based on the Contents of the Report Prepared by the C24 WG "Modification of Commercial Fault Calculation Programs for Wind Turbine Generators"

Chair: Sukumar Brahma
Vice Chair: Evangelos Farantatos
Output: Summary Paper
Established Date: May 2021
Expected Completion Date: January 2022
Draft: 10.0
Assignment: Prepare a Summary Paper for IEEE Transactions on Power Delivery Based on the Contents of the Report Prepared by the C24 WG "Modification of Commercial Fault Calculation Programs for Wind Turbine Generators"

Working group C44 did not meet at this meeting. C44's paper was rejected by IEEE Transactions editors, which will need to be resolved.

M. C45: Protection and short-circuit modeling of systems with high penetration of inverter-based resources

Chair: Ali Hooshyar
Vice Chair: Manish Patel
Secretary: Ritwik Chowdhury
Output: Report
Draft: N/A
Established Date: May 2021
Expected Completion Date: December 2024
Assignment: To prepare a technical report to investigate short-circuit modeling and protection of systems with high penetration of IBRs as a continuation of the works of WGs C32 and C24

The C45 WG met on September 13, 2022, at 10:40 AM CDT. The meeting was kicked off with introductions of the in-person attendees. There were 16 voting members present and a quorum was not met. The May 2022 meeting minutes were not approved and will be sent out for an electronic vote and approval.

Manish Patel briefly reviewed the table of contents for the latest working draft available here: https://psrc.sharefile.com/d-se30beb6ad4fb4f86b6ca0cf5a6fc835b.

Prem P asked what penetration level of IBRs is considered high-penetration. Ali Hooshyar noted that the WG decided to not answer this question.

Ali Hooshyar discussed new material in Sections 2 and 3 in the latest draft. He asked for volunteers to help with model and simulation results of various type/OEMs of IBRs. **Stephen Miller, Sebastian Billaut, and Amin Banaie** offered to help. Sukumar Brahma pointed out that there may not be much benefit in getting models, running simulations, and including them, because their behavior may change over time.

Ratan Das asked if the report is limited to transmission-connected IBRs or also includes distribution-connected IBRs. Ali responded that the scope of the report is transmission-connected IBRs.

Manish Patel then briefly reviewed new material in Sections 3 and 4 of the draft report. Manish asked for volunteers to help with grid-forming inverters and their impact on frequency disturbances. **Amin Zamani and Aboutaleb Haddadi** offered to help.

Ritwik Chowdhury then summarized new material in Sections 5 and 6. He indicated that there were several sections that were complete and were ready for initial review from a few volunteers and a few sections that could use more volunteers. The following were the list of volunteers for Sections 5 and 6 and include both existing and new contributors.

- **Venkatesh Chakrapani and Amin Banaie** for distance protection.
- **Steve Miller, Looja Tuladhar, and Sebastien Billaut's** for bus protection.
- **Sebastien Billaut** for transformer differential element during inrush.
- **Brian Johnson, Sukumar Kamalasadan, Athula Rajapakse, Venkatesh Chakrapani, Abel Gonzalez, Abu Bapary, David López, and Priya Raghuraman** for reviews.

The officers will connect with the volunteers after the meeting.

N. C46: Draft a summary paper of C37.242: Guide for Synchronization, Calibration, Testing, and

Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control

Chair: Allen Goldstein
Vice Chair: Deepak Maragal
Secretary: N/A
Output: Summary Paper
PAR and PAR expiration: N/A
Established Date: May 2021
Expected Completion Date: Sept 2022
Draft: 1.0
Assignment: Draft a summary paper of C37.242

Meeting Date and Time: Hybrid-Meeting, On Sept 13, 2022 at 09:20am CDT

Attendance: 12 of 14 members (Quorum in attendance)
6 guests
Call to order
Officer presiding: Allen Goldstein
Officer recording minutes: Allen Goldstein

Quorum was reached.

Past Minutes: Previously approved via email

Call for Patents: N/A, WG guidance slide was shown

Summary of Activities and Discussions

Writing a paper to describe the guide, using overleaf.
Draft 1.0 is being reviewed by the full working group.
Upcoming meetings: weekly full WG telecon to review draft 1.0
The bulk of the meeting was spent going over WG member comments on the draft.

Meeting Adjourn at 10:30 am CDT

Next meeting: January 8-12 Jacksonville, FL
Same time slot, Room for 30 people.

O. CTF47: Relay Modeling in Electromechanical Dynamic Simulations

Chair: Evangelos Farantatos
Vice Chair: Mohammad Zadeh
Secretary: N/A
Output: N/A
PAR and PAR expiration: N/A
Established Date: January 2022
Expected Completion Date: January 2024
Draft: 1.0
Assignment: Contribute to the report of the Power System Dynamic Performance (PSDP) committee TF “Integrating Relay Models with RMS Dynamic Simulations”.

CTF47 met on Tuesday Sep 13th 2022 at 17:00 CT with 14 attendees, via the virtual online Webex as well as in person.

Chair, Evangelos presided over the meeting. He brought the meeting to order and showed the agenda. Chair and Vice Chair recorded the minutes.

The chair reviewed the last meeting minutes. No approval required. Then, he reviewed the task force scope and explained the main objective of this task force. Later, he informed the attendees that he has proposed to PSRC committee a 2 hour panel session for PESGM 2023, in addition to a 2 hour panel proposed by PDSP TF. Later, “Mohammad Zadeh” from ETAP presented on “Integrated Protection & Dynamic Studies”. First, pros and cons of three-phase and all sequence transient stability were discussed. In case of all-sequence transient stability, the limitations of modeling series capacitor with its MOV and air gap during unbalanced fault were discussed. Then, required enhancement performed by ETAP on relay model for short circuit analysis to be applicable for transient stability were presented. Several questions and discussions raised by attendees were answered by the presenter. Finally, chair encouraged attendees to volunteer to contribute to PSDP task force report if they are interested.

For the next meeting, we will need a projector and a room for 20.

Please avoid conflict with CTF34, C44, C45, B10, K29, D44, H45, C38.

P. C48: Summary/conference paper development for C37.120 IEEE Guide for Protection System Redundancy for Power System Reliability

Chair: Alla Deronja
Vice Chair/Secretary: Melvin Moncey Joseph
Output: Conference paper
PAR and PAR expiration: N/A
Established Date: May 2022
Expected Completion May 2023
Draft: 1.0
Assignment: Write a conference paper for C37.120 IEEE Guide for Protection System Redundancy for Power System Reliability.

C48 met on Tuesday, September 13, 2022, in a single session with 8 participants attending.

The Chair informed the WG that all the writing assignments were received, and that she is working towards finishing her initial review of the document and adding the summary for the paper.

It was decided that the version 1 of the document will be sent to the members of the WG for review by the Chair after her review towards the end of September.

The WG comments are requested by mid-November, so that they can be incorporated in the document and version 2 created before the JTCM in January.

Please email your comments to **aderonja@atcllc.com** and **MonceyM@BV.com.**

The paper abstract was reviewed again, and it was decided to ask the C subcommittee whether the abstract of the paper can be sent to the different conferences before the paper is approved.

Melvin volunteered to start working on the presentation by mid-December.

For the next meeting, we request a room for 20 people, single session, with a computer projector.

Please avoid conflicts with D42, D47, D37, K22, K31, and I2.

Q. CTF49: Joint Sponsorship of IEEE 1547 IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces

Chair: R. Benjamin Kazimier
Secretary/Vice Chair: Mat Garver
Output: None
Established Date: Sept 2022
Expected Completion Date: Sept 2022
Draft: N/A
Assignment: Determine what role PSRC should play as a co-sponsor of the new revision of IEEE 1547 and make a recommendation to the C Subcommittee and PSRC Main Committee.

CTF49 met Tuesday in-person and by web meeting from 1:00PM to 2:10PM. There were 31 voting members present. Benjamin Kazimier chaired and presided over the meeting. Mat Garver recorded the minutes.

Agenda

1.) Introductions
2.) Overview – 1547 revision and PSRC Co-sponsorship
3.) 1547 leadership team introduction
4.) First 1547 meeting
5.) Discuss PSRC interface 1547
6.) Motions for Next Steps

7.) Adjourn

Topics discussed:

- IEEE SC21 is kicking off the next off cycle revision of the IEEE 1547 Standard.
- SC21 is the Lead Committee
  - There are numerous “Co-sponsors”, now referred to as Joint Committees
- PSRC is a Joint Committee in a non-lead role
- SCC21 needs to have a meeting with all the Joint Committees to get everyone on the same page they are targeting the Jan 2023 JCTM
- Dan Sabin 1547 revision vice-chair commented that they are in the process of getting the initial kickoff meeting scheduled
- **Motion**: for PSRC to make a recommendation via PSRC Chair to 1547 leadership team to form a Protection subgroup. Motion was seconded. No abstentions. No opposition. Motion passed.
- **Motion:** CTF49 motions to recommend the Main PSRC Committee that the PSRC create a liaison to 1547 under the B subcommittee WG. Motion was seconded. No abstentions. No opposition. Motion passed.
  - Motion Discussion:
    - PSRC will act as a “Consultant” to the IEEE 1547 Revision team for all things protection related. The Liaison will be the single point of contact for 1547 and will be responsible for conveyance between entities and organizing PSRC members to provide input to IEEE 1547
    - For CTF49 to submit to Don Lukach for motion at PSRC Main Committee.

- Motion: CTF49 motions to disband the CTF49 taskforce contingent upon the creation of a B subcommittee WG. Motion was seconded. No abstentions. No opposition. Motion passed.
- Meeting was adjourned with all agenda items covered.

Meeting Room Requirement (MRR): CTF49 voted to disband. Therefore, CTF49 will not meet at the next PSRC meeting.

R. CTF50: Protection of Inverter-Based Resources

Chair: Amin Zamani
Vice Chair: TBD
Output: Report
Expected Completion Date: TBD
PAR and PAR expiration: N/A
Established Date: September 2022
Expected Completion: September 2022

Task Force Assignment: Investigate the need to revise and expand the PES Technical Report “PES-TR87: Protection of Wind Electric Plants” to explicitly address and include other type of IBR plants (e.g., Battery Energy Storage Systems and Solar PV Systems).

Scope of Proposed WG: Prepare a report based on the PES Technical Report "PES-TR87: Protection of Wind Electric Plants" to cover protection of other type of IBR plants (e.g., Battery Energy Storage Systems and Solar PV Systems).

The Task force met (**virtually** and in person) on Tuesday - September 13, 2022 at 02:20–03:30AM CST. There were total of 35 attendees in the meeting.

Meeting Agenda

- Introductions
- Reasons behind forming the TF
- Next Step
- General Discussion
- Adjourn

Summary of Meeting Discussion

l) The meeting started with the introduction of the people in the room. Since the online attendee list was available, no formal introduction was done for remote attendees.

m) Mike Thompson explained the rationale behind the proposed task force. NERC has been requesting a document that can provide best practices for protection of IBR plants. The existing TR-87 report has been published with the title of "Protection of Wind Electric Plants (WEP)", and it is not well understood that the majority of protection practices are applicable to other types of IBRs.

n) The goal is to improve PES-TR-87 to be also applicable to other type of IBRS (not just WEP).

o) TR-87 will be used as the base work and, when applicable, differences between a WEP and other IBR plants will be explained (examples include difference between collector system design, etc.).

p) The team agreed to start with creating a TR first, which can be later used to develop a guide if deemed necessary.

q) Don questioned if we have enough expertise in the TF to cover protection of other types of IBRs. Since some of the members have experiences with Solar and BESS protection, it was concluded that there is enough experience in the team for the start of the work.

r) It was discussed that the work will focus on large plants (mainly transmission connected). When needed, differences (and/or common practices) for protection distributed-connected IBRs will be explained in the revised report.

s) Since the revision of this TR also includes modification of the title, Fred will check with IEEE on the requirements/regulations.

t) In total, 17 people showed interested to be the member of the proposed WG (if approved).

u) The team concluded to put in a motion to convert this TF to WG. Brandon Davies volunteered to be the Chair of the WG (if formed), and Amin Zamani will serve as the Vice Chair of the WG (if formed).

v) The meeting was adjourned at 3:20 PM CST.

For next meeting, we request a room for 30 people with a projector. Please avoid conflicts with C45, D43, C25, and D45.

Line Protection "D" Subcommittee Report on WG progress of note during Main committee

Scope: Investigate and report on the relaying techniques and systems used for transmission and distribution (T&D) line protection. Develop statistics and recommend protection practices for improving line relaying performance. Develop and maintain standards for line protection.

Chair: Bruce Mackie
Vice Chair: Meyer Kao

- The Subcommittee meeting met in person (Nashville, TN) and virtually (via WebEX) on Wednesday, September 14, 2022, from 2:45 to 3:55 PM PDT.
- Officer presiding – Bruce Mackie
- Officer recording minutes – Meyer Kao
- The Subcommittee meeting was called to order by the Chair
- Introduction from in person
- New Line Protection Subcommittee members: Scott Hayes, Joshua Hughes, Looja Tuladhar, Amin Zamani
- The meeting was attended by 33 voting members and 47 guests, in person and virtual. Quorum was met.
- Minutes from the May 2022 meeting held in person and virtually were approved - motion made by Sebastien Billaut and seconded by Russ Patterson.
- Agenda for the D Subcommittee September 2022 meeting was approved - motion made by Greg Ryan and seconded by Don Lukach.

The Chair reviewed items of interest from the Advisory Committee.

- WG Chairs: please send up to date minutes to Chair and VC by September 23, 2022
- Reminders:
  - Please use template
  - WG officers to update meeting attendance - keep records of newcomers who are not in the system
  - Template for Technical Reports (including Tutorials)
- Standards WG Awards
  - IEEE SA Working Group Awards has new Procedure to request certificates of appreciation for completed (Approved Standard) work.
  - Must be requested by WG Chair or VC directly from the IEEE SA.
  - http://standards.ieee.org/develop/awards/wgchair/wgawards.html [standards.ieee.org]
  - Visit the IEEE SA Awards webpage after the Standard has been approved and published. You will need the IEEE Standard Number and year of publication: e.g. XXXX(Standard number)- XXXX (Year)
  - http://standards.ieee.org/develop/awards/wgchair/wgawards.html
  - The process is very simple and will require to list the names of the WG officers and members
  - The awards can be shipped to the person who is filling out the form OR can all be sent to an event. If you want these awards to be handed at our next PSRC Awards Ceremony, then choose to have them be sent to an event and enter your name or the name of the awards Chair (Andre Uribe) for collection. Important to verify and add the address of the Hotel of our next PSRC Meeting to arrive Monday or earlier.
  - Please email Hugo Monterrubio (HugoM@ieee.org) and Andre Uribe for any questions and also to notify when the awards have been requested for your Standard or Guide WG so we can follow up with IEEE SA

- Another great Monday night! Hugo Monterrubio did an amazing job leading the ceremony for his final time! Andre Uribe will be following in these large footsteps. We will continue to have the ceremony for in-person PSRC May and September meetings on Monday night. Welcome Reception will feature an Awards Ceremony. Please take this into consideration when making travel plans for future PSRC meetings.

- PSRC web page WWW.pes-psrc.org
  - Rick Gamble is contact for D SC (Webmaster)
  - Refresh of web page is coming soon
  - A custom web page is available for each WG, if the WG Chair wishes to use it. Contact Rick Gamble, webmaster@pes-psrc.org
  - Website will have publicity page and plans to develop a page to honor long-term PSRC members who passed away. Fellows are also listed
- Recognized the need for a file share application for non-PAR WG's – https://www.pes-psrc.org/psrcsharefile.html
- WGs that complete their work are encouraged to present it to the IEEE community through WEBEX. Contact PSRC officers or Cathy Dalton (Publicity Chair) for further information
- WG Chair requires PES and IEEE SA membership
- Reminder to apply for Senior Membership in IEEE
- P&P Manual is going through final approval. Don provided some training on Tuesday and the slides will be available. Working Group P&P will be submitted after approval. Then O&P Manual
- For each project development (PAR related) meeting show: Copyright, Patent Policies & New Participant Behavior Slides https://standards.ieee.org/about/policies/
- New mandatory SA training for Working Group Officers is specified from SA (PAR related WG) Due December 31, 2022
- Long Range Planning Committee desires to move to all in-person meetings in the future but will move slowly
- PSRC Officers working with PES on new attendance and email system (Member Planet). Training provided earlier today.
- Attendance 317 total people with 160 in person. First time attendees 24 people.
- Future Meetings (Subject to Change)
  - January 2023 – JTCM – Jacksonville, FL
  - May 2023 – Las Vegas, NV
  - September 2023 – Myrtle Beach, SC

IEEE Standards Documents currently involved with WGs in D Subcommittee

No.	Approval Date	Name
C37.113	2015	Guide for Protective Relay Applications to Transmission Lines
C37.114	2014	Guide for Determining Fault Location on AC Transmission and Distribution Lines
C37.243	2015	Guide for Application of Digital Line Current Differential Relays Using Digital Communication

New Members: Scott Hayes, Joshua Hughes, Looja Tuladhar, Amin Zamani

D29 & D30: Tutorial for Setting Impedance-Based Power Swing Relaying on Transmission Lines and Tutorial on Application and Setting of Ground Distance Elements on Transmission Lines-Both will be excellent tutorials in the future

D46: Summary paper on C37.230 Guide for Protective Relay Applications to Distribution Lines – Approved and the Working Group has been disbanded. Thanks to Brian Boysen and Working Group

D:51 Working Group Formed to create technical report on Protection Consideration for Single Phase Tripping and Reclosing of Distribution Lines
Brian Boysen will chair.

D42, D44, and D47 are currently working on revising IEEE Guides that were last revised in 2014 or 2015.

D35, D37, D38, D43, D45, D48, D51 are working on technical reports with various subjects such as Line Pilot Protection Schemes, Series Compensation, High SIR, DA, Wildfire Risks, and Single-Phase Operations. D50 is working on summary paper for Reclosing Guide(C37.104)

Liaison Reports
T&D Committee / Distribution Subcommittee

None. Latest meeting minutes, agendas, and reports are located here https://cmte.ieee.org/pes-dist/meetings/

Old Business
None

New Business
There was a discussion on creating a Task Force on the subject of traveling wave protection. There were discussions of the actual implementation of traveling wave protection that is being implemented, but not used to actual trip. No motion was made on forming a Task Force. This subject maybe farther discussed in the next subcommittee meeting.

General Discussion
This September 2022 Line Subcommittee meeting will be the last meeting lead by Bruce Mackie. Starting in January 2023, Meyer Kao will be the Chair of the Line Subcommittee and Alla Deronja will be the Vice-Chair of the Line Subcommittee.

Line protection operations of interest
None

Adjournment

D29: Tutorial for Setting Impedance-Based Power Swing Relaying on Transmission Lines

Chair: Kevin W. Jones
Vice Chair: Normann Fischer
Secretary: N/A
Output: Tutorial
Established Date: May 2014
Expected Completion Date: May 2023
Draft: 1.09
Assignment: Create a tutorial on setting impedance-based power swing blocking and out-of-step tripping functions related to transmission line applications. Specific relay settings examples will be provided. Other methods of detecting out-of-step conditions that exist will be summarized and referenced but will not be discussed in detail.

Attendees: 10 Voting members, 3 non-voting members and 21 guests (34 total)

1.) Melvin Joseph will start working on OOS blocking examples for the tutorial and have these completed by the next meeting in January.

2.) The tutorial will also address out of step tripping for both tripping on the way in (TOWI) and the way out (TOWO). There was some discussion about the philosophy with respect to TOWI and the vice chair agreed to speak to PG&E with respect to their philosophy of TOWI for OST.

3.) The following individuals agreed to review the current draft document: Josh Perkins, Gary Schroeder, Abu Bapary, Theresa Bowie, and Abel Gonzales.

4.) The Chair adjourned the meeting.

Next meeting request - single session for 30 attendees with computer projector.

D30: Tutorial on Application and Setting of Ground Distance Elements on Transmission Lines

Chair: Karl Zimmerman
Vice Chair: Ted Warren
Output: Tutorial
Expected Completion Date: Sep 2022
Draft 8.0
Working Group Assignment: Write a tutorial on factors affecting the application and setting of ground mho and quadrilateral distance elements on transmission lines

Working Group D30 met online and in person in Nashville TN at 10:40 AM CDT on September 14, 2022 with a total of 21 attendees, including 14 in person and 7 online. 7 of 19 voting members were in attendance.

After introductions, the Chair reviewed the agenda and status of the working group. In February, Draft 8.0 was distributed to WG voting members for ballot. The Chair showed the results of the ballot with 14 of 19 voting members responded with either approved or approved with comments.

The Chair also acknowledged a missed opportunity for a virtual meeting over the summer. That issue has been corrected and the WG will plan another meeting in between September and January meetings.

The remainder of the meeting, the WG made edits and corrections to the tutorial based on comments from the reviewers. The WG finished all / most edits up to Section 7, which is a section on Application and Setting considerations.

One issue for discussion was the section on short lines and SIR. The WG made some useful edits to add clarity and to harmonize with the work of D38 on SIR impact on distance relays. Also, plan to add a couple newer references from recently published papers.

The WG will plan to meet in January, but will have a meeting in November to continue the review / editing process.

Meeting was adjourned.

Next meeting request - single session for 30 attendees with computer projector.

D34: Coordination with IEC 60255-187-3 Functional Specification for Line Current Differential Requirements

Chair: Normann Fischer
Assignment: Coordinate activities with IEC 60255-187-3, Functional Specification for Line Current Differential Requirements.

Did not meet and not expected to meet in January 2023

D35: Evaluation of Transmission Line Pilot Protection Schemes

Chair: Rick Gamble
Vice Chair: Brandon Lewey
Established: January 2017
Output: Technical report to the Line Protection Subcommittee
Expected Completion date: 01/2023
Draft: Final Draft 3
Assignment: Prepare a technical report to the line protection subcommittee to evaluate advantages and disadvantages of common transmission line pilot protection schemes, including POTT, DCB, DCUB, and line current differential. The schemes will be evaluated in terms of speed, sensitivity, dependability and security based on the design and configuration of transmission lines and system topology. A limited number of example systems will be evaluated.

Working Group D35 met on Tuesday, September 13, 2022 at 8:00am in person and remotely via WebEx with 17 members and 27 guests.

Introductions were made.

The WG discussed final comments along with summary tables.

A couple assignments were made, some new and some old.

Final Draft 4 will be distributed to working group members for review.

Action Items:

- Karl Zimmerman & Ted Warren – to review DCUB write-up
- Brandon Lewey & Rick Gamble – revise various pilot scheme sections, per working group comments along with sending out both summary tables for comments

Next meeting request - single session for 50 attendees with computer projector.

D37: Impact of Series Compensation on Transmission Lines
Chair: M. Kockott
Vice Chair: Nuwan Perera
Secretary: Melvin Moncey Joseph
Assignment: Prepare a report on the impact of fixed series compensation on transmission line protection.

D37 met on September 13th 2:20pm CST. The review and writing assignments were reviewed and the action item list updated.

Updated plan to complete the report was discussed.

Review Section 3, 4 - Aaron Finley, Athula, Nuwan

Review Section 5 - Sent by Mike

Review 6 - Melvin, Jack Wilson, Hardish

Reviews have a deadline of End of October

Version 1.10 will be sent out after that after comments are added by mid-November.

Comments will be tackled during the meeting in January and hopefully have a final document by May.

For the next meeting, we request a room for 25 people, single session, with a computer projector.
Please avoid conflicts with C29, C41, C48 , D29, D42, D47, J18, and if possible also D30, D38, J19

D38: Impact of High SIR on Line Relaying
Chair: Chris Walker
Vice Chair: Greg Ryan
Secretary: Greg Ryan
Output: Technical Report
Established Date: January 2018
Expected Completion Date: January 2023
Draft: 0.5
Assignment: Prepare a technical report to the line protection subcommittee to evaluate the impact of high SIR on line protection.

Presiding Officer: Chris Walker
Minutes Recorded by: Greg Ryan

Agenda:

1. Introductions/Sign up sheet/roster
2. Review Working Group Membership and Membership Process
3. Approve previous meeting minutes: first – Don Lukach second – Art Buanno
4. Discuss status and progress of report
5. Discussion and decision on using numerical values of SIR to define line length
6. Review writing assignments
7. Discussion of next steps
8. Adjourn

Minutes:

35 Attendees: 24 Members, 11 Guests

After introductions Chris reviewed the membership process and displayed the current voting members. Advised anyone who sees an error to notify Chris Walker or Greg Ryan to correct. Meeting minutes were displayed and approved. Outstanding assignments were requested to be submitted soon.

The transmission line guide has numerical values for definitions of long line, short lines, and medium lines. Chris brought up the question should we keep those numbers or is there a different way. The working group is tasked with that question to feed into the transmission line guide a recommendation. The working group discussed. Bogden Kaztenny has a paper that discusses the voltage input into the relay and the accuracy of the relay determines the issue with SIR. Bogden suggested a possibility of a formula with relay specification and CCVT spec as inputs and then get an output that gives the user a value that indicates if you will have an issue. The working group suggested that the numbers from the line guide have no real basis and is not the correct way to go. We do not have a replacement to the numerical numbers ready to go right now but agree that the definition of short, long, medium should not be used. The transmission line guide will need a correction and language completed in the next 6 months to make balloting. Bogden Kaztenny, Pratap Mysore, Juan Pineros, Abu Zahid volunteered to develop a replacement option to the numerical values with a due date of early November so that we can circulate to the working group and have a suggestion to the line guide at the January meeting.

Next meeting request - single session for 40 attendees with computer projector. Avoid conflict with D43, K25

D42: Revise C37.113, Guide for Protective Relay Applications to Transmission Lines
Chair: Jeffrey Barsch
Vice Chair: Rick Gamble
Secretary: Josh Lamb

Output: Guide
Established Date: 5/5/2020
Expected Completion Date: 2024
Draft: C37.113_newtemplate_12172021.doc
Assignment: Revise IEEE Std C37.113-2015, IEEE Guide for Protective Relay Applications to Transmission Lines

a) Officers presiding – Jeff Barsch, Rick Gamble, and Josh Lamb
b) Officer recording minutes – Josh Lamb
c) Call to order – Jeff Barsch
d) Chair's remarks – Copyright and patent slides presented. No issues identified.
e) Results of call for quorum – Quorum achieved with 21 members
f) Approval of Agenda (motion and second) – Rafael Garcia 1st, Jim O'Brien 2nd.
g) Approval of Minutes of previous meetings (motion and second) – Bruce Mackie 1st, Alla Deronja 2nd.
h) Brief summary of discussions and conclusions including any motions.
i) Action item:
    a. Discussed assignments and plan moving forward – Clean up comments in the next 3 to 6 months, submit to working group for ballot, receive and resolve comments, then send out to SA in Sept 2023.
    b. Edited sections 5.3-5.5 and 5.9. Continue to edit next time at section 5.9.1
j) Recesses and time of final adjournment: Adjourned by Jeff Barsch at 2:10 PM CDT.
k) Next meeting date and location at: Online meetings to be held on the first Thursday of each month from 11:00-12:30 ET via Teams; next in-person meeting to be in January 2023 at the Jacksonville FL JTCM meeting

Chat minutes:

from Power System Relaying and Control Committee to everyone: 12:59 PM
Phone number is Taylor
from Sudarshan to everyone: 1:15 PM
I can help with reviewing 6.4
from Arun Shrestha to everyone: 1:16 PM
Arun Shrestha - volunteer to review 6.7.3
from Juan Piñeros - XM to everyone: 1:16 PM
I can help with 6.7.6
from Juan Piñeros - XM to everyone: 1:41 PM
may be there is better-> is initiated by protection system and consist...
from Juan Piñeros - XM to everyone: 1:48 PM
I agree about minimum content about reclosing is useful with the proper reference to the guide of reclosing as well.
from Alla Deronja to everyone: 1:49 PM
Agree with you, Juan. Thank you
from Matt Black Sargent & Lundy to everyone: 1:52 PM
C37.104 should be removed from the Bibliography & placed in the Normative references
from Matt Black Sargent & Lundy to everyone: 2:09 PM
comment rescinded

Next meeting request - single session for 50 attendees with computer projector.

D43: Effect of Distribution Automation on Protective Relaying (Report)
Chair: Greg Ryan
Vice Chair: Amin Zamani
Secretary: Joshua Hughes
Output: Technical Report
Established Date: January 2021
Expected Completion Date: January 2023
Draft: 0.5

Assignment: Update the technical report "Effect of Distribution Automation on Protective Relaying".

Scope: Update the technical report "Effect of Distribution Automation on Protective Relaying" to add/increase discussion on DER integration, volt/var control, reconfiguration and the current complications of adaptation, addition of line sensors, peer-to-peer protocols, distance protection on distribution, telecommunications, DTT for DERs, discussion on IBR (Inverter Based Resources), and Microgrids. The working group will update the existing report and determine if it is advisable to recommend to the subcommittee to form a working group to use this report to create an IEEE Guide.

Working Group D43 met in-person and virtually on September 14, 2022 at 09:20-10:30AM CST. There were total of 19 attendees (7 online and 12 in-person) in the meeting: 8 members and 11 guests.

Meeting Agenda

1) Introductions/sign-up sheet
2) Review Working Group Membership and Membership Process
3) Discuss status and assignment of report
4) Address and resolve comments on Draft 0.5
5) Discussion of next steps
6) Adjourn

Summary of Meeting Discussion

w) Meeting started with the introduction of in-person attendees. Since the attendee list was available, no formal introduction was done for the remote attendees.
x) The Chair explained the requirements for membership, which is attending 2 out of the last 4 meetings.
y) The Chair provided an update on the status of the report, requesting the members to provide their assignment as soon as possible (latest November 4, 2022) to complete the report on time.
z) Colleen merged Sections 3.4 and 3.5 into Section 3.2. Amin will do a final (sanity) check.
aa) Juan suggested to add some explanations about adaptive protection scheme to Section 3.2, considering reclosing schemes.
bb) IEEE 1547-2018 make provisions for unintentional islanding (Amin to add a footnote – Page 35, if needed)
cc) References suggested by Colleen to be added to the reference list.
dd) Colleen suggested to add a sentence that communication infrastructure development for BTM DERs will be a challenging task (Page 37)

ee) Section 3.7 (VVO): This section is developed by Jackie W. Greg will follow up with Jackie to review the provided comments (by Colleen and Amin) as the first round. If needed, conference calls will be set up to discuss the comments in detail.

ff) Section 4: The team discussed that this section is not clearly discussing the impact of DA on protection system (maintenance). Greg will take the action to review this section and make this clear in the report.

gg) Chair noted that there will be virtual meetings before the January meeting to continue addressing comments.

Note from D Sub Committee: Sebastian Billaut will send additional information that the K29 working group received on fault indicators for consideration into our report.

Next meeting request - single session for 30 attendees with computer projector. Avoid conflict with D38, J20, C25, and C50.

D44: Revise C37.114, IEEE Guide for Determining Fault Location on AC Transmission and Distribution Lines

Chair: Sebastien Billaut
Vice Chair: Karl Zimmerman
Secretary: Looja Tuladhar
Output: Guide
Established Date: January 2020
Expected Completion Date: September 2024
Draft: 2.1
Assignment: Revise IEEE Std C37.114-2014, IEEE Guide for Determining Fault Location on AC Transmission and Distribution Lines

Working group D44 met on September 13, 2022, at 3:40 PM CDT, Face-to-face and virtual online with **26 attendees**.
8 were new attendees.
10 voting members were present out of **21** current voting members, so **the quorum was not met.**
The Chair, Sebastien Billaut brought the meeting to order and showed the agenda, and the IEEE copyright guidelines slide for IEEE working group meetings.
We **did not have a quorum to vote for PSRC May 2022 WG meeting minutes**. So electronic voting will be conducted. Vice-Chair Karl Zimmerman and Secretary Looja Tuladhar recorded minutes.

- The group discussed adding some methods about **fault location on 3+ terminal lines**. **Arun Shrestha and Joerg Blumschein** volunteered to propose some wording and references
- The chair outlined the plan to **integrate the remaining comments submitted into draft 2.2.**
- **Looja Tuladhar gave the updates on the figure redraw status**. The WG will update/redraw the figures in Visio. Peiman Dadkhah volunteered to help redraw figures in Visio.
- In parallel, the **WG will resolve the comments to plan to take the draft to a ballot by the end of 2023**.

Bruce Mackie made a motion to adjourn the meeting, seconded by Karl Zimmerman and the meeting was adjourned.
For the next meeting, if face-to-face, we will need a projector and a room for 30. Avoid conflict with C38, D30, D35, D38, D42, K22, K27, and K29.

D45: Protection Methods to Reduce Wildfire Risks due to Transmission and Distribution Lines
Chair: Jonathan Sykes
Vice Chair: Scott Hayes
Secretary: N/A - Bruce has agreed to help with the secretarial work.
Output: Technical Paper
Established Date: September 2020 (1st task force meeting)
Expected Completion Date: Jan 2023 (under an aggressive schedule)
Draft: No overall draft, sections are ready for circulation and comment
Assignment: Prepare a technical report to the line protection subcommittee to "document protection methods used to reduce wildfire risks due to transmission and distribution lines."

D45 WG met on 9/13/22 at 2:20pm (Central Time)
Members = 39 listed
Attendance = 45 – Quorum Established (approximately 30 people met face-to-face)

Jonathan opened the meeting with the agenda. The team reviewed the minutes from the last WG and approved the minutes. We reviewed the scope, assignments, discussed open topics. The team went through the various sections by having the leads of each section discuss their progress. No new items were included.

The Chair, Vice-Chair, lead the team through updates from the leads of each section. The status spread sheet was updated and various items. An open and active discussion occurred for each section and various new topics that could be included. Dates were assigned for the development of the first draft.

Draft – no overall draft yet, several sections have completed their first drafts and after a review these will be submitted for comment. Section leaders were encouraged to hold additional and virtual meeting to facilitate progress prior to the next PSRC in Jan 2022.

For the next meeting, D45 will need a room for 50 and a computer projector.

D46: Summary Paper for IEEE C37.230, "Guide for Protective Relay Applications to Distribution Lines"
Chair: Brian Boysen
Vice Chair: Chris Walker
Secretary: Chris Walker
Output: Technical Report
Established Date: May 2021
Expected Completion Date: January 2022
Draft: 1.10
Assignment: To develop a summary paper for C37.230-2007, "Guide for Protective Relay Applications to Distribution Lines".

Assignment is completed and summary paper approved by the PSRC officers.

D46 Chair Brian Boysen motioned to the D Subcommittee to disband WG D46.

This was seconded by Steve Conrad

Members of D Subcommittee voted to disband Working Group D46

D47: Revise C37.243, IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communications
Chair: Alla Deronja
Vice-chair/Secretary: Steve Klecker
Established: January 2021
Output: Guide Revision
Draft: 3.0
Expected Completion Date: December 2025
Assignment: Revise C37.243 IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication

This work is a joint project between the PSRC leading and PSCCC supporting it.

The WG D47 met with 25 voting members, 3 non-voting members, and 24 guests on Wednesday, September 14, 2022, at the IEEE PSRC and PSCCC 2022 meeting. One guest joined the WG as a non-voting member.

After the introductions, the WG chair displayed the IEEE-SA Copyright, Patent, and Behavior policy slides as required for the working group with PAR related activities. There were no objections from the meeting participants.

The meeting agenda was approved. Motion: Ian Tualla, 2nd: Chris Walker. There were no objections.

The quorum was met, so the WG voted to approve the May 11, 2022, PSRC and May 19, 2022, WebEx meeting minutes. Motion: Joerg Blumschein, 2nd: Taylor Raffield.

In June of 2022, the WG conducted an electronic vote to add Traveling Wave line current differential protection method to C37.243. The motion failed with 16 “No” votes, 15 “Yes” votes, and 5 no-replies. Therefore, the topic of travelling wave line protection will not be included in the presently revised version of the standard.

The WG discussed the status of the assignments for Clause 6 *Communication channel considerations* that is being restructured. There is no material related to digital PLC, and a comment was made that this technology may not be suitable for use with current differential. Therefore, this material is tentatively proposed to be not included in the guide while a verification is made with PSCCC.

Another questionable channel is a switched Ethernet-based channel based on the PRP and HSR protocols. A comment was made that these protocols are LAN based, not WAN based, and would not support a communication channel for current differential. Also, it may fall under the fiber optic or MPLC technology. We will investigate further.

The guide’s other Clauses have been reviewed, including 4 *Current differential line protection applications,* 5 *Current differential operating methods*, 7 *Application considerations*, and 8 *Testing and troubleshooting*. The WG is ready to start reviewing and resolving the received comments to create a draft the WG will review for the future sponsor ballot. Initially, 4 monthly 2-hour long WebExes will be

scheduled on Thursdays. Based on the comment resolution progress, we may decide to move to bi-weekly WebExes after the JTCM 2023 meeting in January.
The WG started resolving the comments for clauses 2.0 and 3.0. There were comments concerning the normative references. All the documents listed as normative references appear to be informative and will be moved to the Bibliography.

Concerning Clauses 4 and 5, there is a suggestion to swap them because the existing Clause 4 compares the current differential function to other line protective functions while Clause 5 describes the current differential principles. This is needed to know and understand the principles of a function before comparing it to others, so this option is on the table to swap these clauses.

Action Items:

1. **Jim O'Brien** will review, revise, and extend if needed subclause 6.1.6 *Latency*.
2. **Ian Tualla** will review, revise, and extend if needed 6.3.2 *Communications channel interface options*.
3. **Joerg Blumschein** will review, revise, and extend 6.3.5 *Interoperability*.
4. **Tuan Tran** will review, revise, and extend 6.3.6 *Addressing*.

These assignments are requested by December 1, 2022. Please email them to **aderonja@atcllc.com, Steve.Klecker@midamerican.com,** and **galina.s.antonova@hitachienergy.com.**

The agenda was completed, and the meeting was adjourned.

Next meeting request - single session for 40 attendees with computer projector. Avoid conflict with C48, K22, K31, D42, I2.

D48: Create Report on Single-phase Trip and Reclose on Transmission Lines
Chair: Kamal Garg
Vice Chair: Ilia Voloh
Secretary: N/A
Output: Report
Established Date: Sep 2021
Expected Completion Date: Dec 2023
Draft: Sep 14, 2022
Proposed assignment for WG: To prepare a report focusing on the considerations associated with single-phase tripping and reclosing on transmission lines.

1. Fourth meeting of D48 working group in a single session with 42 attendees. 11 out of 21 members in attendance. Quorum was not achieved when counted. Minutes notes are being sent via email for approval.
2. Minutes from May meeting were presented. Discussion about coordination with D42 Line guide. D42 is due by 2024 but may finish early (by 2023). However, D48 may be delayed beyond 2023 at this point.
3. Kamal presented progress of the draft.

4. **Review Assignments- All due by October 28, 2022**
   a. Steve Klecker willing to help with reviewing sections (Section 3).
   b. Qun (section 4).
   c. Gopal Gajjar (Section 5 – Phase selection)
   d. Venkatesh, Kanchan, Juan (section 7)- This section is still not ready for Review. Will wait for review on this. (Instead, please review sections 2.1 and 2.2 or section 9, if comfortable). Please let us know.
   e. Abu (section 9 reclosing).
5. David Lopez presented section 9 followed by discussion. Good discussion on Multiphase reclosing practice for parallel lines (Japan and South Korea). Also, protection issues discussion.
6. Pratap presented delayed zero crossing. Good discussion on the compensation and various issues. Also, short discussion about offshore applications.
7. Cross country faults that Ilia was planning for September 2023 meeting, probably done during next meeting in January 2023.
8. Additional meeting may be arranged before January 2023 meeting, based upon the progress of WG.
9. Latest Draft on share point Dated September 14, 2022. If questions reach out to Ilia, Kamal or Bruce. https://psrc.sharefile.com/d-sedda4856525247e0a2fe9595b1557b12
10. Adjourn 11.50 AM PST.

Next meeting request - single session for 30 attendees with computer projector.

D50: Prepare a summary paper for IEEE Std C37.104 Guide for Automatic Reclosing on AC Transmission & Distribution Lines

Chair: Manish Patel
Vice Chair: Joshua Lamb
Secretary: Miguel Rios
Output: NA
Established Date: May 2022
Expected Completion Date: December 2023
Draft: NA
Assignment: Prepare a summary paper for IEEE Std C37.104 Guide for Automatic Reclosing on AC Transmission and Distribution Lines.

The WG met in a hybrid format on September 13th, 2022, at 9:20 am CT with 17 members and 8 guests.

Officers presiding – Manish Patel, Joshua Lamb & Miguel Rios
Officer recording minutes- Manish Patel

Chair's remarks – Thanked everyone for submitting contribution on time. First draft of the summary paper is looking good.

The WG reviewed 1st complete draft of the summary paper and agreed to move it for the WG review/vote. The draft will be sent to WG members with a request to submit comments/vote by November 11th, 2022.

The tentative timeline for completing work is as following:

WG review/vote: By November 15, 2022
Comment resolution: December 2022 – February 2023
D-Subcommittee review/vote: March - April 2023

The WG plans to submit this summary paper to following conferences:

Georgia Tech protective relay conference 2024 (abstract due in September 2023)
Texas A&M conference for protective relay engineers, 2024 (abstract due in October 2023)
Western protective relay conference 2025 (abstract due in Spring 2024)
Minnesota power systems conference 2025 (abstract due in Spring 2024)

Rafael Garcia volunteered to present the summary paper at the Texas A&M conference. The WG is looking for volunteers to present the summary paper at other conferences.

For the next WG meeting, D50 will need a room for 30 and a computer projector. Avoid conflict with B10, C45, CTF34.

DTF51: Investigate the need to create a WG on "Protection Consideration for Single Phase Tripping and Reclosing of Distribution Lines"
Chair: Brian Boysen
Vice Chair: N/A
Secretary: N/A
Output: TBD
Established Date: January 2021
Expected Completion Date: May 2022
Draft: N/A
Assignment: *Make a recommendation to the D subcommittee whether to form a working group and if the recommendation is to proceed, to develop a recommended assignment for the D subcommittee to consider.*

Presiding Officer: Brian Boysen
Minutes Recorded by: Brian Boysen

Agenda:

1. Introductions
2. Discussion of the issue: Why apply Single Phase Tripping to Distribution Lines what are its challenges
3. Discussion on any utility practices and existing guidance and challenges
4. Discuss if a Working Group should be formed and if so, what should be the output
5. Show of interest in Joining a Working Group
6. Next Steps:
    - Identify and review existing papers and practices: Send any to me
    - Review D48 outline and paper
    - Develop outline and obtain writing assignments

Minutes:

- The task force group met on Tuesday, September 13 at 5:00 PM CDT
- There were 27 people in attendance (19 in person and 9 hybrid).
- Brian Boysen introduced the issue and discussed the reason for and challenges with applying single phase tripping and reclosing of Distribution Lines.
- The group discussed some of their experiences and interest in the subject
- All in attendance voted to recommend that the D Subcommittee form a Working Group to develop a Technical Report on the Protection Considerations for Single Phase Tripping and Reclosing of Distribution Lines.
- Over 20 people in attendance indicated their interested in joining the new working group
- Assuming a Working Group is formed, it will meet in January with presentations provided by members discussing their practices and experiences with single phase tripping of Distribution Lines and the group will start forming an outline and writing assignments for the Technical Report.

DTF51 Chair Brian Boysen motioned to the D Subcommittee to form WG D51, Protection Consideration for Single Phase Tripping and Reclosing of Distribution Lines, with assignment of prepare a technical report on Protection Consideration for Single Phase Tripping and Reclosing of Distribution Lines

This was seconded by Adi Mulawarman

Members of D Subcommittee voted to form Working Group D51

For the next WG meeting, D51 will need a room for 30 and a computer projector. Avoid conflict with D45.

H: Relaying Communications Subcommittee

Scope: Evaluate and report on the characteristics and performance of protective relaying communications and control systems. Recommend communication requirements, operating and test procedures which assure reliable performance of the overall protection and control system.

Chair: Aaron Martin
Vice Chair: Hugo Monterrubio

IEEE PSRC SC H currently has 17 active Working Groups (WGs) and two Taskforce: 9 are producing or revising IEEE PSRC Standards. HSC also has two members serving as external liaisons.

HSC met yesterday afternoon with 34 members and 13 guests. Quorum was established and May minutes were approved. We welcomed three new members, Shave Haveron, Steve Kleckler, and Scott Mix.

The following report will be submitted to the HSC for approval before January PSRC meeting:
H17: Establishing Links between COMTRADE, IEC 61850, and CIM Chair: C: Brunner

The following report is on track to be submitted to the HSC for approval before January PSRC meeting:
WGH17: Establishing Links between COMTRADE, IEC 61850, and CIM Chair: C: Brunner

The following IEEE guide is on track to be submitted to RevCom in October.

WGH22 PC37.249 Guide for Categorizing Security Needs for Protection Related Data Files Chair: A. Makki

The following PAR extension requests were approved by the HSC electronically and submitted to MyProject by their respect .
WGH27 H27 IEEE C37.251 Standard File Format for IED Configuration Data (COMSET). M. Capuozzo
WGH40 PC37.1.2 Recommended Practice for Databases Used in Utility Automation Systems Chair: T. Laughner
WGH44 PC2030.100.1 Monitoring and Diagnostics of IEC 61850 GOOSE and Sampled Values Based Systems Chair: A. Martin
WGH45 PC37.300 Guide for Centralized Protection and Control Systems within a Substation Chair: R. Das

The following PAR was submitted in to NesCom.
HTF54: C37.111-2013/IEC 60255-24:2013 submitted PAR to revise C37.111-2013/IEC 60255-24:2013. Chair: M. Admiak
Other Topics:
Related to the H45 PC37.300 Guide for Centralized Protection and Control Systems within a Substation, the following Motion was discussed:

Motion to form a joint task force with PSCC (P21) to create a PES Technical Report based upon the output of the PSCCC P21 SG and the CIGRE B5.60 technical brochure that recommends a roadmap for developing new or updating existing IEEE standards to address issues of Centralized Protection and Control (CPC) Systems.
HSC discussed the motion and decided not to vote on it during the meeting.

<u>Announcements:</u>

a. The following new H SC members were announced. Shane Haveron, Steve Kleckler, and Scott Mix.

b. New items from September 2022 AdCom Meeting
    i. New PSRC SA P&Ps, PSRC WG P&P, and Quorum Clarity Documents to be adopted and posted on PSRC website this year. Notable updates include, what is required in WG meeting minutes and WG membership policies.
    ii. Twelve of thirteen PAR extension requests have been approved by SCs and submitted to NesCom. Four requests by WGs in HSC.
    iii. WG meeting minutes doe to HSC Chair and Vice Chair by next Friday, September 23. SC meetings are due with 30 days of PSRC meeting.
    iv. Memberplanet selected to be replace 123signup. Scheduled to go live this Fall 2023
    v. If WG or TF officers are not physically present, room meeting hosts are to collect in person attendance and share with PSRC secretary and corresponding SC Chair.

c. New items from Awards and Recognition Meeting:

i. Uncollected awards from the May or the September Awards ceremonies are available here in the registration desk for pickup. Awards will be shipped one more time to Jacksonville to be picked up there.
ii. Awards committee should be all caught up with pending awards from 2019, 2020 and 2021. If you feel that you or your WG please reach out to Hugo Monterrubio or Andre Uribe.
iii. Next awards ceremony will be Monday May 8, 2023, in Vegas!!! Please save the date and try to join us to honor your fellow PSRC members for their work and contributions.

d. Standards Coordination Meeting did not meet.

e. New items from SC and reminders carried from prior meetings:
i. WG officers to attend Stds Coordination meeting
ii. SC Members are required to Vote on Reports
iii. WG officers are required to submit meeting minutes within two weeks of PSRC meetings.
iv. iMeet space available for Non-PAR WGs. PSRC Officers have organized documents depository for non-PAR WGs
v. WG presentations to be reviewed by SC Officers
vi. Upon work completion, prepare a presentation to the MC
vii. New mandatory training for Subcommittee Officers and Working Group Officers leading standards work specified by SA. Training includes 15 modules total 8-12 hours. SA will be responsible for tracking the training.
viii. WG Chairs that they are required to show the Copyright, Patent, and the Participant Slides required from SA

WG business:

Related to the H45 PC37.300 Guide for Centralized Protection and Control Systems within a Substation, the following Motion was discussed:

Motion to form a joint task force with PSCC (P21) to create a PES Technical Report based upon the output of the PSCCC P21 SG and the CIGRE B5.60 technical brochure that recommends a roadmap for developing new or updating existing IEEE standards to address issues of Centralized Protection and Control (CPC) Systems.

HSC discussed the motion and decided not to vote on it during the meeting.

WORKING GROUP MEETING REPORTS

H6: IEC 61850 Application Testing

Chair: C. Sufana
Vice Chair: B. Vandiver
Output: Summary Paper
Established: January 2021

Assignment: Assignment is to write a summary paper on TR84 Application Testing Of IEC-61850 Based Protection and Control Systems.

A. Introductions
B. IEEE Patent slides
C. IEEE Copyright slides
D. Approval of previous meeting minutes
E. Updates on IEC-61850 activities
F. Summary paper

Voting members:
Charles Sufana, Benton Vandiver, Jay Anderson, Christoph Brunner, Jason Buneo, Herbert Falk, Dinesh Gurusinghe, Chris Huntley, Sughosh Kuber, Aaron Martin, Tim Mathias, Daniel Reckerd, Antonio Riccardo, Mickey Schultz, Harsh Vardhan, Marcos Velazquez, Quintin Verzosa, Emmoji Vundekari, Austin Wade

Non-voting members
Galina Antonova, Oscar Bolado, James Bougie, Nestor Casilla, Darren De Ronde, Xiangyu Ding, Michael Dood, Didier Giarratano, George Gresko, Richard Liposchak, Deepak Maragal, Daniel Nordell, Silvio Roesler, Dustin Tessier

You can find the technical report at: http://www.pes-psrc.org/kb/published/reports/H6_17.6_Application_Testing_of_IEC_61850_Based_Systems.pdf and at Application Testing of IEC 61850 Based Systems (ieee-pes.org)

The meeting got a late start due to problems with getting the WebEx meeting to start properly.

Main emphasis of the session was to review the comments from the working group vote on the latest summary paper draft.

There were 5 voting members, 0 non-voting members, and 2 non-members present.

After seeing the patent, copyright, and participant slides and going over the minutes; the working group worked on updating the summary paper.

There were requested changes from Austin Wade and Dinesh Gurusinghe. The following changes will be done:

1. Remove the sentence as suggested by Austin Wade in clause 5.2.2.
2. Use Dinesh's version based on his comments:
Abstract should be separate from the introduction

Figure numbers start from 1 and should be independent from figure numbers of the report as this paper is a standalone document.

Quality of Fig. 3 (Conceptual Substation Ethernet LAN) should improve as fonts are too small for reading.

A separate section should be added at the end of the paper for references.

Some minor editorial changes that can be found in the attach paper and changes are tracked.

3. Based on Dinesh's comments, Figure 3 will be removed, Figure 9 will become Figure 1, Figure 10 will become Figure 2, and the reference clause will be added. The reference section will be developed using the footnotes from the full Technical Report since the format for a Technical Report does not use a reference clause. Because the summary paper is using a two column format, figure 3 can not be resized to make it clearer, so it was decided to remove it.

Because of the extensive amount of changes being made, it is anticipated that a working group re-ballot will be needed.

The working group will meet at the next PSRC meeting to go over the summary paper. It is also anticipated that the working group may meet before the next PSRC meeting. For the next meeting, we will meet in a single session in a room for 25 to 30 people, and with a computer projector.

Charlie Sufana
H6 Chair

Voting members attending: 5 out of a total of 19 voting members

NAME	**AFFILIATION**
Charles Sufana	Retired
Jason Buneo	General Electric
Aaron Martin	Bonneville Power Administration
Marcos Velazquez	Doble Engineering Company
Austin Wade	Schweitzer Engineering Labs

Non-voting members attending: 0 out of total of 14 non-voting members

NAME	**AFFILIATION**

Non-members attending 2

NAME	**AFFILIATION**
Daniel Lebeau	Hydro Quebec
Karen Wyszczelski	Schweitzer Engineering Labs

H17: Establishing links between COMTRADE, IEC 61850 and CIM

Chair: C. Brunner
Vice Chair: A. Apostolov
Output: Report
Established: 2010
Expected completion date:

Assignment: Develop a standard approach to link IEC 61850, CIM and COMTRADE so that the COMTRADE channels can be associated to a node in the power network.

H17 met with on Tuesday at 9:20. Alex Apostolov reported that all but one comment of the current draft had been addressed. Mark Adamiak has one more edit. When the edit is finalized, report will be sent to HSC chair, Aaron Martin. Aaron Martin will check the comments and share the edited draft with HSC members that commented to verify that comments were addressed. HSC chair will then request a new vote from the HSC members to approve the report.

H22/C19: Guide for Categorizing Security Needs for Protection Related Data Files

Chair: Amir Makki
Vice Chair: Cesar Calix
Secretary: Hugo Monterrubio
I-Meet Administrator: T.W. Cease
Output: Guide - PC37.249
Established: January 2014
Expected Completion Date: December 2022
Expected Final Draft: 8.20

Assignment: Identify and categorize protection, automation, and control (PAC) related data files based on content, use, and risk of disclosure or compromise (confidentiality, integrity, and availability). PAC related data files include but are not limited to files used for configuration, management, and analysis of protective relaying systems.

September 2022, Meeting Minutes:
The Working Group met on time with 8 members and 4 guests in attendance. Quorum was established. Patent and Copyright slides were presented. The minutes from the last meeting were approved.

The Chair presented the comments that had been addressed by following members: Amir Makki (pages 1-8), Cesar Calix (pages 8-15), Craig Preuss (pages 16-21), and TW Cease (pages 22-28). The consolidated document with highlighted changes was then presented. Several comments that had been assigned to TW Cease were discussed and resolved. The document was updated accordingly.

3 other members of the comment resolution group have not submitted their assignments yet. The Chair asked the members to submit their assignments no later than September 24th, 2022. Then the document will be submitted to IEEE by the end of the following week for the 10 day ballot recirculation. The document will be completed by the end of October if no additional comments are received. If additional comments are received the Working Group will meet via web meeting to discuss and resolve.

It was advised that the Working Group's PAR expires at the end of 2022. The Group plans to meet in January and then disband.

Attendance List:
Amir Makki (Softstuf Philadelphia) (Member)
Byungtae Jang (KEPCO)
Cesar Calix (Burns & MacDonnell) (Member)
Charles Sufana (Retired) (Member)
Craig Preuss (BV) (Member)

Eric Thibodeau (Hydro Quebec) (Member)
Gayle Nelms (SEL)
Hugo Monterrubio (Hubbell) (Member)
Malia Zaman (IEEE SA)
Shane Haveron (AMETEK) (Member)
Thomas Rudolph (Schneider Electric)
T W Cease (IEEE) (Member)

H27: PC37.251 Standard for Common Protection and Control Settings or Configuration Data Format (COMSET)

Chair: Mario Capuozzo
Vice Chair: Benton Vandiver
Secretary: Daniel Sabin
Output: Standard
Established: 2013
Estimated Completion Date: December 2023
Draft: 4.0

Assignment: Develop a standard file format for exchange of protection and control configuration data between engineering tools and asset management tools.

The chair established quorum because 10 of the 12 working group members were in attendance.

The initial project authorization request (PAR) for PC37.251 was approved by IEEE New Standards Committee (NesCom)on 2016 February 05, with an expiration date of 2020 December 31. However, an extension for this project was approved by IEEE New Standards Committee (NesCom) on 2020 December 2.The expiration date for the PC37.251project is 2022 December 31.A second PAR extension will be requested by in September 2022as submission to IEEE SA RevCom would likely not happen until second quarter of 2023.

The chair showed the slides required by IEEE Standards association for patent policy, copyright policy, and working group participation. No essential patents were declared when the chair asked for a call for essential patents. Minutes from the May 2022meeting were approved. Chair discussed comments received from both TC57/WG10 and the CAPE PSSe User Group. Chair discussed recent submission for PAR extension, which will be voted on at the NESCOM in October. The extension is for one year, ending December 31, 2023, to allow time for voting. From the received comments, resolutions were determined, resulting in the action items below, with comments posted to iMeet Central.

Action Items

- Craig Preuss will perform an editorial review of the next draft standard and will ensure that the IEEE template is utilized correctly, such that formatting and style is correct.
- Mario Capuozzo will complete the following tasks:
    - Provide a transitional namespace.
    - Add an engineering process workflow diagram that shows the COMSET file amongst other SCL files and tools. Provide a suggestion, somewhere, that the COMSET file could be queried from the IED via MMS GetFile service.

- Clarify that Data Objects with no CDC reference must utilize the given DOType id attribute.
- Clarify that settings with fc=SP are global and fc=SG belong to one or more groups.
- Update references/bibliography.
- Add a note that <Communications> is okay for IEC 61850 devices, as it is settings.

- As well, just talk a little more about XML overall structure for a non-61850 application.
  - Clarify that secondary Val may be in percent, per-unit, or just raw secondary. Attach the toy COMSET file to the Annexes.

- Add note that Digital Logic is being resolved by WG10, and make a reference to the upcoming standard number.

H30: IEC 61850 User Feedback

Chair: D. Maragal
Vice Chair: A. Martin
Secretary: D. Tessier
Output: User Feedback to IEC 61850 TFUF, UCA, TISSUE Task Force & Vendors
Established: September 2014
Estimated Completion Date: Ongoing

Assignment: Collect user feedback from utilities and consultants for designing and implementing IEC-61850 based substation automation system. Prepare a report outlining the experienced issues and suggest enhancements to IEC-61850 standard and manufacturer implementations.

Agenda
- User Experience from Google
  - Google's roadmap on IEC 61850
  - Discussion on the Issue encountered during implementation with Communication Network https://redmine.ucaiug.org/issues/5335
- Honest Opinions on IEC 61850
  - Different perspectives of what Utilities/Industries are thinking of IEC 61850?
  - What H30 can do to address the common challenges?
- Time Synchronization Issues with SV system
  - Possible solutions
  - IEC 61850 Standardization with EtherCAT Implementation?

28 attendees attended the meeting.
Deepak briefly described purpose of H30 forum and the progress we have made so far.
Google Inc. shared their experience on implementing IEC 61850 and brought out following key aspects:

1) Google IEC 61850 with GOOSE for feeder protection significantly reduce complexity compared to hardwired option. Their pilot system has been successful with no miss-operations.

Lessons learnt include:

a. Do not use RSTP as it could lead to broadcast storm
b. 100M links are becoming more expensive to purchase and maintain as many data center network switch manufacturers have moved to 10G links.

c. Top-down design approach has significantly reduced the design complexity due to repeatability
d. Focus on inhouse training needs
e. HMI system to depict signals for both monitoring and trip conditions.
f. Utilized bruteforce method of VLAN per IED due to product limitations

Another members of H30 pointed out the IEC 61850-90-4 that mentions the concerns of RSTP and suggestions on MRP and HSR technologies as alternatives.

2) The group discussed the challenges and concerns with the adoption of IEC 61850 technology. Two utility members expressed the concern of overheads dealing with networking and configurations in addition to protection considerations. The H30 group decided to focus on future meeting to delve into sharing best practices & guidelines especially from IEC 61850-90-4 standard for the benefit of the community.

The group could discuss the Time Synchronization issues due to time restrictions but planned to conduct web meetings.

H31: Common Protection & Control parameters for COMSET

Chair: D. Maragal
Vice Chair: A. Apostolov
Output: Report
Established: September 2015
Estimated Completion Date: September 2022
Draft: 6

Assignment: Develop generic models and parameters for protection & protection related parameters.

Meeting conducted with 7 attendees
The group discussed the progress of the report achieved so far and the remaining pending work. Chair discussed the lack of manufacturer support to provide input on implementation and model. The group exchanged various contact details to communicate with.
The chair discussed the thought of extending the work to PAR activity to include North American profile for typical bus configurations. The group felt that the PAR activity should be postponed to later stage after completion of the existing report. However, the group agreed to include a profile for typical Feeder configuration.

H40: Databases used in SAS

Chair: T. Laughner
Vice Chair: M. Capuozzo
Output: Guide
Established: 2017
Expected completion date: December 2022
Draft: D2

Assignment: Develop IEEE Std C37.1.2, IEEE Recommended Practice Guide for Databases Used in Utility Automation Systems

Attendees:
Members: Theo Laughner, Craig Preuss, Anthony Johnson, Galina Antonova
Guests: Lakshan Piyasinghe, Aaron Martin, Jack Wilson, Dan Sabin

Called to order at 8 AM CT.
Introductions.
Patent slides were shown.
Quorum established.
Minutes from the September 2021 meeting were approved. Motion by Craig. Second by Tony.
Draft 3.3 was reviewed. Suggested comments/edits approved during the meeting.
Outstanding issues:
Page 10 line 21 – Bullet list of different replication technologies.
Definition of RAID / Reference provided by both Dan and Craig.
Sections 7.6 and 7.7 were reviewed and need additional editing. Chair agreed to review and edit these sections.
Meeting closed at 9:10 AM CT.
Next meeting in January at the JTCM.

H41: Revision of IEEE 1646 Communication Delivery Time Performance Requirements

Chair: D. Holstein
Vice Chair: T.W. Cease
Output: Standard
Established: 2017
Completion Date: 2021
Draft: 5E4

Assignment: Revision to IEEE Standard 1646-2004

WG H41 did not meet in September 2022

H44: Monitoring and Diagnostics of IEC 61850 GOOSE and Sampled Values Based Systems (PC2030.100.1)

Chair: Aaron Martin
Co-Vice Chair: David Dolezilek
Output: Guide
Established Date: 2018
Expected Completion Date: 2022
Current Revision: 3.0

Assignment: Write a IEEE guide titled “Monitoring and Diagnostics of IEC 61850 GOOSE and Sampled Values Based Systems”

Scope: This guide provides information about what factors to consider when applying IEC 61850 GOOSE and Sampled Values to monitor and diagnose communication of automation systems.

Purpose: To provide guidance to protection & automation engineers when applying monitoring features IEC 61850 GOOSE messages and Sampled Values to support the implementation of condition-based maintenance, cyber security monitoring and improved commissioning of communications of automation systems.

H44 met with 7 members, 6 attendees in person, and 25 attendees online.
Introduction
Quorum was not met
Copyright Slides, Participant Slides and Patent Slides were presented to the group

H44 Scope and Assignment was reviewed
Chair reported the PAR extension request was approved by HSC and extension request for was submitted to the NesCom. Chair responded to one comment and IEEE SA Liaison M. Zaman responded to another comment. Motion received 15 Yes votes and 0 negative votes

Group Discussed difference between monitoring and diagnostics.
Group Discussed moving informative content in section 3 to the appendix
C. Preuss made the recommended master/slave terminology.
S. Mix suggested using requestor/responder

Chair the status of the reported

- All assignments have been received.

D. Dolezilek's assignment is still be integrated into the draft.

- Draft is missing Conclusion

The following assignments were issued:

- C. Preuss volunteered to write a several paragraphs on monitoring and diagnostics to be added to introduction

A. Martin volunteered to move informative information from Chapter 3 to Appendix

- A. Martin to continue formatting draft

A. Martin: will schedule working session when Dave is available to finish integrating hi contribution

- A. Martin will update master/slave terminology.

Chair asked if anyone was interested in volunteering to be secretary.

Attendee List (Names and affiliation only, no emails**)**

Members		
NAME	AFFILIATION	
Alex Apostolov	Omicron	
Nestor Cassillo	Doble	
Eugenio Carvalheira	Omicron	X
David Dolezilek	SEL Inc.	
Aaron Martin	BPA	X
Herbert Falk	Outside the Box	
Scott Mix	PNNL	X
Ryan Newell	TRC Companies	

Dean Ouellette	RTDS	X
Jose Ruiz	Doble	X
Craig Preuss	Black and Veach	X
Arun Shrestha	SEL Inc.	
Dustin Tessier	Tesco	
Benton Vandiver	Hitachi	
Jun Verzosa	Doble	X
Emmoji Vundekari	GE	
Karen Legget-Wyszczelski	SEL Inc.	
Guests		
Abel Gonzalez		
Amin Banaie	GE	
Andre Melo	SE	X
Byungtae Jang	Naver	X
Bharat Nalla	SEL Inc	
Emmoji Vundekari	GE	
Fernando Calero	SEL Inc	
Daniel Nordell	Xcel Energy	
Dinesh Gurusinghe	RTDS	X
Emmoji Vunderkari	GE	
Farzad Khalilpour	GE	
Gayle Nelms	SEL Inc.	X
Greg Zweigle	SEL Inc.	
Hani Al-Yousef	Eaton	
Jesse Sliva	SCE	
Jeff Dagle	PNNL	
Jorg Blumshein	Siemens	
Marcos Velazquez	Doble	X
Mario Capuozzo	Doble	
Matt Black	Sargent Lundy	
Michael Cummingham	Powergrid	
Mital Kanibar	GE	
Jack Wilson	Ameren	
Jeff Pack	Power Engineers	X
Hugo Monterrubio	Hubbell	X
Nuwan Perera	Earlphase	
Rich Hunt	Quanta Technology	
Romulo Bainy	University of Idaho	
Safety Pepljak	YRC Companies	
Shane Haveron	Ametek	
Thomas Rudolph	SE	
Dan Ransom	GE	

Mohit Sharma	Megger	
Andre Uribe	Powergrid	
Wayne Pawley	Sisco	
Gayle Nelms	Sel Inc	X
Mital Kanabar	GE	
Bharat Nalla	SEL Inc	
Yuchen Lu	ERPI	X
Jim Hackett		
Priyanka Nadkar	SEL Inc	
Mathew Black	Sergent Undy	
Angelo Tempone	Duke Energy	
Thai Li	Hubbell	
Xiangyu Ding	S&C E	X
Yanfeng Gong	SEL Inc.	X
Yujie Yin	GE	
Wang Zitao		

H45: C37.300 Guide for Centralized Protection and Control (CPC) Systems within a Substation

Chair: R. Das
Vice-Chair: P. Myrda
Secretary: M. Kanabar
Expected Output: Guide
Established: 5/18
Expected Completion Date: 12/2022
Draft: 5.0

ASSIGNMENT: Develop a guide for Centralized Protection and Control (CPC) Systems within a Substation

(Hybrid) Meeting # 30 (September 14, 2022) Minutes

The working group met on September 14, 2022 with 60 attendees - 20 of them are voting members (out of 23), four are non-voting members (out of 14) and 36 guests. The names and affiliations of attendees are enclosed in Annex I, along with their mode of participation.

Chair presided over the meeting. Secretary helped with checking quorum and taking meeting notes. IEEE SA patent, copyright and participant behavior policy and other guidelines for working group meetings were reviewed.

Quorum was achieved and maintained throughout the meeting. Proposed agenda as in Annex II was approved (Motion – Joerg, Second – Ritwik, Dissented - None).

Chair provided a brief overview of the WG progress since 2018 including the current draft status for participants – WG is in an expeditious process of resolving about 700 comments on Draft 5.0

(Sept 2021) from WG members by meeting virtually (except PSRC May 2022 hybrid meeting) every two weeks since February 2022. Majority of the comments have been resolved.

Chair provided the status of approvals received from members on minutes of last two meetings on August 14 and August 26 – both of which were approved without any modifications. Chair also provided status of approvals on proposed comment resolutions requested via email. Majority of the members approved the proposed resolutions without any comments. However, three of the members provided alternate suggestions or had questions on the proposed resolutions. Continuing with the practice of building consensus, discussions were held on alternate resolution proposals and comments for Comment IDs 5-6-48, 5-6-81, 5-6-82, 5-6-88, 5-6-90, 5-6-91, 5-6-95, 5-6-103 and 5-6-104. Updated resolutions for these comment IDs were approved (Motion – Rich and Arun, Second – Hugo, Dissented - None). Discussions were then held on proposals for resolutions of two more comment IDs 5-6-102 and 5-6-121. Updated resolutions for these comment IDs were approved (Motion – Rich, Second – Arun, Dissented - None). Updated version R7 for General/Technical Comment resolutions related to Clause 6.0, including the approved resolutions for above comment IDs is available in iMeetCentral (‘./Draft5.0/Review Comments Resolution/31_Sept 30_2022’ folder).

Comments on proposed resolutions for comment IDs 5-6-38, 5-6-83, 5-6-87, 5-6-107 and 5-6-112 and agenda items 6-9 could not be taken up for discussions due to lack of time.

Chair suggested to have the next working group meeting on Sep 30, 2022 (Friday) as per the plan for continuing meeting every two weeks until all the remaining comments are resolved.

Meeting was then adjourned (Motion – Ritwik, Second – Jay).

Sincerely,

Ratan Das Paul Myrda Mital Kanabar

Annex I

Memebers

#	Role	First Name	Last Name	Affiliation	Present	
1	Chair	Ratan	Das	GE Gas Power	Yes	
2	Vice-Chair	Paul	Myrda	EPRI	Yes	
3	Secretary	Mital	Kanabar	GE Renewable Energy	Yes	
4	Voting Member	Jay	Anderson	SEL	Yes	
5	Voting Member	Joerg	Blumschein	Siemens	Yes	
6	Voting Member	Ritwik	Chowdhury	SEL	Yes	
7	Voting Member	Mohammad	Dadash Zadeh	ETAP	Yes	
8	Voting Member	Richard	Hunt	Quanta Technology	Yes	
9	Voting Member	Erin	Jessup	SEL	Yes	
10	Voting Member	Jack	Jester	Exelon	Yes	
11	Voting Member	Raluca	Lascu	DTE	Yes	
12	Voting Member	Yuan	Liao	U of Kentucky	Yes	
13	Voting Member	Vahid	Madani	GridTology	Yes	
14	Voting Member	Sakis	Meliopoulos	Georgia Tech	No	
15	Voting Member	Hugo	Monterrubio	Beckwith	Yes	
16	Voting Member	Damir	Novosel	Quanta Technology	No	
17	Voting Member	Craig	Preuss	Black & Veatch	No	
18	Voting Member	Qun	Qiu	AEP	Yes	
19	Voting Member	Thomas	Rudolph	Schneider Electric	Yes	
20	Voting Member	Jose	Ruiz	Doble	Yes	
21	Voting Member	Arun	Shrestha	SEL	Yes	
22	Voting Member	Austin	Wade	SEL	Yes	
23	Voting Member	Joemoan	Xavier	ABB	No	20
24	Non-Voting Member	Alexander	Apostolov	Omicron Electronics	No	
25	Non-Voting Member	Bruno	Andre	Schneider Electric	No	
26	Non-Voting Member	Philip	Beaumont	Retired	No	
27	Non-Voting Member	Robin	Byun	BPA	Yes	
28	Non-Voting Member	Evandro	De Oliveira	Siemens	No	
29	Non-Voting Member	Chikashi	Komatsu	Hitachi	Yes	
30	Non-Voting Member	Yuri	Luskind	Consultant	No	
31	Non-Voting Member	Bharat	Nalla	SEL	No	
32	Non-Voting Member	Jean	Raymond	Hydro-Quebec	No	
33	Non-Voting Member	Mohindar	Sachdev	U of Saskatchewan	No	
34	Non-Voting Member	Jeff	Shiles	SCE	Yes	
35	Non-Voting Member	Harsh	Vardhan	GE Renewable Energy	Yes	
36	Non-Voting Member	Donald	Ware	Power Grid Engineering	No	
37	Non-Voting Member	Qiaoyin	Yang	Tsinghua university	No	4
	In-Person only	2			Total	24
	Virtual only	19				
	Hybrid	3				
	Total	24				

	Guests		
#	First Name	Last Name	Affiliation
1	Carolina	Arbona	Burns& McDonnell
2	Romulo	Bainey	University of Idaho
3	Dinesh	Baradi	ABB
4	Art	Buanno	First Energy
5	Eugenio	Carvalheira	Omicron
6	Catherine	Dalton	EPRI
7	Dale	Finney	SEL
8	Kamal	Garg	SEL
9	Yanfeng	Gong	SEL
10	Frank	Gotte	NEI Electric Power Engineering
11	Michael	Higginson	S&C
12	Chris	Huntley	SEL
13	Daquing	Hou	SEL
14	Randy	Hamilton	Basler Electric
15	Byungtae	Jang	KEPCO
16	Farzad	Khalipour	SCE
17	Nicholas	Kraemer	NuGrid
18	Sugosh	Kuber	Megger
19	David	Lopez	REE (Spain)
20	Alexander	Machado	SCE
21	Aaron	Martin	BPA
22	Ryan	McDaniel	SEL
23	Andre	Melo	Schneider Electric
24	James	Michaelies	Commonwealth Associates
25	Tom	Miller	ITC Transco
26	M.	Mourey	BV
27	Prianka	Nadkar	SEL
28	Gale	Nelms	SEL
29	Shivam	Prabhakar	Siemens
30	Priya	Raghuraman	Siemens
31	Neil	Saia	Entergy
32	Tuan	Tran	TVA
33	Eric	Udren	Quanta Technology
34	Jim	Van De Ligt	Shaw
35	Ilia	Voloh	GE Grid Solutions
36	Murty	Yalla	Beckwith/Hubbell

	In-Person only	13
	Virtual only	15
	Hybrid	8
	Total	36

H46: Recommended Practice for Human-Machine Interfaces (HMI) used in Substation Automation Systems (PC37.1.3)

Chair: Matt Black
Vice Chair: Craig Preuss
Secretary: Shane Haveron
Output: Recommended Practice for Human-Interfaces (HMI) used with Electric Utility Automation Systems (PC37.1.3)
Established: September 2018
Expected Completion Date: December 2023
Draft: v0.55

Assignment: Produce a Recommended Practice for Human-Machine Interfaces (HMI) used with Electric Utility Automation Systems

The chair called the hybrid meeting to order on Wednesday 9/14/22 at 9:20 CDT. There were 12 attendees: 8 out of 20 voting members and 4 guests, not achieving a quorum. Minutes from the meeting in May '22 will be approved via email.

After introductions, the agenda, patent, copyright, and participant slides were reviewed with no comments received. There were no presentations. Old business rediscussed the descope of the recommended practice due to lack of contributions to fit the breadth & depth of the original scope & purpose of the initial PAR. We will be approaching a PAR revisions/extension after the JTCM as needed.

The PAR which expires end of year 2023 with a planned initial ballot mid 2022 does not seem like a realistic goal given the present status of the draft.

The draft is in moderately decent shape at the moment. Upcoming milestones are as follows: 10/1/22 – outstanding contributions received; 10/31/22 – Contributions received incorporated into the draft; 10/31/22 – Hold a web meeting for discussion of descope & any outstanding contributions including initiating a vote to approve the draft with any comments from voting members; 11/30/22 – Working group comments/"ballot" completion; JTCM – optimistic that we can have a draft ready for ballot with IEEE-SA (this entirely depends on the number of comments received at the end of November).

The chair has taken an action item to approach several WG members (including himself) for missing contribution(s) & schedule the meeting for 10/31/22.

The PAR revision (including a likely PAR extension) will be included in the expected agenda items at the JTCM in January.

At the next meeting we will request room for 25 with a projector. Please avoid conflicts with I31, J24, H27, H51, H52, C26, & S15.

H47: Impacts of IEC 61850 sampled values, GOOSE and PTP time synchronization on protection and control applications using process bus

Chair: M. Kanabar

Vice Chair: A. Riccardo
Secretary: D. Ouellette
Output: Report
Completion Date:
Draft: 0.5

Assignment: In a digital substation Protection and Control (P&C) devices rely on Sampled Values (SV), GOOSE and time synchronization (using Precision Time Protocol, PTP) together over process bus communications. This WG will generate a report evaluating the discrepancies in the communication of SV, GOOSE or PTP messages and their impact on protection and control applications such as performance and behavior.

September 2022 Minutes not available

H49: Application Considerations on the Use of Packet-Switched Communication Channels for Pilot Protection and Teleprotection Schemes

Chair: S. Klecker
Vice Chair: Galina Antonova
Secretary: L. Erichsen
Output: Report
Completion:
Current Revision:

Assignment: To develop a report on application considerations and experiences on the use of packet-switched networks from a teleprotection application point of view for the benefit of relay engineers. Produce tutorial/summary presentation based on report.

Scope: Document fundamentals of packet-switched networks as they apply to protective relaying. Document teleprotection application requirements when using packet-switched networks; including latency, bandwidth, redundancy, switch-over, asymmetry, use of external time synchronization for 87L with dependence on GPS. Considerations for leased networks (Service Level Agreement). Document any industry experiences. Outage processes and procedures.

The WG H49 met on Monday 9/12/2022 in a Hybrid meeting, with 36 attendees (7 voting members, including 1 non-voting member and 29 non-members). Quorum was achieved.

The WG Chair, Steve Klecker, presented the meeting Agenda. Agenda, May 2021 and July 2022 meeting minutes were sent prior to the meeting.

Attendees were introduced. The Chair presented slides covering IEEE-SA Policy, IEEE Copyright and Participants Behavior. No issues were raised.

Don Ware moved to approve both May 2021 and July 2022 meeting minutes. Ken Fodero seconded. Minutes were approved unanimously.

Tuan Tran, Stephen Craven and Gary Kobet prepared a presentation on TVA experiences with packet-switched networks. Stephen Craven and Tuan Tran presented on testing MPLS-TP performance in a lab and on on-going TVA pilot installation. A paper on lab testing was presented

at GATech conference before pandemic, recent successful field pilot testing results were added to the presentation for H49.

Testing performed by TVA aimed at comparing MPLS-TP with SONET performance, specifically for one-way latency, reliability and failover time. A network with 8 nodes was used in test setup. Pilot protection was successfully tested in the lab, and field pilot. Line current differential protection was not included. Packet-switched network technologies initially defined as best effort with no guarantees for reliable data delivery are subject to out of order frames arrival, dropped traffic, etc. While SONET comes with reliable data delivery, one must work hard to configure packet-switched networks to achieve comparable performance levels.

TVA requires ½ power cycle one way latency (alarm at 6ms), this requirement was met and exceeded in pilot tesitng. While jitter (delay variation) was not statistically assessed, it was reported to be minimal with use of 10Gbits/s network data rate. One way delay (latency) for different Ethernet frame lengths was measured (it increases with frame size, as expected). While max length of Ethernet frame is 1518 bytes, jumbo frames of 9K bytes were also included into testing. Failover algorithm requires 3 dropped out packets to switch over, with configured 10ms heartbeat period, failover time of 30ms was measured, as expected. A known number for SONET failover time is 50ms, for small ring even 12ms was measured. With shorter heartbeat period the measured 30ms MPLS-TP failover time can be shortened. MPLS-TP performance achieved in the lab was met and exceeded in the field pilot. The pilot project uses relays from 2 vendors protecting a 60-mile-long line. Vendor 1 relays achieved 2ms one way latency, and vendor 2 relays achieved 4ms one-way latency. These delays are consistent with internal processing for these devices. Work may be continued to test line current differential protection. For relay-to-relay communication one relay vendor uses IEEE C37.94 framing, while another uses native Ethernet.

In summary, TVA testing showed that MPLS-TP performance can meet and beat SONET. The presentation will be shared with H49 participants, along with GATech paper, if permitted.
Draft report outline was displayed next followed by a brief discussion. Attendees were asked to review and propose topics for inclusion as well as utilities to reach out to which can share experiences with deployed packet switched networks.

The Chair suggested to meet in a Webex session in mid November and will suggest meeting dates.

For Jan 2023 JTC: single session, a room for 30 people with a projector, a Hybrid meeting.
Meeting Room Requirements: Avoid A1, B2 and P14. Current time slot Monday 1pm-2:10 pm local time works well.
Attendee's list is provided in a separate Excel file.

H50: Requirements for Time Sources in Protection and Control Systems

Chair: Dean Ouellette
Vice Chair: Jay Anderson
Secretary: None
Output: Report
Established Date: May 2019
Expected Completion Date: 12/31/2022
Draft: 1.6

Assignment: Presently there are IEEE and IEC standards around (accurate) time distribution systems (for example, IEEE 1588 and associated Profiles, IEEE/IEC 61850-9-3, etc.). The intent of this Report is to document requirements for Time Sources (Clocks) used in Protection and Control Systems.

Meeting 13 September 2022, 10:40 – 11:50 CST. All working group officers were present. The chair presided over the meeting and Jay Anderson recorded minutes.

The meeting was called to order with 26 in attendance of which 7 were voting members, 1 non-voting member, and 18 guests. Quorum was achieved.

A motion was made by Aaron Martin to approve the agenda; seconded by Chris Huntley. The agenda was approved.

Patent slides and Copyright policies were shown, and all participants asked to speak up about any patent claims at this time. No claims were offered. The new IEEE Participant Behavior slides were also shown.

A motion was made by Benton Vandiver to approve the May 2022 meeting minutes; seconded by Aaron Martin. The Minutes were approved.

Presentations:
Jay Anderson presented the use cases created by the Energy Sector Use Case task force for the P1952 Standard for Resilient Positioning, Navigation, and Timing (PNT) User Equipment. The P1952 WG is working on technical requirements and expected behaviors for resilient Positioning, Navigation, and Timing (PNT) User Equipment (UE). The scope is limited to the reception, ingestion, processing, handling, and output of PNT data, information, and signals.

The use cases will be posted to the H50 iMeet site.

Old Business
The Scope and Assignment were reviewed.

New Business
Rich Hunt will work on his outstanding assignment.

Jay to reach out to Deepak Maragal for clarification on options for redundancy in antenna systems.

We noted that Section 4 (Applications) still requires additional work. We may be able to reference some of the work done for P1952 for performance information.

The document should be aligned with IEEE 2030.101-2018 "IEEE Guide for Designing a Time Synchronization System for Power Substations"

Note: we will probably not be complete by 12/31/22.

Meeting was adjourned at 11:50 CDT.

Note: files for the H50 workgroup are stored in iMeet Central at:

https://ieee-sa.imeetcentral.com/psrcc-h50/folder/WzIwLDEyNTQ5NTk4XQ

Avoid Conflicts: P1, S15, C33

H51: Revision of C37.239-2010 Standard on a Common Format for Event Data Exchange (COMFEDE)

Chair: Mark Adamiak
Vice Chair: Pierre Martin
Secretary: Zach Makki
Output: Standard Revision
Completion Date:
Current Revision: 2010

Assignment: Revise the current COMFEDE standard (C37.239-2010)

Meeting Proceedings:

WH H51 did not meet in September 2022

WG H52 – Common Format for Naming Time Sequence Data Files (C37.232, COMNAME)

Chair: Amir Makki
Vice Chair:
Output: Revision of an Existing Standard
Established: September 2021
Expected Completion Date: December 2024

Assignment: Revise the Standard. The revision to include clarification on methods of use such as use for naming folders and allowing for underscore delimiters.

September 2022, Meeting Minutes:

Agenda: Our main agenda for this meeting is to continue working on defining the needed changes to the standard as per the attached minutes. I look forward to our meeting.
Amir reviewed the May 2022 minutes.

7 (out of 8) voting Members attending, quorum established.

Shane made the motion to approve the May 2022 minutes, Hugo seconded the motion. No objections heard. Minutes approved.

Discussion: 2 digit year (2011 standard) vs. 4 digit year (proposed)

- Arguments for keeping existing 2 digit year
  - Saves two characters for the filename / path
  - Backwards compatible
  - Works with proposed 7th character to identify delimiter

- Arguments for changing to 4 digit year
    - More Consistent with IEC 8601 time/date standard (YYYY-MM-DD)
        - See Appendix A for other organizations ascribing to ISO 8601 for file naming
    - More human-readable without needing to reference the standard
    - Year 2100 safe
    - More easily sortable by date when 19xx and 20xx date are in the same folder
    - More consistent with widely used YYYY MM DD standard for file naming

Dan made the motion to approve that the year be a 4-character field, Jun seconded the motion. No objections. The motion passes.

Discussion: using 7th character for delimiter
If accommodating both 2 and 4 character date formats, we would not be able to use the 7th character to identify the delimiter (comma vs. hyphen). Recommend using the first non-digit character as delimiter.

Discussion: Time code format
Amir Recommended holding off until COMTRADE makes their determination regarding this issue.
Ellery volunteers to make a presentation relating the timecode standards between COMTRADE and COMNAME.

Assignment: Shane – revisit delimiter due to 4 digit year.

Discussion: Use case about how people are using COMNAME to name folders. (Informative Appendix)

- The solution needs to only require one copy of each event file. A method that caters to both would be ideal.
- Need to address both the Machine-centric and Human-centric use cases
- Need to address if it is feasible to require generation of metadata (e.g., index file).
- An auto-archiver program could interpret a schema to categorize files as desired. The schema would also serve as a navigational aid to locating data.
- An auto-archiver program could update a meta-data index file.
- A standardized HTML file could include javascript to read meta-data index file and support browser-based filtering/searching to provide links to files and/or folders. Could also be accomplished with CSV file that could be opened in a spreadsheet application or imported to a database.
- Need to support both event centric and device/station centric structure.
- Need to support NERC PRC-002 continuously stored trend data for disturbance monitoring.

Theo made the motion that the WG create an informative appendix describing multiple suggested ways of naming folders. Hugo seconded the motion. No objections. Motion passed.

Assignment: Ellery – how does the schema apply to data organized by date but we want to find all data related to a specific station/device? Can an automation system use the schema to collect from one structure and export to a different folder structure?

Amir motioned to adjourn. Seconded by Shane. Adjourned.

Attendance List:
Amir Makki (Softstuf Philadelphia) (Member)
Ellery Blood (SEL) (Member)
Dan Sabin (Schneider Electric) (Member)
Hugo Monterrubio (Hubbell) (Member)
Jun Verzosa (Doble) (Member)
Shane Haveron (AMETEK) (Member)
Xiangyu Ding (S&C Electric Co.) (PES Member)
Theo Laughner (Lifescale Analytics) (Member)
Malia Zaman (IEEE SA)
Jim Hacket (Meta Tech) (Member)

Not in attendance.
Byungtae Jang (KEPCO)
Zitao Wang (IEEE)

H53 Working Group –Use Guide for Smart Distribution Applications P1854

Chair: Xiangyu Ding
Vice Chair: J. Lombardo
Output: Guide
Established Date: 09/2021
Completion Date: 12/2023
Current Revision: D001

Assignment: Revision of IEEE Guide P1854 Use Guide for Smart Distribution Applications

The WG met on Wednesday, with 4 members and 12 guests in attendance. A quorum was not presented. Attendees introduced themselves and affiliation.
The call for patents was presented – no response.
The call for copyright slides was presented – no response.
The H53/P16 PAR Scope was reviewed.
Reviewed the recent updates to P1854 and solicit comments.

- Reviewed the latest edits and got feedback on them from the PSRC/PSCC team members. We only had enough time to review the introduction, definitions, and communication sections.
    - Edits and comments were captured in the guide that is being redlined
    - Two more people asked to participate in the SDWG meetings to continue to review and provide comments
    - Edits and comments will be provided and reviewed in the next SDWG meeting on this guide.
    - Regarding the term RTU. Tony Johnson commented that PLC capability should not be included in the definition of the RTU. Recommend adding new term for PLC and

change references to RTU with logic capability to IED with both RTU and PLC capabilities.

- Include Utility owned LTE in discussion of cellular communication.

Future Meetings:

- Bi-Weekly Working Group Meetings through the T&D Working Group

Joint H53/P16 Meetings during PSRC/PSCCC Meetings

Attendee List

Members	
NAME	**AFFILIATION**
Xiangyu Ding, H53 Chair	S&C Electric Company
Jason Lombardo, P16 Chair	S&C Electric Company
Anthony Johnson	SCE
Alexander Machado	SCE
Guests	
Randy Hamilton	Basler Electric
Amin Zamani	Quanta
Galina Antonova	Hitachi Energy
Ken Martin	EPG
Mike Basler	Basler Electric
Peiman Dadkhah	NuGrid Power Corp
Rena Fourkas	S&C Electric Company
Shivam Prahlabar	Siemens
Lakshan Piyasingle	Hubbell
Farzad Khalilpour	SCE
Sukumar Kamalasadan	University of North Carolina at Charlotte
Vlad Rybka	S&C Electric Company

SC Notes: Leadership for H52 will change starting January 2023 as follows:

Ellery Blood was nominated for WG Chairman and approved without objection
Shane Haveron was nominated for WG Vice Chairman and approved without objection
Amir Makki was nominated for WG Secretary and approved without objection

HTF54: Revision of IEEE C37.111-2013/IEC 60255-24:2013 Standard for Common Format for Transient Data Exchange (COMTRADE)

Chair: Mark Adamiak
Vice Chair: Zach Makki
Secretary: Dan Sabin

Output: Standard Revision

Meeting Attendees:
- Mark Adamiak
- Daniel Sabin - Approve
- Deepak Maragal
- Eric Thibodeau
- Jun Verzosa
- Murty Yalla
- Shane Haveron
- Eric Udren

Meeting Proceedings:
The TF met on Tuesday, September 13. The PAR for the Next Generation COMTRADE has been submitted to NESCOM and is scheduled for vote the week of September 19, 2022. In as much as the PAR was not approved for this meeting, an "informal" meeting was held to identify the process moving forward for the revision of COMTRADE. COMTRADE is a dual-logo standard with IEC TC95 and it is the plan to hold joint meetings with TC95 members in attendance.

The chairman proposed a 3-phase plan as follows:
1. Vote on the identified changes in the COMTRADE TR90 Technical report that the WG deems valuable
2. Brain storm (1 session) on any additional features that may have been missed in the report
3. Discuss implementation strategies and assign writing assignments

An overview of the proposed changes was presented and discussed. Of note, a proposal for how to integrate multiple data types in a COMTRADE file was presented. Specifically, the TF proposed the concept of "multiple" data sections in the file to contain Sample Values, Integrated Data (RMS, Harmonics), Synchrophasors, and SOE. A few proposed new features include Substation Status Images, Virtual Channels, Programmable Logic, XML Configuration, and Programmable Channel size.

It is requested that, pending approval of the PAR by NESCOM, a solicitation for membership to the COMTRADE WG be issued. People requesting membership will need to read the COMTRADE TR90 report and be ready to vote on inclusion of the identified options.

Next meeting: 30 people; Monday – triple session at 8am – to be coordinated with the vice-chair and secretary.

NOTES ADDED BY THE H SC OFFICERS
The PAR to revise P37.111 COMTRADE was approved on September 21, 2022 by IEEE SASB. HTF54 is now WG54 is calling for membership. The Technical Report 90: COMTRADE Next Generation is attached. It is recommended that if you are interested in joining WG54 to read TR90. The chair plans to assign preliminary work based on the which features of TR90 end up being adopted by WG54. The WG54 officers are Chair Mark Adamiak, vice chair Zack Makki, and Secretary Dan Sabin.

HTF55: Distributed Cyber Physical Assessment for Grid Resilience

Chair: Jeff Pack
Vice Chair: Craig Rieger
Secretary:
Output: Report
Established Date: 05/2022
Expected Completion Date: 2024
Current Revision: 1.0

Assignment: Investigate Distributed Cyber Physical Assessment for Grid Resilience and evaluate participation with other technical committees, societies, groups, and associations that may have interest.

a) Jeff Pack, Chair, presided and took the minutes
b) Meeting participants

Name	Affiliation	Attendance Type (W – Web, P – Phone, L – Local)	Member - Guest
Jeff Pack	POWER Engineers	L	M
Craig Rieger	Idaho National Laboratory	W	M
Romulo Bainy	University of Idaho	W	G
Abder Elamdaloussi	Southern California Edison	L	G
Brian Johnson	University of Idaho	W	M
Van Le	Western Area Power Authority	W	G
Aaron Martin	Bonneville Power Administration	W	
Hugo Monterrubio	Beckwith Electric	L	G
Gayle Nelms	Schweitzer Engineering Laboratories	W	G
Craig Preuss	Black and Veatch	L	M

c) The agenda was reviewed with no recommended changes.
d) This is the second meeting of the Task Force, but we ran short of time during the first meeting, so we asked for membership for the Task Force. Those selections are reflected in the meeting participant's section.
e) We discussed the differences between a Task Force and a Working Group regarding duration and membership.
f) Assignment Discussion:
    a. We discussed methods to gather information on potential collaborators and current work in the area.
    b. Elandaloussi asked about adding modelling of power systems to the scope.

c. Rieger suggested that this may be more scope than we want to take on at this time. Other groups are already doing this work.

d. Pruess said that Item 2 in the Scope – title is broad but description is narrow with focus on synchrophasors. He feels that Item 2 can't be accomplished without simulation so it should be part of Item 2 scope.

e. Rieger agrees that Item 2 needs hardware in the loop testing

f. Martin mentioned that BPA does this with RTDS and they have a third party do cyber testing

g. Rieger stated that the scope is focused on what has already been developed and tested – what research is available and what is in progress?

h. Elandaloussi asked how does an event cascade through the system?

i. Rieger responded that existing work needs to be vetted and validated so we get a better perspective on what is available now and work towards categorization of technology.

j. Johnson mentioned that synchrophasors are in commercial use and can be used as part of monitoring the communication between devices vs. just informed monitoring.

g) Survey Discussion

a. Rieger described the challenge in getting people to complete the survey. It is important to take a personalized approach and keep it brief. We need to develop questions relative to the five topics – example is development and use of SDN in the OT environment – what is the benefit for cyber defense? We need to do homework to understand what is in place.

b. Pruess discussed a PSCCC survey process that was focused on IEEE membership – there is a specific process that must be followed.

c. Pruess mentioned using other IEEE organizations to get the word out – SmartGrid, AMPS and CAMS.

d. Pruess also suggested that submitting the topic as a panel session to the PES General Meeting – post survey or a webinar with SmartGrid.

e. Johnson mentioned that the deadline for the General Meeting may already be past, but we could submit the idea to the TCPC for PSRC.

f. Martin said he would check on deadlines.

g. Pruess suggested potentially partnering with Newton Evans for survey.

h) Other methods to collect information

a. Pruess suggested searching topical papers recently published to find relevant ones – also checking with Eric Udran to see if IEC has any related work.

b. Johnson mentioned that he knew a CIGRE contact also.

c. May want to see if this makes a good project for a graduate student

d. Need to see if there is a contact within AMPS also.

i) The meeting was adjourned at 6:15 P.M.

j) Next scheduled meeting is January 2023 in Jacksonville, FL – the chair will send out draft meeting minutes and considerations for working sessions held via web conference prior to the scheduled meeting.

OLD BUSINESS

NEW BUSINESS
PSCCC P21 proposal to form to form joint task force to create a PES technical report based upon the output of the PSCCC P21 SG

Motion to form a joint task force with PSCC (P21) to create a PES Technical Report based upon the output of the PSCCC P21 SG and the CIGRE B5.60 technical brochure that recommends a roadmap for developing new or updating existing IEEE standards to address issues of Centralized Protection and Control (CPC) Systems.

HSC discussed the motion and decided not to vote on it during the meeting.

ADJOURN

I: Protection and Control Practices "I" Subcommittee Report on WG progress of note

Chair: Jim Niemira
Vice Chair: Ritwik Chowdhury

Scope: Evaluate and report on all matters related to protection and control practices for compatibility with the physical and electrical environment (including but not limited to equipment withstand capabilities to electromagnetic interference), characteristics and performance of instrument transformers and sensors, equipment and system testing procedures, protection and control performance criteria and applications, event/transient recording, and definitions of protection and control systems. Develop, recommend, establish, and maintain standards on protective relaying and control equipment and practices. Evaluate, report on, and develop standards on other pertinent aspects of protective relaying and control systems not addressed by other PSRC Subcommittees.

I SC met Wednesday, September 14, 2022, in a Hybrid meeting. 22 members were present in person and additional members on line – quorum was met. Actual attendance will be in reported in the minutes.
Total 39 Voting Members

- New members Mohit Sharma and Don Burkart
- Approved I SC Minutes from May 2022
- Presently 20 Active WG (1 New WG added)

WG updates of note:

- I26 – *Report on Mathematical Models of Current, Voltage, and Coupling Capacitive Voltage Transformers*
    - Making progress. Expect to submit for SC ballot by May 2023

- I38 - PC37.92 – *Standard for Low-Energy Analog Interfaces between Protective Relays and Power System Signal Sources*
    - Making progress; expect recirculation ballot this year.
        - SC approved PAR extension for 1 year to complete the balloting process.

- I31, I36, I37, I40, I41 - C37.90.x and 1613
    - 1613, C37.90.2, C37.90.3 are working through the balloting process.

        - SC approved 1 year PAR extension for 1613 to complete balloting process
    - C37.90 is close to final draft for WG ballot.
        - SC approved 2 year PAR extension to complete final draft and work through the balloting process
        - Work proceeding on C37.90.1
- I33 – Report on Review of Relay Testing Terms
    - Comments received in SC ballot are being addressed. Revised report will be resubmitted for SC ballot.
- I48 – Review and revise C37.103-2015 - *IEEE Guide for Differential and Polarizing Relay Circuit Testing*.
    - I SC approved submittal of PAR.

- I29 – C37.110 - CT application guide
    - Ballot comments resolved; submitting for final recirculation ballot.
- I32 – Survey relay test practices
    - Approximate 35 survey responses returned with about 16 in the target demographic. WG is soliciting more responses.
    - Will begin analyzing results when more responses are received.
- I47 Review and revise: *IEEE C37.231-2006 - IEEE Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control.*
    - WG feels a Standard is warranted.
    - Developing PAR for approval by PSRC MC
    - Considering Joint Sponsor with PSCCC for Cyber Security Issues
- I35 *IEEE PC37.2-202x - IEEE Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations.*
    - With RevCom for final approval.

- I43 – Report on Response to USA executive order regarding EMP protection
    - Expect to submit for SC approval by end of 2023 or January 2024
- I46 – Review and revise: IEEE C57.13.3-2014 - IEEE Guide for Grounding of Instrument Transformer Secondary Circuits and Cases.
    - SC approved submittal of PAR with no changes to Scope or Purpose.

<u>OTHER TOPICS</u>

- There was a motion at the I SC to form a joint task force with PSCC (P21) to create a PES Technical Report based upon the output of the PSCCC P21 SG and the CIGRE B5.60 technical brochure that recommends a roadmap for developing new or updating existing IEEE standards to address issues of Centralized Protection and Control (CPC) Systems. The motion was approved by the subcommittee and the I SC is requesting guidance from PSRC committee officers on how to move forward as there was a similar motion at the H SC. If we move forward the joint WG will be I49 *.

- Jim Niemira will be completing term as I SC Chair on Dec 31, 2022.
- Ritwik Chowdhury to take over as I SC Chair effective January 2023.
- Angelo Tempone to take over as I SC Vice Chair effective January 2023.

1. Welcome and guidelines for meeting
2. Recognitions:

a. Thank guests for attending
b. Jerry Ramie – Recipient of EMC Society *Laurence G. Cumming Award for Outstanding Service* for his work as liaison with PSRC

3. Many thanks to former members of the I-SC:
   a. (no departures)
4. Welcome to new members of the I-SC:
   a. Mohit Sharma (since Sept 2021)
   b. Don Burkart
5. Determine a Quorum (**39 members** total in I SC)
   a. Attendance: __31_____ (min 20 for quorum; YES_X__ or NO ___)
6. Approval of Minutes of the September 23, 2021 on-line meeting
   a. Motion entered by: __Friend_____
   b. Motion seconded by: __Udren_____
   c. Motion carried unanimously.
7. Coordination & Advisory Committee Meetings Items of Interest
   a. Subcommittee Members' status and incoming Officers for January 2023
   b. Attendee information (approximate)
      - 350 Registered for PSRC and PSCCC attendees
      - Roughly 50% on-line and 50% in-person
   c. *Future Meetings – See "Future Meetings" page on PSRC website all plans subject to change:*
      - *Trying to get back to In Person meetings.*
      - *Jan 2023 – JTCM Jacksonville, FL*
      - *May 2023 – Las Vegas, NV*
      - *Sep 2023 – Myrtle Beach, SC*
   d. Policies and Procedures for: Power System Relaying and Control Committee Working Group – see PSRC Knowledge Base – please review regularly for updates
      - Three officers: Chair, Vice-Chair, Secretary
      - **All WG Officers must be members of IEEE SA and of IEEE PES!!!**
   e. ***Working Group sign-in sheets – use confidential procedure!!!***
      - See instructions on PSRC website for how to create your Working Group roster and attendance list for handout at your meeting. Email addresses are no longer permitted to be placed on your sign-in sheet. Attendees must add their email address when they register for PSRC meetings.
      - 123Signup IS NO LONGER AVAILABLE. Use a spreadsheet to maintain records. Use BCC on email correspondence to maintain confidentiality of user contact information. Attendance roster should contain name and affiliation, but not email addresses, phone numbers, or other contact information.
        Begin using new Member Planet Association Management System when available.
   f. For PAR related work, please present the new patent slides and *record in your minutes* whether essential patent claims exist. If there are none, please write this into the minutes. ***Do this at every working group meeting***. New JUNE 2021 slides available and are at http://standards.ieee.org/about/sasb/patcom/materials.html.
      To expedite your meeting, send the slides with the meeting agenda so meeting attendees can review ahead of time.
   g. Looking for Webinars to publicize our PSRC work products as part of Global Outreach

- Availability of WebEx for presentations by IEEE. Every WG that has completed their work is encouraged to present it to the IEEE community through WebEx which will project our work. Please contact Cathy Dalton, Chair of Publicity group or Murty Yalla, Michael Thompson, or Gene Henneberg.

h. Looking for presentations for future Main Committee meetings – please contact Jim Niemira.
i. The PSRC Committee is international and open to anyone who cares to attend.
j. New "Awards" page on PSRC website – with pictures of recent awards ceremonies

8. Administrative Items
   a. From IEEE-SA: WG/TF Agendas and Minutes: "***The 14-calendar-day rule" – the Standards Association requirement in O&P***
   b. Procedure for PARs:
      - All PAR related activities must be approved by the PSRC Main Committee members, although certain activities are now delegated to the Subcommittee
      - See examples provided of how to request at the Main Committee – a Working Group Chair makes a motion at the Subcommittee meeting for the SC Chair to create a slide and then send it to the Main Committee Officers for inclusion on the slide set at the Main Committee meeting. The SC Chair reads the motion (s)

        PAR Committee motion_2020-6-18.p
      - Create new PAR for new standard – MC
      - Create new PAR for existing standard without major changes to scope – SC; with changes to scope – MC
      - Approval to proceed to IEEE-SA for creation of a balloting body or to proceed to sponsor ballot – SC
      - Minor changes to statements of PAR title, scope and/or purpose without change of scope – SC; Changes to PAR scope - MC
      - Working group submits to the Subcommittee the new or revised PAR, scope, purpose, minutes of their meeting, attendees, their affiliations, any disagreements are noted in the minutes.
      - Actions at SC level (i.e. motions approved or disapproved) are reported to MC; motions requiring action of the full MC are brought to the MC floor by the SC Chair.
      - The Subcommittee reviews it, and then the SC Chair **submits the PAR/name/ID number and reason for approval to the Main Committee Secretary to put in the slide deck. The slide is displayed while the SC Chair reads the request to the Main Committee members. A vote is then taken.**
      - Motion to approve the new or modified PAR is done at the Main Committee meeting (or if done at the SC, will be reported to the MC by the SC Chair).
      - PSRC Committee is the Sponsor
      - myProject™ Volunteer User Guide – good stuff https://mentor.ieee.org/etools_documentation/dcn/11/etools_documentation-11-0014-MYPR-myproject-user-guide.pdf
   c. Review Draft 1 of the PSRC meeting agenda as soon as the meeting notice arrives in your inbox – to avoid meeting conflicts and multiple agenda revisions. Contact Ritwik Chowdhury and Jim Niemira for your requested changes – we will consolidate them and forward to Gene Henneberg.

d. **Make sure that on the Meeting Room Request (MRR) form for the *January 2023* meeting that you include scheduling conflicts to avoid, e.g. "do not conflict with I50, D87, …" etc.**
e. As Chair or Vice-Chair of WG or TF, please contact Jim Niemira and Ritwik Chowdhury ***if you cannot attend your session***.
f. Non-PAR related document drafts can be shared with anyone who is interested. Please add a note that this is a draft version subject to change. Once this document is complete and approved it will be posted on PSRC website which is open to all and/or published on the PES Resource page.
g. All PAR related document (IEEE related) drafts **may not** be forwarded by the WG member to anyone else – there is a public review period for all IEEE documents where anyone can submit their comments.
h. When submitting "comments resolution" CSV file back to IEEE-SA in myProject, make sure that your draft is updated to reflect all the changes made – must match up to the CSV file!
i. Email WG or TF Minutes to Ritwik Chowdhury at: ritwik_chowdhury@selinc.com **– PLEASE HAVE THIS IN WITHIN 1 WEEK – USE THE MINUTES TEMPLATE FORMAT PROVIDED ON p. 8 OF THIS AGENDA** – confirm WG information is all correct and do not use special formatting or extra indents.
j. ***iMeet Central*** (formerly Central Desktop) is to be used for IEEE Guide / Recommended Practice / Standard documents with a PAR
k. PSRC has File Share facility for non-PAR documents. Contact Jim Niemira (I-SC Chair) if your group has need or interest. Need list of participants with email addresses to allow write access - typically only a few people (WG Chair, VC, and/or Secretary); view access can be granted to others. See instructional videos on PSRC Website.
l. Standards WG Awards - The IEEE Standards Association Working Group Awards has a new Procedure to request certificates of appreciation for completed (Approved Standard) work.

    - WG Chair or WG VC must request certificates directly from the IEEE SA. Awards can be shipped to our next PSRC meeting hotel for announcement and distribution or can be shipped to the requestor. The request for the SA certificates must be made at: http://standards.ieee.org/develop/awards/wgchair/wgawards.html You will need list of WG Officers and Members; and shipping address. If shipping to the hotel for the next meeting, send to attn of Awards Chair Hugo Monterrubio, verify the address, and be sure they arrive prior to the Monday of the meeting.

    - Awards Ceremony will be at Monday night reception dinner for all future PSRC Meetings in May and September. Please consider this when making travel arrangements. Don't miss the opportunity to recognize your colleagues or to be recognized yourself!

m. Reports/Paper Final Output – To be considered for PES level award the output of all Working Groups with a Technical Output including Technical Reports, Transactions / Journal and conference papers must be completed in PES Format and submitted and posted in the PES Resource Center. Final Draft of PSRC

Reports, without PES Resource publication number or cover will also be posted to PSRC Website.

n. Links to PES:

- PES Technical Resource Center: http://resourcecenter.ieee-pes.org/
- PES Technical Activities Resources and templates: https://www.ieee-pes.org/technical-activities/committees/resources
- PES - Technical Report Template: https://www.ieee-pes.org/images/files/doc/tech-council/PES-Technical-Report-Template_Jan_2019.docx
- PES - Technical Paper Template: https://www.ieee-pes.org/templates-and-sample-of-pes-technical-papers
- PES Resource Center Submission Checklist with instructions on how to get your report or Paper submitted please use this link: http://ieee-pes.org/images/files/doc/tech-council/Submission_Checklist_PES_Resource_Center.docx

9. Working Group Reports – 2 minutes each, MAX.
What is your status? Are you on track? Do you need help?

WG/TF #	Name	Spokesperson
I2	Terminology Review	Mal Swanson
I4	International Standards Development	Eric Udren
I26	Review and Expand Transaction Paper on Mathematical Models of Current, Voltage, and Coupling Capacitive Voltage Transformers	Mike Meisinger
I29	PC37.110 - IEEE Draft Guide for the Application of Current Transformers Used for Protective Relaying Purposes -- Revision of C37.110-2007	Michael Higginson
I31	P1613 - Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus -- Revision of 1613-2009	Brian Mugalian
I32	A Survey of Protective System Test Practices	Andre Uribe
I33	Review of Relay Testing Terms	Will Knapek
I35	PC37.2 - Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations -- Revision of C37.2-2008	Mike Dood (did not meet)
I36	PC37.90.2 - Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – Radiated Electromagnetic Interference Withstand Capability Requirements and Tests -- Revision of C37.90.2-2004	Jim Niemira
I37	PC37.90 - Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – General Requirements and Tests -- Revision of C37.90-2005	Marilyn Ramirez

I38	PC37.92 - IEEE Draft Standard for Analog Inputs to Protective Relays From Electronic Voltage and Current Transducers -- Revision of C37.92-2005	Ritwik Chowdhury
I40	PC37.90.1 - Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus-Surge Withstand Capability (SWC) and Electrical Fast Transient (EFT) Requirements and Tests -- Revision of IEEE C37.90.1-2012	Roger Whittaker
I41	PC37.90.3 - Standard Electrostatic Discharge Tests for Protective Relays -- Revision of IEEE C37.90.3-2001	Steve Turner
I43	Investigate response to USA executive order regarding EMP protection	Art Buanno
I44	Investigate and write a report on skill sets required by relay test technicians for setting, commissioning, and testing relay systems, given new technologies such as IEC 61850	Andre Uribe
I45	Report on Grounding and Bonding Issues Associated with Substation Wiring Practices and Instrumentation.	Adrian Zvarych
I46	Review and revise: IEEE C57.13.3-2014 - IEEE Guide for Grounding of Instrument Transformer Secondary Circuits and Cases.	Bruce Magruder
I47	Review and revise: IEEE C37.231-2006 - IEEE Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control.	Amir Makki
I48	Review and determine need of revision for: C37.103-2015 - IEEE Guide for Differential and Polarizing Relay Circuit Testing.	Ritwik Chowdhury (did not meet)

I2: Terminology Review

Chair: Mal Swanson
Vice Chair/Secretary: Fred Friend
Output: Terminology recommendations to working groups
Established Date: circa 1995
Expected Completion Date: on-going
Draft: N/A
Assignment: Review drafts of PSRC publications for proper terminology, abbreviations and symbols; and to recommend additions and changes to the PSRC Terminology database as appropriate

The hybrid meeting was called to order by Mal Swanson, Chair at 10:40 am (Central Time) on September 14, 2021 with Fred Friend, Vice-Chair recording minutes with 9 members and 2 guests in attendance. Welcome one new member: Colleen Konsavage. Quorum was achieved. The minutes from the May 2022 meeting were reviewed with no corrections provided, Tony Seegers motioned for approval and was seconded by Addis Kifle, and unanimous approval was given. The participant behavior policy was reviewed without comment.

Updates were given on of each of the assignments. New assignments were made: C37.111, Mal Swanson; C37.231 and C37.232, Colleen Konsavage.

All working groups are reminded the database is available to them for use during their document development. All IEEE members have access to The IEEE Standards Dictionary Online using their IEEE account credentials at http://ieeexplore.ieee.org/xpls/dictionary.jsp.

Any standards work with a PAR (and IEEE Transaction Papers) must be submitted for review and approval of terms from I2. The output from a working group in the form of a report does not need the mandatory review; however, these will be accepted for review and comment upon request to the chair.

Words from approved Standards and Guides with a Section 3 (Definitions) have been incorporated into the IEEE database. An alphabetical listing of the words not in the database, but useful to the PSRC is posted on the web site under "TERMS" link under the "Knowledge Base" tab.

Matt Black motioned for adjournment and was seconded by Roger Whittaker, and unanimous approval was given. The meeting was adjourned at 11:30 am (Central Time)

I4: International Standards Development Working Group

Chair: Eric A. Udren
Vice Chair: Normann Fischer
Output: IEC TC 95 USNC standards votes and PSRC status reports
Established Date: 1990
Expected Completion Date: Meetings are continuing.
Assignment: Develop comments and votes for USNC of IEC on TC 95 (Measuring Relays and Protection Systems) standards projects and drafts. Report to PSRC on IEC Standards development.

Chair Eric Udren called the hybrid meeting to order at 5:00 PM CDT on Tuesday September 13, 2022, using PSRC WebEx platform, attended by 9 members and 1 guest, 7 on site and 3 remote attendees.
The January 2022 minutes had been circulated in advance and were approved with no issues or changes.

- Allen Goldstein, US participant in the TC 8 JWG 12 projects for IEC TS 62786-41 ED1, *Distributed energy resources connection with the grid – Part 41 - Requirements for frequency measurement used to control DER and loads* and IEC TS 62786-42 ED1, *Distributed energy resources connection with the grid – Part 42 Requirements for voltage measurement used to control DER and loads* made the attendees aware of the work. For the former project, the recent draft document CD2 is 1/1623/CD - the vote was not flagged for US TC 95 review. Eric and Murty Yalla agreed to investigate how to ensure that the TC 95 member nations are tied into this work going forward.
- TC 95 chair Dr. Murty Yalla reviewed the agenda for the TC 95 Plenary Meeting scheduled for Florida on October 6. The agenda was published in the I4 meeting agenda and circulated documents. Only 11 live attendees are expected.
    - *Post-Nashville note: Due to the disruption of Hurricane Ian, the Florida meeting format has been changed to virtual-only.*
- The US delegation comprises the I4 Chair and Vice Chair, TAG Administrator Jeff Dagle, and JWG Convenor Ken Martin.

- The IEC-IEEE joint COMTRADE Standard 60255-24 revision project will run under IEEE SA processes and PAR with IEC international participants invited to join the JWG. The PAR is near completion.
- New projects on traveling-wave fault location and protection (AHG4) and on HVDC protection (AHG5) reported in September 2021 are off to a slow start. There are US delegates assigned to participate. To date Dr. Xinzhou Dong, Convenor of AHG4, has called only one meeting and published no results. AHG5 chaired by Dr. Geraint Chaffey from KU Leuven has met a few times and is expected to present a project direction report.
- Murty and Normann gave the following update on other standard projects:
  - 60225-1 Ed 2, General Requirements analogous to IEEE C37.90, is being issued as FDIS for voting.
  - 60255-26 Ed 4, EMC requirements, passed from CDV status and will be issued for FDIS vote soon.
  - 60255-27 Ed 3, Safety Requirements, passed from CDV status and will be issued for FDIS vote soon.
  - 187-2 – Functional standard for busbar differential relays – early stages – waiting until 187-3 CD is issued, later this year.
  - 187-3 – Functional standard for line differential relays – still headed for CD with PSRC inputs later in 2022. Many meetings held and work done. Reconvene D34 to review CD when issued.
  - 167 – draft to be circulated – may get 2022 CD. No overcurrent; just directional unit requirements.
  - 132 – draft to be circulated – may get 2022 CD.
- *New addition* – 60255-21-1,2,3 mechanical shock, vibration, seismic testing standards – should have a first CD in early 2023 for a merged single standard.
- 60255-216-3 Digital Interface - Requirements for protection data exchange interfaces – the Convenor, with US and Canadian input, has revised the scope statement in a former failed NP and supplied an outline in a new NP. The USNC voted in favor based on input from the I4 Chair the week following the Nashville PSRC meeting.
- 95/487/Q Enquiry on interest in Collaborative Safety
  - The USNC had commented that coexistence safety is adequate for relays and there is no requirement for a collaborative safety standard in TC 95.
- No other TC 95 national committee comments advocated collaborative safety.
- TC 95 WG2 for 60255-216-1 – *Guideline for requirements and test for protective functions with digital inputs and outputs* – this previously reported and circulated advanced-stage document was a CD headed for Technical Report voting, but the upcoming Plenary will vote to change its status to Technical Specification in light of all the firm requirements it presents. PSRC WG H47 has been following this work and will submit future comments as needed. H47 work will be complementary to the 216-1 specification, not duplicating or contradicting it.

<u>Nashville Attendees:</u>
Eric Udren
Murty Yalla
Normann Fischer
Jim Niemira
Ken Martin
Bill Morse
Allen Goldstein

On-line Attendees:
Veselin Skendzic
Hani Al-Yousef
Ilia Voloh

I26: Mathematical Models of Current, Voltage, and Coupling Capacitive Voltage Transformers

Chair: Mike Meisinger
Vice Chair: Steve Turner
Secretary: Amir Makki
Output: Report
Established Date: ???
Expected Completion Date: ???
Draft: ???
Assignment: Recommendation to update and expand mathematical models of instrument transformers and transducers, including interface electronics such as merging units, for use in both off-line and real time transient simulation. There are now new transducer types such as optical, Hall Effect and Rogowski coils in addition to improved models for conventional CTs, VTs and CVTs.

l) Officer presiding – Mike Meisinger
m) Officer recording minutes – Steve Turner
n) Call to order – Mike Meisinger
o) Chair's remarks – Begin the report.
p) Results of call for quorum – Not applicable
q) Approval of Agenda – Not applicable
r) Approval of Minutes of previous meeting – Not applicable
s) Begin drafting the report.
t) Action Items:

Writing assignments have been tasked. Ritwik Chowdhury added a section on using transfer functions to model CCVTs. Complete writing assignments and produce report for balloting.

XII. I29: Revision of C37.110 Guide for the Application of Current Transformers for Protective Relaying Purposes

Chair: Joseph Valenzuela
Vice Chair: Michael Higginson
Output: IEEE Guide
Established Date: January 2015
Expected Completion Date: December 2022
Draft: D5
Assignment: Revise C37.110-2007 Guide for the Applications of Current Transformers for Protective Relaying Purposes

Joseph Valenzuela presided over this meeting and Michael Higginson recorded the minutes. The meeting was called to order on Tuesday, September 13, 2022 at 8:00 AM CDT. The meeting was conducted via WebEx. The meeting had 8 attendees, including 3 members and 5 guests. The working group did not achieve quorum.

The IEEE SA patent slides were reviewed, and no essential patents were identified.

Michael provided an update to the working group on the status of our work and planned next steps. Since the May 2021 meeting, Michael has completed integrating everyone's technical ballot comment resolutions in the spreadsheet and resolved most open editorial comments.

The working group discussed ballot comment resolution. All ballot comments have been resolved, and the working group discussed the resolution. One figure edit is required and will be made.

The working group discussed sending the document to re-ballot. Working group members raised no concerns or objections to sending the proposed resolutions to re-ballot.

The working group adjourned at approximately 8:32 AM CDT.

I31: IEEE 1613 Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus

Chair: Brian Mugalian
Vice Chair: Jerry Ramie
Secretary: Craig Preuss
Output: Standard
Established Date: 05-Feb-2016 (PAR approval date)
Meeting Date: Sept 13, 2022
Expected Completion Date: 31-Dec-2022 (PAR extension requested)
Draft: 3.0
Assignment: Revise 1613

a) Officer presiding: Brian Mugalian
b) Officer recording minutes: Craig Preuss
c) Call to order, approximately 9:20 am Central time
d) Chair's remarks, general welcome
e) Results of call for quorum: 10 members in attendance for quorum
f) Approval of Agenda: Jerry Ramie motion, Mike Dood, second. No objections. Motion passed.
g) Approval of Minutes of previous meetings: May 2022 motion Jerry Ramie, second Mike Meisinger. No objections. Motion passed.
h) Patent slides were shown, no claims were made.
i) Copyright slides were shown.
j) Participant behavior slides shown.
k) Motion to extend PAR one year: Jerry Ramie motion, second Lou Garavaglia. No objections. Motion passed.
l) Reviewed comment categorization by Comment Resolution Team. Resolved editorial comments.
m) Comment Resolution Team agreed to meet again on a bi-weekly basis starting September 27 through Dec 20, skipping Nov 22
n) No items reported out of executive session
o) Recesses and time of final adjournment, approximately 10:30 am Central time.

p) Next meeting date and location, conference calls as noted above.

Meeting Participants:

Name	**Affiliation**	**Voting Status (voting member, non-voting member, guest)**
Brian Mugalian	S&C Electric Company	Chair
Craig Preuss	Black & Veatch	Secretary
Solveig Ward	Quanta	Guest
Bill Morse	SEL	Guest
Malia Zaman	IEEE	Guest
Louis Garavaglia	G&W Electric Co.	Guest
Zitao Wang	S&C Electric Company	Voting Member
Roger Whittaker	Self	Guest
Jim Niemira	S&C Electric Company	Guest
Eric Udren	Quanta	Guest
Hani Al-Yousef	Eaton Corporation	Voting Member
Mike Dood	SEL	Voting Member
Gerald Ramie	ARC Technical Resources	Vice-Chair
Jay Anderson	SEL	Voting Member
Michael Meisinger	S&C Electric	Voting Member
Abdel Hamid	Hydro Quebec	Guest
Chris Huntley	SEL	Guest
Tony Bell	Ametek	Guest
Jay Herman	EPRI	Guest
Galina Antonova	Hitachi Energy	Guest
Byungtae Jang	Kepco	Guest
Thomas Rudolph	Schneider Electric GmbH	Voting Member

I32: A Survey of Protective System Test Practices

Chair: Andre Uribe
Vice Chair: Will Knapek
Secretary:
Output: Report
Established: 05/2015
Expected Completion Date: 01/2023
Assignment: To review report prepared by working group I11 in 2001 called "Survey of Relaying Test Practices" and update the survey accordingly to today's industry environment.
Draft: Ver 1.0

a) Officer presiding: Andre Uribe, Vice Chair
b) Officer recording minutes: Will Knapek, Vice Chair
c) The meeting was established to announce
    a. The survey link
    b. That only 16 has participated since July

    c. Instructions on requesting utility contacts in relay to take the survey
    d. An email template has been written for members to use when making the request
d) Meeting was double booked with another WG at 2:30 pm
e) I32 forfeit its position to CTF50
f) Email will be sent out this week

I33: Review of Relay Testing Terms

Chair: Scott Cooper
Vice Chair: Hugo Monterrubio
Secretary: Scott Cooper
Output: Report
Established Date: 1/19
Expected Completion Date: 9/23
Draft: 2.0
Assignment: Review the various definitions of relay testing terms and develop a Report with formal definitions in order to help eliminate any confusion. The Report will also be used by I2 for inclusion in the IEEE dictionary.

a) Officer presiding-Scott Cooper
b) Officer recording minutes-Scott Cooper
c) Call to order- 09/14/2022 9:20 CDT
d) Chair's remarks- Current membership, Review of project status, way forward.
e) Results of call for quorum: 2 guests, 2/5 members present
f) Approval of Agenda (motion and second)-NA
g) Approval of Minutes of previous meetings (motion and second)-NA
h) Summary of discussions and conclusions including any motions
    a. Reviewed results of I-Subcommittee vote on approval, comments by Fred Friend, Tony Seeger
    b. Reviewed path forward
i) Action items
    a. Add introductory purpose to the report
    b. Accept suggested edits
    c. Resubmit to I-subcommittee for another vote
j) Items reported out of executive session (if such sessions have occurred)-NA
k) Recesses and time of final adjournment (if different from our published face-to-face meeting agenda) 09/14/2022 10:00 CDT
l) Next meeting date and location (if different from our published face-to-face meeting schedule) January 2023, TBD

I35: IEEE Std PC37.2 - IEEE Draft Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations

Chair: Mike Dood
Vice Chair: Marc Lacroix
Output: Standard
Established Date: January 2016
Expected Completion Date: September 2022
Draft: 0.7

Assignment: To revise and update C37.2, Standard for Electrical Power System Device Function Numbers, Acronyms, and Contact Designations

The working group did not meet. Document is with RevCom for publication approval.

I36: PC37.90.2 Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – Radiated Electromagnetic Interference Withstand Capability Requirements and Tests

Chair: Chase Lockhart
Vice Chair: Mat Garver
Output: Standard
Established Date: September 2017
Expected Completion Date: December 2022
Draft: 5.0
Assignment: Revision of - Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – Radiated Electromagnetic Interference Withstand Capability Requirements and Tests

Meeting Participants:

Name	Affiliation	Voting Status (voting member, non-voting member, guest)
Mat Garver	Hubbell (Beckwith)	Vice-Chair
Gerald (Jerry) Ramie	ARC Technical Resources Inc.	Voting Member
Jim Nimera	S&C Electric	Guest
Hani		Guest
Bill Morse	SEL	Guest
Tom Beckwith	Hubbell (Beckwith)	Guest
Travis Mooney	SEL	Voting Member
Louis Garavaglia	G&W Electric Co.	Voting Member

Time called to Order and Chair's remarks: The meeting was called to order at 2:30pm Central Time and introductions were made. This meeting to establish a plan of action to have all comments addressed and document modifications made in order to meet the December 2022 completion date.
IEEE Policy Reminders (patents and copyrights): These were reviewed, and no objections were made.
Confirm that call for Patent issues was made and record any responses: These were reviewed, and no objections were made.

Topics discussed:

- Comment resolution from balloting body
- Plan to meet off cycle to address and resolve remining comments.
- It was suggested that the remining comments be divided up among the voting members and all given the task to address their assigned comments
- Chair or Vice Chair will arrange for meeting invites to be sent out.

- Planned dates to meet off cycle at the following times:
    - Oct 19 @ 1PM EST

Times of any recesses and time of final adjournment: Motion to adjourn at 4:00pm, 2nd was made. Approved by all, meeting adjourned.
Date, time, and location of next meeting: January 2023

I37: C37.90, Standard for Relays, Relay System Associated with Electric Power Apparatus

Chair: Marilyn Ramirez
Vice Chair: William Morse
Output: Standard
Established Date: 2018
Expected Completion Date: 2022
Draft: 2.0
Assignment: Revision of C37.90 Standard. PAR Expiration 31-Dec-2022

Meeting Participants:

Name	Affiliation	Voting Status
Marilyn Ramirez	Qualus	Voting Member
Galina Antonova	Hitachi Energy	Guest
Hani Al-Yousef	Eaton	Voting Member
William Morse	SEL	Voting Member
Roger Whittaker	Self	Guest
Todd Martin	Basler	Voting Member
Tony Bell	Ametek	Voting Member
Jim Niemira	S&C Electric	Guest
Adrian Zvarych	Qualus	Guest
Mat Garver	Beckwith	Guest
Tapan Manna	Burns & Mc	Guest
Malia Zaman	IEEE SA	Guest
Craig Palmer	Power Comm	Guest

- Officer presiding: Marilyn Ramirez
- Officer recording minutes: Marilyn Ramirez
- Call to order, approximately 9:20 am Central Time
- General welcome
- The meeting had 5 members and 8 guests in attendance. Quorum was met.
    - January 2022 & May 2022 Meeting Minutes were reviewed and approved.
- William Morse stepped up as the Vice Chair of the Working Group.
- Patent slides were shown, no claims were made. Copyright and Participant behavior slides were shown.

- Latest draft updates were reviewed. Motion to approve these changes was made by Todd Martin and seconded by Hani Al-Yousef. These changes were approved by members in attendance with no objections.
- Action Items:
    - Review IEEE 485 for harmonization with Section on DC Rated Power Inputs
    - Motion to be presented at the I Subcommittee to request a PAR extension
- Final adjournment, approximately 10:30 am Central Time.

I38: IEEE Standard C37.92 Standard for Analog Inputs to Protective Relays from Electronic Voltage and Current Transducers

Chair: Ritwik Chowdhury
Vice Chair: Eric A. Udren
Output: Standard
Established Date: January 2019
Expected Completion Date: May 2023
Draft: 5.0
Assignment: To revise and update C37.92

WG I38 met on September 14, 2022, at 8 AM CDT, live and by PSRC WebEx virtual platform. With 10 total attendees, 7 members comprised a quorum. The Chair reviewed IEEE standard patent slides, meeting participation rules, and copyright slide. May minutes were approved after motions by Hugo and Eric.
Ritwik began a review of Draft 4.9 edits to the last few Draft 4.8 comments not previously reviewed. Review highlights:

- The group revised the Clause 5.6 statement of bandwidth and frequency response for clarity, protection application suitability, and practicality for implementation by manufacturers. The technical requirement is slightly different from the prior standard version.
- The group reviewed all recent technical changes of substance, and agreed that Draft 4.9 with the new Clause 5.6 change is ready for balloting recirculation as a clean Draft 5.0.
- The group accepted a proposal to allow minor non-technical appearance-improvement edits by the Chair's assistant without WG review in Draft 5.0 before reballoting submission.

The next action, within one to two weeks, is to submit Draft 5.0 to IEEE for balloting. The next meeting in January will review balloting results as available by then.

Attendees: (L) – Live attendee in Nashville; (R) Remote attendee via WebEx
Ritwik Chowdhury (R)
Eric Udren (L)
Veselin Skendzic (R)
Hugo Monterrubio (L)
Hani Al-Yousef (R)
Rich Hunt (R)
Zitao Wang (L)
Malia Zaman (L)
Scott Cooper (L)

I40: Review of IEEE C37.90.1 – Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus

Chair: Roger Whittaker
Vice Chair: Todd Martin
Output: Review for revision IEEE C37.90.1
Established Date: September 2018
Expected Completion date: Dec 31, 2024
Draft: 3
Assignment: Revise IEEE C37.90.1 – Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus.

Task Force I40 met on Wednesday, September 13 at 8:am central daylight time in a single session. This was a hybrid meeting with 13 people attending. Of those, 6 were in person in the conference room. A quorum was achieved with 8 of 13 voting members present.

After introductions, the IEEE patent slides were reviewed. No patent concerns were identified. There were no copyright issues identified.

The agenda was reviewed. The motion was made Jerry Ramie to approve agenda. The motion was seconded by Louis Garavaglia. Agenda was approved.

Minutes from the May 2022 meeting were reviewed. The motion was made Jerry Ramie to approve agenda. The motion was seconded by Todd Martin. Meeting minutes were approved.

Annex C and D needs added. Bill Morse will arrange an interim meeting with Travis Mooney and Jerry Ramie to complete this.

Clause 10 changes provided by Travis Mooney were reviewed. There we several small changes

- Add requirement to identify UUT firmware revision
- Add requirement to list all equipment with calibration date if applicable
- EFT to “SWC Generator
- List any deviation from the standard

Discussed the need to evaluate if procedure needs to be added to document, or if it already exists in standard in another location

Discuss need to change Annex B to normative. It was changed since it identifies how to validate test equipment as required.

Normative references were discussed. C37.90 will be the added as normative reference.

Review of clause 4, Test Wave Shapes, was completed by the workgroup and there were no changes to it.

It was noticed that notes 4 and 5 have disappeared. Roger will resolve that and fix the note call outs.

This completed the meeting. We had motion to adjourn by Bill Morse and Louis Garavaglia.

I41: Draft Standard for Electrostatic Discharge Tests for Protective Relays

Date: September 13, 2022, Nashville, TN USA
Chair: Steve Turner
Vice Chair: Dan Ransom
Secretary: (open)
Output: Standard
Established Date: September 22, 2020
Expected Completion Date: January 2023
Draft: 1
Assignment: Revise and update C37.90.3, IEEE Standard Electrostatic Discharge Tests for Protective Relays

1. *Officer presiding*

The presiding officer at this online meeting was Chair Steve Turner.

2. *Officer recording minutes*

Vice Chair Dan Ransom recorded the minutes in this document.

3. *Call to order*

Chair Turner called the meeting to order at 10:46 a.m., Central Daylight Time, on September 13, 2022.

4. *Chair's remarks*

Chair Turner welcomed all to the hybrid (in-person and virtual) meeting. He stated that the proposed standard was balloted and there are comments.

5. *Results of call for quorum*

The quorum check established that a quorum was present.

6. *Approval of Agenda (motion and second)*

It was moved and seconded to approve the agenda. This motion passed on a voice vote.

7. *Approval of Minutes of previous meetings (motion and second)*

It was moved and seconded to approve the previous minutes. This motion passed on a voice vote.

8. *Brief summary of discussions and conclusions, including any motions*

Chair Turner reported that the standard was balloted and there are 85 comments. During the meeting participants considered three of these comments. Chair Turner set Fridays at 9 a.m. Pacific Time to resolve the remainder of the comments--

Sept.23

Oct 7

Oct 21

Nov 4

These meetings will be 2 hours in length.

9. Action items

AI6: Resolve ballot comments

10. Items reported out of executive session (if such sessions have occurred)

There was no executive session.

11. Recesses and time of final adjournment (if different from our published face-to-face meeting agenda)

Chair Turner adjourned the meeting on time at 11:44 a.m. Central Daylight Time.

12. Next meeting date and location (if different from our published face-to-face meeting schedule)

The next meeting will be in January 2023 at the PSRCC meeting in Jacksonville, FL.

I43: Investigate Response to USA Executive Order Regarding EMP Protection

Chair: Angelo Tempone (Presiding)
Vice Chair: Art Buanno
Secretary: Dolly Villasmil
Output: Report
Established Date: May 11, 2020
Expected Completion Date: 2024
Draft: None yet
Assignment: Write a report to, (1) Investigate and describe EMPs and their likely effects on protection and control apparatus, and (2) Determine and describe strategies generation, transmission, and distribution utilities can utilize to mitigate the effects of EMPs on their equipment.

The meeting was called to order at 17:00 CDT on Monday, September 12, 2022 in a Hybrid format.

1. Introductions

The chair introduced himself. The meeting opened with 8 members and 35 in-person & remote guests. There were significant audio issues that prevented virtual and in-person attendees from participating except through the conference room phone line.

2. Quorum verification

A quorum was not obtained since less than 12 members attended the meeting (under 50%).

3. The May meeting minutes could not be approved without a quorum.

4. The table of contents of the report was shared with the group as illustration of the contents of the report and the progress made to date.

5. Mark Adamiak asked whether both radiated and conducted EMP was being addressed in the report. Both are. Further, it is important to address mitigation of the conducted effects. This did spur much discussion on the depth of understanding of both phenomena.

6. Mark Adamiak offered to be a member of the working group. He also offered to assist with the lab work associated with coupling of the EMP signal on the CCVT and its circuits. He referenced a lab in Connecticut, AFS (Advanced Fusion), that could accomplish the testing.

7. Bill Morse volunteered to review the report based on his expertise.

8. The meeting agenda & minutes will be approved remotely.

The meeting was adjourned at 17:34 CDT.
Our next meeting will be Jacksonville, FL in January of 2023 (time TBD). A room for 40 people will be needed.

I44: Skills Required to Program, Commission, Test, and Maintain Ethernet Based PAC Systems

Chair: Andre Uribe
Vice Chair: Mike Dood
Output: Report
Established: 01/2020
Expected Completion Date: 05/2023
Draft: Ver 5.1
Assignment: Create report on Skills Beneficial to Program, Commission, Test, and Maintain IEC-61850 and other Ethernet Based Protection, Automation, and Control (PAC) Systems.

a) Officer presiding: Andre Uribe, Chair
b) Officer recording minutes: Andre Uribe, Chair
c) Call to order at 5:00 pm
d) We had 7 in person attendees and 6 virtual attendees, total of 13 members and guest
e) Agenda Items:
    a. Chair's remarks the title on the I-subcommittee agenda has been updated to **"*Skills Required to Program, Commission, Test, and Maintain Ethernet Based PAC Systems*".**
    b. Reviewed report and assignments were made. Contributors agreed to an October 17th due date and a virtual meeting on October 24th. We anticipate a final draft to be reviewed and finalized during the January 2023 meeting in Jacksonville.

f) Need to provide members with a share file to access the report.
g) Meeting adjournment at 6:10 pm central.
h) Next meeting date and location: Jacksonville, FL

Assignments

a. January sessions volunteers to contribute.
    i. Section 1: Karen Leggett assigned to peer review.
    ii. Section 2: Will Knapek, Marcos Velazquez assigned to contribute.
    iii. Section 3: David Dolezilek assigned to contribute.
    iv. Section 4: Karen Leggett, Wyszczelski, Peiman Dadkhah assigned to peer review.
    v. Section 5: Yujie Yin assigned to peer review.
    vi. Section 5.6: Bharat Nalla assigned to contribute. Austin Wade assigned to peer review.
    vii. Section 6: Mike Cunnigham, Tim Mathias, Gaina assigned to peer review.
    viii. Section 8: Jonathan Sykes assigned to contribute.
    ix. Section 9: Mike Cunnigham assigned to contribute.
    x. Section 10: Will Knapek, Sughosh Kuber assigned to contribute.
    xi. Section 11: Bharat Nalla assigned to contribute.
    xii. Section 12: Mike Dood assigned to contribute.

b. May sessions volunteers to contribute
    i. Section 5.7: Scott Cooper assigned to peer review
    ii. Section 5.8: Don Ware assigned to peer review
    iii. Section 7 & 8: Will Knapek assigned to combine these two sections and make commissioning and maintenance a subset of sec 7. Retitle this section.
    iv. Section 9: Abel Gonzalez assigned to peer review
    v. Section 11: Andre Uribe and Adrian Zvarych assigned to contribute
    vi. Report: Andre assigned to update report to refer to engineer/technician vs single function

I45: Report on Grounding of Instrumentation and Control Circuits

Chair: Adrian Zvarych
Vice Chair: TBD
Secretary: Jalal Gohari
Established: May 2020
Output: Report on Grounding and Bonding of Instrumentation and Control Circuits
Expected Completion date: ???
Assignment: The purpose of the WG is to develop a Technical Report reviewing grounding and bonding of circuits associated with instrumentation, protective relaying, communications, power supplies, and other electric facilities in substations. The report will review existing practices and standards, identify where conflicts or omissions exist, and address means of reconciling conflicts.

Report on Grounding of Instrumentation and Control Circuits

- Call to Order – by Adrian Zvarych 11:55 AM Eastern

- Check for quorum – Voting Members in Attendance
- Display the following:

    - IEEE Patent Policy: Call for Patents: https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.pdf
    - IEEE Copyright Policy: https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/copyright-policy-WG-meetings.potx

- Approve past minutes 1st Don Ware 2nd Robert Frye
- Approve Agenda 1st Don Ware 2nd Prasad
- Unfinished Business (**Action Items**)
    a. **Z to check through the document and ensure acronym protocol is followed (needs final independent review)**
    b. **Z to strengthen Glossary area (ongoing)**
    c. **Z – overall document image renumbering (ongoing)**
    d. **I45 WG – review each Report Section, decide whether to:**
    i. **"Refine the Content"**
    ii. **"Keep"**
    iii. **"Move to Reference Only"**
    iv. **"Delete"**

During this meeting, the Voting Members will be voting on the status of each Section in the Report based on the above decision criteria. Thanks in advance for doing a little homework.

Clarification: This doesn't mean new content won't be accepted, this is just Team-I45 taking a virtual 'breath' to consider if the contents of the Report are properly aligned with the "Assignment" and what might still be missing.

1. **Items Discussed**
    a. This Report can be considered as a 'Bridge' between NEC, NESC, Telcordia Grounding and Bonding GR, and other non-IEEE documents, where those documents speak to grounding and bonding, but not directly applied to substation control building design or construction.
    b. Closed Loop Grounds = "bad", but are applied widely in electric power systems as a legacy practice.
    c. Where home run or insulated grounding conductors are installed, what is the method to test the integrity of that connection?
    d. Angelo Tempone = I43 HEMP Chair
    e. Maxwell's Equations for inductance and bend radius
    f. Proposed End Date could be 9/2023 for submitting this Report for Balloting
    g. In our Recommendations statement, should we include a statement on recommended testing intervals?

h. When testing the integrity of a grounding/bonding connection, it is common practice to use DC resistance as a measurement, or potentially an insulation tester. However, we have not traditionally tested the impedance of a grounding or bonding connection using a frequency source. This would take inductance and capacitance into consideration, a more accurate predictor of the apparent impedance to higher frequency transients…

- Other business
  a. PSRC has a library of standard symbols for Visio (psrc.vss file within PSRC Website > Posted Work area; font sizes also included in the IEEE Style Manual) – to be used in converting cut-pasted imagery.
  b. Z to reach out to Chuck Haahr on IEEE 80 and CEE grounding conductor
- Future Meeting
  Wednesday 5 October 2022
  11:30 AM – 12:30 PM Eastern Time
  Teams Online
- Adjourn: 1st Robert Frye 2nd Mike Cunningham 11:50 AM - Central

I46: Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

Chair: Bruce Magruder
Vice Chair: Sudarshan Byreddy
Virtual Meeting/Teams: 10 May 2022, 3:40 – 4:50 PM CST
Output: Revise IEEE C57.13.3-2014
Established Date: September 2021
Expected Completion Date: January 2024
Draft:
Assignment: Prepare PAR for IEEE C57.13.3-2014

a) Call to order – Bruce Magruder, 3:40 PM CST
b) Chair's greeting & remarks, a total of 14 participants joined the hybrid (in-person/Webex).
c) Agenda was presented and reviewed
d) Patent slides were reviewed. The attendees did not present any patents requiring further action.
e) Copyright slides were presented. No comments from the attendees.
f) September 2021 and January 2022 meeting minutes are approved through email.
g) As quorum was achieved, James Niemira made a motion to accept the May 2022 meeting minutes and Brian Mugalian seconded the motion.
h) PAR need to be approved by I subcommittee.
i) Motion to adjourn was made by Bruce Mugalian and seconded by James Niemera.

Name	**Affiliation**	**Voting Status (voting members)**
Bruce Magruder	SOLV Energy	Chair – Voting Member

Name	Affiliation	Voting Status (voting members)
Sudarshan	Burns & McDonnell	Vice Chair - Voting Member
Brian Mugalian	S&C Electric	Voting Member
Zitao Wang	S&C Electric	Voting Member
Jim Niemira	S&C Electric	Voting Member
Jim O'Brien	Duke Energy	Voting Member
Jalal Gohari	WSP Group	Voting Member
Josh Warner	Commonwealth Associates	Voting Member
Shivam Prabhakar	Siemens	Voting Member
Lou Garauagua	General Electric	Guest
Todd Martin	Basler Electric	Guest
Matt Black	Sargent & Lundy	Guest
Bill Morse	SEL	Guest
Randy Brannen	Southern Company	Guest

I47: Revise IEEE C37.231-2006 - IEEE Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control.

Chair: Don Burkart
Vice Chair: Nicholas Kraemer
Secretary: Amir Makki
Output: Revision of an Existing Standard
Established Date: September, 2021
Expected Completion Date: December, 2025
Draft: N/A
Assignment: Revise the Standard. The revisions include clarification on the use of the Standard and on the impact of the latest NERC CIP and PRC requirements.

Presiding officer: Amir Makki
Minutes recorded by: Nicholas Kraemer

Meeting Participants:

Amir Makki (Softstuf Philadelphia) (Sec)
Craig Preuss (Black & Veatch) (Member)
Don Burkart (Con Edison) (Chair)
Gayle Nelms (SEL) (Member)
Hani Al-Yousef (Eaton) (Member)
Jack Wilson (Ameren) (Member)
Jason Lombardo (S&C) (Member)
Jim Hacket (Member)
Nicholas Kraemer (NuGrid Power) (VC)
Zitao Wang (S&C) (Guest)

Meeting was called to order. Pre-PAR patent and copyright information was discussed; links to slides were shown. Quorum was achieved with 8 of 8 members and 1 guest. Craig Preuss

motioned to approve the May 2022 Minutes with Gayle Nelms seconding. Minutes were approved unanimously.

Main discussions and proceedings:

- Old recommended practice scope & purpose displayed.
- Potential content similarities with a PSCCC SBOM task force was noted. A time conflict noted. The time conflict will attempt to be rectified by the WG officers. Craig Preuss volunteered to be a Liaison.
- WG discussed expanding the scope beyond microprocessor based protection device firmware control to include control of IED firmware and potentially some software. Goal is to keep the standard short.
- WG discussed moving from a recommended practice to a full standard.
- WG discussed requesting joint PSCCC sponsorship once a title, scope, and need have been finalized.
- WG agreed new report should have a title change to reflect the broadening of the scope beyond microprocessor based protection devices.

WG discussed holding an interim virtual meeting after a title has been drafted. Exact date TBD.

Jim Hackett motioned to adjourn with Jack Wilson seconding. Motion was approved unanimously.

The WG plans to meet again at the next PSRC meeting. The meeting objectives are to complete the PAR application and submit.

ITF48: Revision to IEEE C37.103-2015: Guide for Differential and Polarizing Relay Circuit Testing

Chair: Mohit Sharma
Vice Chair: N/A
Output: Revised Standard
Established Date: September 2021
Expected Completion Date: September 2026
Draft: N/A
Assignment: Revise IEEE Std C37.103-2015, IEEE Guide for Differential and Polarizing Relay Circuit Testing
Working group did not meet. PAR is being developed for official SC approval and official WG start.

10. Liaison Reports
    a. Instrument Transformer Subcommittee – Will Knapek – See meeting minutes on website

11. Old Business
    a. email ballots since January 2022 meeting:

- MOTION to form WG I48 and create PAR for PC37.103 “Draft Guide for Differential and Polarizing Relay Circuit Testing” to revise C37.103-2015 with no changes to Scope or Purpose.
  Title: PC37.103 “Draft Guide for Differential and Polarizing Relay Circuit Testing”
  Scope: This guide covers tests to help ensure correct connections of differential relays and polarizing circuits of phase and ground relays. Although other preparatory tests are mentioned in this guide, these tests are not discussed in detail.
  Purpose: This guide provides a methodology to establish a systematic series of tests to verify the integrity and accuracy of connections of differential and polarizing circuits.
  Motion by: Mohit Sharma
  Second by: Ritwik Chowdhury
  email ballot sent June 21, 2022 with response date June 29, 2022.
  MOTION PASSED: 39 members; 22 responses; 22 Approve, 0 Disapprove, 0 Abstain.

b. I33 WG Report – “Review of Relay Testing Terms” is still under revision. WG is addressing comments received on SC ballot and will revise and resubmit the report for approval by I-SC.

c. MOTION to sponsor a joint task force with the PSCCC P21 Task Force to create a PES Technical Report based upon the output of the PSCCC P21 SG and the CIGRE B5.60 technical brochure that recommends a roadmap for developing new or updating existing IEEE standards to address issues of Centralized Protection and Control (CPC) Systems.

   Discussion: Recommendations of the TF may include:
   • Recommend a new standard (e.g., PC37.300.1) that explicitly addresses, for in-scope H45 PC37.300 applications, the specific performance requirements and tests for a CPC system that are unrelated to communications
   • Recommend a new guide (e.g., PC37.300.2) for CPC system architectures supporting the virtualization of substation protection, control, monitoring, communication, and asset management functions
   • Recommend updates to existing standards P1613, PC37.90 series, PC37.2, P1646, C37.115, P1686, PC37.240, PC37.231, and P2808) to address the impacts of CPC-based systems and CPC systems as described in PC37.300
   Motion by: Craig Preuss Second by: Amir Makki
   Unanimously passed. If approved by the main committee, this will be designated WG I49.

12. New Business
    a. MOTION requesting PAR Extension for I31 P1613 – one year to address comments.
       Motion by: Mugalian Second by: Frye
    b. MOTION requesting a PAR extension for WG I38 for one year. The draft standard, IEEE Std C37.92, has been sent for sponsor ballot and is undergoing comment resolution. We plan to send it for recirculation this year.
       Motion by: Chowdhury Second by: Udren
    c. MOTION requesting par extension for WG I37 Revision for 2 years — IEEE Std C37.90 Standard for Relays and Relay System Associated with Electric Power

Apparatus.
Motion by: Ramirez Second by: Whittaker

d. MOTION to create PAR for WG I46 as follows: Revise IEEE C57.13.3 with no significant change to Scope or Purpose.

Title: P57.13.3 -IEEE Guide for Grounding of Instrument Transformer Secondary Circuits and Cases

Scope: This guide contains general and specific recommendations for grounding current and voltage transformer secondary circuits and cases of connected equipment. The practices recommended apply to all transformers of this type, including capacitive voltage transformers and linear couplers, irrespective of primary voltage or whether the primary windings are connected to, or are in, power circuits or are connected in the secondary circuits of other transformers as auxiliary current transformers or voltage transformers. Although most diagrams included in this guide show relaying applications, the recommended practices apply equally to metering and other areas where instrument transformers are used.
Exceptions to grounding are permissible or sometimes required where advantages obtained by not grounding, in certain instances or in certain types of installations, are considered to outweigh the advantages obtained by grounding. The scope of the guide includes grounding practices presently used and North American grounding practices is included.

Purpose: This guide provides information on the grounding of the following:
- Secondary circuits of electromagnetic CT and VT circuits
- Cases of relays, CTs, and VTs
- Secondary circuits of optoelectronic CTs and VTs
The primary emphases of this guide are personnel safety and proper performance of relays at electric power frequencies. Update to include new items and technologies (if applicable).

Motion by: Magruder Second by: Ware

e. Email Ritwik and Jim if you'd like to be an I48 officer—vice-chair or secretary
f. In the WG MRR and Matrix, put full name of officers to facilitate awards.

13. Other announcements?
    a. PSRC Panel Session at PES GM week of July 17, 2022, Denver, CO.
        - Session can be 2 hours or 4 hours as appropriate for the topic and scope.
        - Panelists must participate in face-to-face meeting, travel to Denver required.
        - Proposals required before end of next week. Contact Mike Thompson.
14. Motion to Adjourn, by _Chowdhury___, second by _Uribe_
    Adjourn time: __3:47 PM_____
    Next meeting will be likely in Jacksonville, FL, January 2023. Planned as in-person meeting with possible hybrid format. In any case, hope you stay well and look to meeting with you soon!

Reference Material:

WG and TF Minute Format Template: **Please use the template to simplify compilation of the Minutes from all the groups! Refer to PSRC P&P for Working Groups, Subclause 6.4 for the minimum information to be included in the Minutes.**

L##: Title of Working Group
Chair: ???
Vice Chair: ???
Secretary: ???
Output: ??? (Paper, Report, Tutorial, Guide, Recommended Practice, Standard, etc.)
Established Date: ??? (Month, Year)
Expected Completion Date: ??? (Month, Year)
Draft: ???
Assignment: ???
The following information should be included in your minutes as appropriate. The working group is free to use whatever form they choose to cover the items from the below list that apply to the meeting.

a) Officer presiding
b) Officer recording minutes
c) Call to order
d) Chair's remarks
e) Results of call for quorum
f) Approval of Agenda (motion and second)
g) Approval of Minutes of previous meetings (motion and second)
h) Brief summary of discussions and conclusions including any motions.
i) Action items
j) Items reported out of executive session (if such sessions have occurred)
k) Recesses and time of final adjournment (if different from our published face-to-face meeting agenda)
l) Next meeting date and location (if different from our published face-to-face meeting schedule)

Additional notes:

a) Be diligent to keep the standard header information up to date.
b) Expected completion date gives anyone a reasonable idea of where you stand in your work – without having to seek out another document such as the excel spreadsheet listing what rev you are on.
c) **Do not include meeting room requests and conflict avoidance requests in your minutes**.
d) Do not use significant paragraph indents.
e) Keep multilevel numbered lists to no more than two levels if possible.
f) If this is PAR related activity, include the SA document number in the Title of the Working Group.

Proposal for New TF or WG

Date:
Definition of the Problem

What is happening?

What should be happening?

Proposal for Task Force

Submitted by:

Rotating Machinery "J" Subcommittee Report on WG progress of note

SCOPE: Evaluate and report on protective relaying concepts and practices applicable to generators, motors, synchronous condensers, associated auxiliary systems, and performance of plant protective systems. Develop and maintain related relaying standards.

Chair: Gary Kobet
Vice Chair: Will English

J SC met Wednesday September 14, 2022 at 1:15 PM CDT with 27 out of 33 members and 15 guests, reaching quorum. A motion to approve the May 2022 J SC meeting minutes was made by Jason Eruneo and seconded by Russ Patterson. The minutes were approved unanimously.

- J18 Effect of subsynchronous oscillations due to IBR on rotating machinery P&C (report) – No reliable commercially available EMTP model that can be used for SSCI studies; report will be completed, unable to draw any conclusions
- J20 Generator synchronization systems – nearing WG ballot, target publishing 2023
- J21 Motor protection tutorial – started, outline being developed
- J25 Synchronous condenser protection (report) – draft 0 completed, filling in assigned sections

Four PAR activities:

- J16 Revise C37.101 Generator ground protection: In progress, PAR closes 2024
- J17 Revise C37.102 AC generator protection: 1st SA ballot closed 9/12/2022 (404 comments); issues with Annex A (sample calculations); requesting 2yr PAR extension but hope to finish much sooner
- J19 C37.106-2022 to be published by end of 2022
    - J27 WG Summary Paper just starting
- J22 Revise C37.96 Motor protection: Work started, still need figures from earlier document; PAR closes 2025

J15: Investigation of the Criteria for the Transfer of Motor Buses
Chair: Wayne Hartmann
Secretary / Vice Chair: Doug Weisz
Established 2015 (1/15)
Output: Report (Draft 11)
Status: 23nd Meeting (9-13-22)

Assignment:

1. Review, compare, and contrast NEMA MG-1 with ANSI C50.41 regarding transfer criteria.
2. Examine published reports and papers on motor bus transfer criteria to compare the conclusions with NEMA MG-1 with ANSI C50.41 regarding fast transfer criteria.

3. Investigate existing open-transition motor bus transfer (MBT) actual data from multiple events at the medium voltage level. Examine for current and torque ratio versus Volts/Hz at transfer periods to see if there is a correlation.
4. Examine published reports, papers, C50.41 and NEMA MG-1 on motor fast bus transfer criteria to reconcile the conclusions with the field-measured results.
5. Study existing motor protection oscillography voltage and current to identify which motors are generating and which are motoring. Examine v/Hz of composite bus and individual motors, and individual motor reacceleration current versus total bus reacceleration current (if available).
6. Produce a Report to Subcommittee with findings of the above

WG Report

Activity:

1. The Working Group (WG) met for a single session on September 13, 2022, with 8 members and 4 guests. Quorum was not met.
2. May 2022 Minutes were not approved as we could not obtain a quorum count during the meeting.
3. The WG assignment was reviewed as well as a brief history of WG activities.
4. During the meeting, Dr. Murty sent Chair equations for page 51, calculation of air-gap torque, for L-L voltage values.
5. All “Draft 10-B Live Edit” open items were resolved and accepted, except for those listed in Assignments below.

Assignments:

1. Chair will conduct email vote for approval of May 2022 Meeting Minutes.
2. Chair will update “Draft 11 Live Edit” to “Draft 12” based upon resolved comments
3. Chair to check with Dale Finney (representative for Modeling B, Section 9):
   - If Section 9 is complete as drafted. Last look opportunity.
   - If figures 6 [p85], 8 [p88], 9 [p89] and 11 [p90] with visible data discontinuity stand, have discontinuity data struck, other.
4. Annex 2 was added to Draft 10-B. This Annex addresses Best Curve Fit – Motor Transient Torque and Peak Current versus Closing Angle. JC Theron and Derrick Haas volunteered to review.
5. T. Beckwith: Section 10. Add language to conclusion about the failure of the 1.33 V/Hz criterion correlating with resultant transfer torque levels and the 1.33 V/Hz criteria inefficacy.
6. T. Beckwith, Dr. M Yalla: Annex B. Add annex on correlation equation for torque ratio and angle difference.W. Hartmann: Section 3, Page 14. Replace entire clause starting with “Large cyclic torques (peak-to-peak) can cause mechanical vibration….” with same Clause in Rev. 9-A
7. T. Beckwith: Section 10: Add conclusion bullet that references Annex B
8. After Assignments are complete, Chair will revise Draft 12 with comments to Draft 13. Intent is to have Draft 13 in IEEE Report Format.T. Beckwith: Section 3, Entire Section. Add references where indicated at the rear of this section.

Other Business and Adjournment:

1. Dr. Murty explained Annex B calculations and how the curves were fit.
2. Meeting was adjourned.

Next Meeting:
In Person: Single session, projector, room for 30 people for in-person meeting
Virtual: WebEx or similar from PSRC. The WG also requests no conflict with all J particularly J16 (C37.101), J17 (C37.102) and J20 (Sync)

J16: <u>Revision of C37.101, Guide for Generator Ground Protection</u>

Chair: Ryan Carlson
Vice Chair: Doug Weisz
Established: 2016
Output: Guide
Status: 15th Meeting (9-13-22)
PAR Expiration: Dec 2024 (extension approved)

Assignment: Revise C37.101 Guide for Generator Ground Protection

WG Report

The WG met with 27 total participants (19 in-person, 8 via Webex), where 16 out of the 20 voting members were present. As quorum was achieved, Ryan asked if someone would like to make a motion to accept the May 2022 meeting minutes. Dale made a motion to accept those meeting minutes and Sudarshan seconded that motion.

Ryan will set up an interim meeting prior to the January 2023 meeting to address more of the comments that have thus far been submitted.

Ryan reviewed the patent slides required for IEEE PAR WGs and he mentioned that the PAR has been extended until 12-31-2024 with projected schedule of the following: 2022/2023 review/edit technical body of guide, 2023 review/edit annexes, and 2024 balloting.

Ryan mentioned he will post the latest working draft copy of C37.101 in the "Drafts in Progress" folder on imeetcentral this week. If any members need access to this workspace, please let us know and we will ensure you get access.

The new, overhauled C37.101 format change was briefly reviewed again and the TOC of the latest draft for the guide was reviewed. The working group then proceeded to discuss several topics in more depth:

- Reviewed some of the comments provided by Steven Mueller on the injection schemes section and discussed making this section more mfg agnostic, as it is written now specifically related to how one mfg does it.
    - Nader volunteered to review this section accordingly.
- Briefly reviewed some of the comments and text used in the tripping methods section
- Discussed the reliability and security of using the 27TH element as Laurel and Gary reported some misops in some cases due to wiring issues and in some cases due to insufficient collection of commissioning third harmonic data at all possible machine operating points. Additional misops were due to loss of signal events such as loose wires.
    - Decided to add some clarification and emphasis on the collection of 3rd harmonic commissioning data.

- Also emphasis will be added on the advantages of using the 59THD element as opposed to 27TH as it is generally, significantly more secure for all operating regions.
- There was some discussion on adding some information in the document on the pros and cons of alarming or tripping upon the loss of the injection signal.
- Also discussed the extra capacitance from the measuring device or relay itself and that it can skew the calculations and commissioning results so some discussion on this may be added to guide.
- Several WG members (Nader, Dale, Zeeky) volunteered to review this section.

- Discussed removing the figure in the low impedance grounded generators section that shows an NGT and secondary connected NGR as this was thought to be rare or uncommon, but Zeeky will research this first to see if there was any basis for adding this in past editions of this standard.

Motion to adjourn was made by Zeeky.

Next Meeting:
Single session, room for 30 people and a projector and WebEx. The WG also request no conflict with other J meetings, especially J17 (C37.102). Request meeting on Tuesday or Wednesday.

J17: <u>Revision of C37.102 Guide for AC Generator Protection</u>
Chair: Manish Das
Vice Chair: Gary Kobet
Output: IEEE Guide
Draft: 7.2
Established: May 2017
Status: 20th meeting, September 2022 (hybrid)
Expected completion date: -
PAR Expiration: Dec 2022

Assignment: Revise C37.102 Guide for AC Generator Protection

WG Report

WG met on September 12, 2022 virtually via webex and in person for a double session with attendance recorded from a total of 20 members and 29 guests. Quorum was achieved. The May 2022 minutes were approved (motion by Michael Thompson, second by Jason Eruneo).

Patent slides were presented, no claims were made. Copyright and Participant slides were also shared.

Sponsor ballot at closing achieved 82% participation and 93% approval, and over 400 comments.

Motion made to request a 2-yr PAR extension (Jason Eruneo, second Michael Thompson). Motion approved.

SA requires forming a Comment Resolution Group (CRG) which is open to everyone. Jalal Gohari, Paul Nyombi, Jun Verzosa, JC Theron volunteered. Motion was made by Jason Eruneo,

seconded by Bob Pettigrew to accept them along with the original WG membership into the new CRG. Motion carried.

It was also proposed that the comments be sorted by clause/subclause, and divided up over this new CRG to distribute the comment resolution workload across the entire group. Malia Zaman noted there should be one resulting marked-up document (Redline of the balloted version) with all the comment resolutions under “Tracked Changes” for the recirculation ballot.

Annex A produced some negative ballots. Some balloters considered Annex A of little/no use to the industry due to the lack of details compared with the 2006 version. The machine used in the 2006 document was one with unusual parameters. The new machine has more typical parameters. A motion was made by Michael Thompson to revise the Annex A to use the new machine but with the detail of the 2006 version (e.g., R-X plots, etc), with appropriate corrections (e.g., consider the effects of field forcing on the 21 backup distance element). Motion was seconded by Bob Pettigrew, and motion carried.

A small team was formed of the following volunteers to handle the Annex A: Nader Safari-Shad, Theresa Bowie, Juan Gers, Jason Eruneo, Phil Tatro, Rahim Jafari, Bob Pettigrew, Laurel Brandt, Gary Kobet, Faridul Katha Basha. The Annex A effort will be coordinated by the WG chair.

Additionally, WG discussed and addressed the following ballot comments. (See ballot comment spreadsheet for the disposition details):

- Comment I-313 – Revised
- Comment I-304 – Rejected
- Comment I-256 – Presently only 60Hz freq referenced in this guide. WG ok to with either of two proposals to say it applies to both 50 Hz and 60Hz. Chair will implement the easier proposal.
- Comment I-254 – Rejected
- Comment I-253 – Rejected
- Comment I-252 – Revised
- Comment I-251 – Revised
- Comment I-236 – Revised

SA ballot comment resolution spreadsheet will be uploaded in iMeetCentral. Chair will assign ballot comments to CRG to help review and address and set up virtual meetings to continue to discuss and resolve the comments.

In the J Subcommittee meeting the following motion was made by Manish Das, and seconded by Mike Thompson. The motion was approved unanimously.
Motion: Working Group J17 motions to extend the PAR for IEEE Guide C37.102 AC Generator Protection, for 2 years.

Next Meeting:
Request a double session with space for 40 people and a computer projector. The WG also requests no conflict with all J especially J16 (C37.101)

J18: <u>Investigate the effects of sub-synchronous oscillations due to inverter based resources (IBR) on rotating machinery protection and control</u>
CHAIR: Normann Fischer

VICE CHAIR: Jared Mraz
Output: Report
Established: September 2017
Status: WG September 13, 2022

Assignment:
Write a report that describe the different types of sub-synchronous phenomena, their causes, and effects on the power system. Investigate the potential Impact on existing rotating machinery protection. Investigate how to detect these events and what mitigation techniques can be applied.

WG Report

Attendance:
Total 27 (20 attendees in person and 7 on line)

Overview:
1. The chair led the discussion with respect to the validity of Type 3 WTG models currently available to study transient phenomena. The Chair and Romulo Bainy both discussed why the currently available models available in commercial SW packages are not adequate to study transient phenomena. The chair proposed that until a viable commercial model becomes available the report will wrap up with the finding.
2. In the meantime, the Chair, Romulo Bainy, Dr's Brian Johnson and Joe law, will study the Doctorial Thesis of Dr. Donald Novotny that describes the instability of the wound rotor induction motor and, build the DFIG model from first principles and use this to study this phenomena.

Next meeting:
For the next meeting, if it is not held virtually, J18 will need a room for 30 and an overhead projector. Avoid conflicts with J, D29, I4.

J20: <u>Report on Practices for Generator Synchronizing Systems</u>
CHAIR: Jason Eruneo
VICE-CHAIR: Ritwik Chowdhury
Output: Report (Draft 7.0)
Established: January 2019
Status: 10th WG Meeting, Nashville, TN Hybrid September 13, 2022

Assignment: This report will discuss all aspects related to implementation of a generator synchronization system. This includes design, settings, testing, commissioning practices, monitoring, and protective schemes for generator synchronizing systems. The report will include a range of common system configurations.

WG Report

Meeting started with attendees introducing themselves. There were 10 voting members in attendance and a quorum was established. Steve motioned and Dale seconded to approve the May meeting minutes.

- There was some discussion on the OOPS acronym based on Gary's suggestion which might give a reader that trivializes the issue. Gary thinks OPS might be one option. Mike pointed out C50.12 and C50.13 use faulty synchronization. Ritwik made the motion for the use of OPS instead of OOPS in the report, Steve Conrad seconded. Everyone agreed and motion passed.
- There was some discussion on the exclusion of the cross-compound machines from the relevant draft annex. The working group did not raise any concerns, so it will be removed.

Gary started a synchronizing presentation on a TVA hydro plant. Roughly 50 MW of Ocoee generation was islanded inadvertently with no load (except station-service) at Ocoee. Two of the generators tripped on either overspeed or overvoltage. The frequency of the island was 67 Hz. They looked at the synchronoscope and, because the frequency was outside the range at 67 Hz, it was chattering. The operator performed a manual close with the 7 Hz frequency difference. There was no synchronism-check supervision. There were many three-phase disturbances during the synchronizing because of several autoreclose attempts.

Gary also shared a comparison of an analog synchroscope and compared it with a digital line relay to better understand what the operator might've seen. And the manual synchroscope was chattering, although not at exactly 12 o'clock, but depending on the frequency could be close.

There was discussion following Gary's presentation. TVA has apparently had lots of OPS events and their hydro units are sturdy and get right back up. The island could be bigger in ERCOT, but at that level you are at a system level synchronization and not generator synchronization. It might be a topic that the C-SC may be interested in pursuing.

Jason E. presented the plan to get the first complete draft of the report to the working group for ballot by January 2023. Working group appeared to agree with the plan.

There were several discussion items and action items:

- **Action Item: Gary** will add one or more paragraphs in the report in Section 3.2.1 summarizing some of the discussion.
- There was also discussion on putting in synchronizing lights to improve the discussion associated in the report for manual synchronization. **Action Item: Mike** volunteered to paraphrase some of the discussion associated with synchronizing lights in Section 3.2.1.
- There was discussion on the Section 3.2.4 on the Synchronization Enable (01) Switch. **Action Item: Steve Conrad** and **Faridul** will add to this section.
- Mike mentioned that different control methods, such as proportional pulse width, should not be under prime mover automatic speed control (3.2.8.2) because it might be also applicable to automatic voltage control. This led to discussion on the need to populate the section on automatic voltage control, a section that has nothing at present. There was discussion from several others that this would be a beneficial section to have.
    - **Action Item: Randy Hamilton** to provide write up for automatic voltage control section

Next meeting:

Single session. With room for 30 and a projector. Request no conflict with C45, I38, J15, J17, J25, J27.

J21: Motor Protection Tutorial
CHAIR: Derrick Haas
VICE-CHAIR: JC Theron
Assignment – Develop a practical motor protection tutorial based around IEEE C37.96. The intent is to aid the reader to develop effective relay settings.
Output: Tutorial
Established: September 2019
Status: WG (10th meeting 20220914)

WG report

The WG met with 6 members and 13 guests. 11 local attendees and 8 virtual attendees.

The chair called the meeting to order and asked for introductions.

Six out of fourteen members were present. Quorum was not met. The minutes will be approved offline.

The chair mentioned that he is looking for a permanent VC and new members are welcome.

A discussion followed on how to progress on writing the document:

- Tom B. suggests to first look at what sections of C37.96 will have significant revisions?
- Should the powerpoint precede the document?
- Hasnain A. and JC Theron felt that an outline is the best place to start.
- Hasnain A. outline should include separate sections for induction, synchronous, and drives.
- Dale F. suggested to start with “basics” or “fundamentals of motor protection. Tom B. pointed out that the 96 annex is called basics.
- Doug mentioned that synchronous motor protection is currently somewhat lacking.

Assignments

- The chair took an assignment to review annex A.
- Dale F. & W. English volunteered to review section 4.
- Gary K. will write an outline proposal and will send it to the chair.
- JC T. and Derrick H. will review the 3000 series standards.
- Tom B. will speak with colleagues in PCIC to review this effort.
- Dale F. will provide the previous power point from the generator tutorial.

The chair adjourned the meeting.

Next meeting:
A single session is requested with room for 30 and a projector. Also request no conflict with J, especially J22. Schedule J21 to immediately follow J22.

J22: Revision of C37.96, Guide for AC Motor Protection

Chair: Zeeky Bukhala
Vice Chair: Jason Buneo
Secretary: --
Output: Guide
Draft: -
Established Date: May 2021
Status: WG Meeting 6
Expected Completion Date: May, 2025
PAR Expiration Date: December, 2025

Assignment: To revise and update C37.96, Guide for AC Motor Protection

WG Report

The Working Group held its sixth meeting on Wednesday, September 14th, 2022. There were 23 (13 in-person and 10 virtual) attendees with 14 members.

I. Welcome/Introduction
   a. The Chair kicked off the meeting at 9:25am CDT and welcomed members and guests to the working group's sixth meeting.
II. Quorum check
   a. Quorum was met with 14 of 23 members in attendance.
III. Approval of Meeting Minutes
   a. September 2022 minutes were approved.
IV. Patent Slides
   a. Patent Slides were shared, and no issues were raised.
V. Coordination with J21. Chair reminded the working group that it was agreed at the May 2022 J subcommittee meeting that J20 and J21 cooperate and coordinate on their respective assignments.
VI. Assignments
   a. IEEE-SA has confirmed they do not store figures in raw/original format. Chair put out a call to attendees to send any figures from guide that they may have.
   b. Reviewed Section 7, Setting and Adjustment of Protective Devices comments (Jason Buneo & Gary Kobet)
      i. Reviewed assignments from the May meeting.
         - 7.2.6.1 Phase Balance Relay. JC Theron, Andy Kunze & Derrick Haas to review recommended setpoints. No update
         - 7.2.6.2 Device 46—negative-sequence current relay. JC Theron, Andy Kunze & Derrick Haas to review recommended setpoints. No update
         - 7.2.7 Device 47—phase-sequence or phase-balance voltage relay. Derrick Haas and Nabil El Halabi Fares to add a discussion on applications of these relays. Applications will drive protective actions and settings. *Nabil reported beginning collection of waveforms to share with the working group.*
      ii. Completed review of section from sub-clause on Device 50/51— fuses and overcurrent devices.

- 7.2.11 Breaker Failure. Discussed to keep second paragraph and rewrite the rest and refer to C37.119 (for breaker failure general description) and C37.120 Subclause 5 (for discussion on breakers with redundant trip coils) . Nabil El-Halab, Hasnain Ashrafi and Prem Kumar.
- 7.2.16 Device 81—frequency relay. Add a short discussion on awareness of coordination with generator frequency protection. Bracy Nesbit.

c. Reviewed Tom Beckwith comments on Section 6.4 Motor bus transfer (MBT) up to (and including sub-clause 6.4.2
d. There was some discussion about the flow of the document specifically relating to Clauses 5 and 7. Jason Eruneo reminded the working group that he was reviewing options for better alignment.
e. The following sections are assigned for review:
    i. Section 2 – Sunil Kabra
    ii. Section 3 – Open
    iii. Section 4 – Will English, Jalar Gohari
    iv. Section 5
        - 5.1-5.5 – Derrick Haas, Jason Eruneo
        - 5.6-5.8 – Nabil El-Halabi
        - 5.9 – Hasnain Ashrafi
    v. Section 6
        - 6.1-6.2, 6.5 – Andy Kunze
        - 6.3 – JC Theron
        - 6.4 – JC Theron, Tom Beckwith
    vi. Section 7 – Jason Buneo, Nabil El-Halab
    vii. Section 8 – Zeeky Bukhala
    viii. Annex A – Dale Finney
    ix. Annex B – Sunil Kabra
f. The following guests asked to join the working group as members and were accordingly welcomed.
    i. Theresa Bowie
    ii. Dale Finney
    iii. Paul Nyombi
    iv. Prem Kumar

VII. Next Steps.
a. February 28th, 2022. Chair reminded working group that assignments had been due February 28th and asked for assignments to be completed and incorporated in C37.96 D1 in iMeetCentral as soon possible. Chair asked members still having difficulty accessing iMeetCentral to send him a reminder email.
b. November TBD, 2022. Chair will schedule a virtual meeting for November.
c. January 8th-12th, 2023.

VIII. Adjournment. Meeting Adjourned at 10:20am

Next meeting:
Single session with accommodations for 30 people and a projector is requested. Also request no conflict with J15 and J21. Schedule J22 to immediately precede J21.

J23: <u>Report on Generator Condition Monitoring</u>
Chair: Steve Turner
Vice Chair: Rob Messel
Secretary: Open
Output: Report
Established Date: May 2021
Status: (9-14-22)
Expected Completion Date: Open
Draft:
Assignment:
Develop a report that covers the following aspects of condition-based monitoring for synchronous machines:

- Describe and develop guidelines for online condition monitoring of large synchronous machines, including salient-pole rotors as well as cylindrical rotors.
- Use online machine condition-based monitoring to detect potential problems before an actual fault develops and schedule maintenance.
- Provides information on online condition monitoring techniques as well as proposing typical thresholds to trigger alarms and initiate remedial or compensating action.
- Demonstrate how to use specific the protection functions to monitor machines.
- Describe mechanisms of degradation and applicable monitoring devices.
- Some relays can monitor RTDs and other transducer-based signals. Some relays monitor field voltage and current. Some relays also include thermal models for the stator and rotor.
- Pilot projects to explore this technology.
- Work with other technical committees as necessary.

WG report

Minutes from previous meeting were approved.

Rob Messel accepted the position of vice chairman for the working group.

Presentation was given by Steven Turner on using signal profile monitoring to calculate generator stator capacitance-to-ground.

Presentation was given by Bracy Nesbit on online condition monitoring of large synchronous generators, including salient-pole rotors as well as cylindrical rotors.

Outstanding writing assignments are as follows:

1. Provides information on online condition monitoring techniques as well as recommending thresholds to trigger alarms and initiate remedial or compensating action.
   Steve Turner – APS
   Jay Mearns
   Abel Gonzales - Megger

2. Demonstrate how to use specific the protection functions to monitor generators.

Steve Turner – APS
Sungsoo Kim – TRC Engineering
JC Theron - GE

3. Describe mechanisms of degradation and applicable monitoring devices.
   Ellery Blood – SEL, Inc.

4. Pilot projects to explore this technology.
   Steve Turner – APS
   Dale Finney - SEL

5. Jay Mearns of PGE (Hydro division), will provide results from a study on partial discharge conducted on 107 machines

Next meeting:
Single session with accommodations for 25 people is requested. Also request no conflict with J

J24: Report on Synchronous Generator Disturbance Recording
Chair: Shane Haveron
Vice Chair: JC Theron
Secretary: open
Output: Report
Established Date: September, 2021
Expected Completion Date: January, 2026
Draft: -
Assignment: Establish a working group to publish a document on the use of disturbance recording for synchronous generators and critical associated auxiliary systems which will include: Digital Fault and Dynamic Disturbance Recorder basics, NERC disturbance monitoring and reporting requirements (PRC-002), detection of events and oscillations, and creation/handling of data files.

WG Report

The working group met on 09/13/2022 at 3:40 pm CDT with 12 people in attendance. 3 out of 5 voting members present, achieving quorum.

Proposed agenda and minutes from May meeting were reviewed and approved, moved by Derrick Hass and seconded by JC Theron. Participant behavior, patent, copyright, and WG assignment were reviewed with no comments.

William English delivered a presentation on his written contribution regarding NERC PRC-002-02 Disturbance Monitoring and Reporting Requirements, focusing on minimum recording specifications and placement for generation owners. The NERC requirements for recording sample rates and durations are currently low (960Hz for FR and 30Hz for DDR) and could increase as recent Major Event Analysis Reports published by NERC noted that higher resolution data is needed for proper analysis. The group discussed why additional triggering, such as negative sequence, is not included in the requirements. Different areas, such as Alberta, have more onerous recording requirements such as recording PMU data for high and low sides for one year. NERC MOD-026 and MOD-027 also includes PMU recording for verification of models and data for generator excitation, governor, and load control. H

subcommittee working groups are revising the COMTRADE and COMNAME standards referred to in PRC-002.

Sections of the C5 report on Considerations for Use of Disturbance Recorders relating to generation were reviewed and the group discussed including and expanding these points in the J24 report:

- Section 8 points out differences between transmission and generation requirements, additional turbine-generator-exciter measurements, and disturbance analysis.
- Section 12.2 covers system oscillations, often low frequencies in the range of 0.2 to 1Hz, cause, location of highest magnitude in a power system, natural frequencies in different areas, system conditions, damping.
- Section 12.4 is about loss of generation or load and the need for operations and planning to determine change in frequency, voltage, or power flow.

Derrick Hass will reach out to the Chair of J18 to determine if their work regarding effects of SSO due to IBR on rotating machinery protection and control could be of some relevance to the J24 report. J23 condition monitoring may also be of interest.

Cost of measuring additional signals was discussed and a suggestion made to investigate alternative technologies, possibly synchrophasors. The Vice Chair volunteered to start writing sections addressing generation measurements and oscillations. The Chair will continue to develop the structure of the report and add disturbance recording basics. When sections have been identified, volunteers will be invited to contribute to the report and guests were invited to become members or corresponding members.

WG files and resources uploaded to ShareFile folder (https://psrc.sharefile.com/home/shared/fo6be30c-453a-4e15-a84c-500b1c1cf436). Meeting adjourned, motioned by Derrick Haas and seconded by JC Theron.

Next meeting:
Single session with accommodations for 20 people is requested.
Please avoid conflicts with H46, H52, PSCC S15 and all J, particularly J21.

J25: <u>Report on Synchronous Condenser Protection</u>
Chair: Jason Eruneo
Vice Chair: Dale Finney
Secretary: open
Output: Report
Established Date: September 23, 2021
Status: 3rd WG Meeting, Nashville, TN Hybrid September 13, 2022
Expected Completion Date:
Draft: -

- **Assignment:** Develop a report for Synchronous Condenser Protection. This report will discuss all aspects related to the protection of synchronous condensers. This includes design, settings, and protection schemes for synchronous condensers. Specifically, identify functions that apply to a synchronous condenser and refer to IEEE C37.102 for functions that align with the synchronous generator guidance.

WG Report

WG met with 14 in-person attendees and 8 virtual attendees There were 8 voting members in attendance and a quorum was established. Zeeky motioned and Dale seconded to approve the May meeting minutes.

Gary K. discussed a conversation with Russ Patterson about the fault current response of a synchronous condenser. During a system fault event, the voltage of the machine will reduce, and the machine will output a high magnitude of fault current. This fault current is the result of the trapped flux within the windings. The fault current from a synchronous condenser is purely reactive in nature. We would expect the fault current response from a synchronous condenser to be similar to a synchronous generator.

- **Action Item: Gary K**. will write a short paragraph describing synchronous condenser fault current contributions
- **Action Item: Gary K**. will cleanup section 1 based on feedback from Sungsoo K.

The WG discussed sections of the report that need some support

- **Action Item: Sungsoo K** will provide a write-up for loss of field section
- **Action Item: Sungsoo K**. will provide a write-up for current unbalance section
- **Action Item: Dale F**. will provide a write-up for field ground protection section

The WG discusses the different types of synchronous condensers:

- A dedicated synchronous condenser
- A hybrid synchronous machine that can operate in condenser mode with the turbine decoupled
- A hydro machine that can operate as a synchronous condenser with their turbine still coupled

The WG must add this nuance into the report to accurately reflect and describe synchronous condensers.

The WG discussed whether a synchronous condenser needs out of step protection

- Gary K. had a discussion with a manufacturer (Siemens) that stated they do not implement this protection scheme on their machines. They do not believe an out of step event should occur
- Gary K. will perform a simulation to support the WGs decision that a synchronous condenser should not implement out of step protection
- **Action Item: Derek Haas** will look into the reason for utilizing out of step (78) protection for a synchronous motor
- Normann F. expressed at the J subcommittee that during a 3-phase fault that separates the machine from the system, once the fault is cleared it is possible for the condenser to go of synchronism with the system.

The WG discussed whether a synchronous condenser has a steady state stability limit (e.g. angular stability limit)

- Zeeky believes that the WG should keep the steady state stability limit section in the report.

- Gary K. believes that there may not be a steady state stability limit for a synchronous condenser
- Manish D. recommended the WG to reference C37.102 and the J5 report

The WG decided that inadvertent motoring is not needed on any of the synchronous condenser that is not coupled to a turbine. Gary expressed that TVA may implement this scheme and there may be another reason besides protection that it is implemented.

- **Action Item: Gary K**. will investigate TVA practices and report back to the WG

The WG decided that frequency protection is not needed on any of the synchronous condenser types

- Hydro machines can withstand greater frequency deviations than other synchronous generators and WG members expressed that they do not typically implement frequency protection on these machines.

Mike T. discussed flywheels and why a synchronous motor can go out of step. Drastic changes to the speed of the turbine can cause the motor to go out of step. However, a synchronous condenser does not have to worry about this phenomenon.

Next meeting:
Single session. With room for 30 and a projector. Request no conflict with J17, J20, J27.

J26: <u>Summary Paper - Modeling of Generator Controls for Coordinating Generator Relays</u>

Chair: Juan Gers
Vice Chair: Phil Tatro
Output: Summary Paper
Established Date: January 12, 2022
Status: 2nd WG Meeting September 24, 2022
Expected Completion Date:
Draft: -

Assignment: Write a summary paper of the J13 report, Modeling of Generator Controls for Coordinating Generator Relays.

WG Report

The working group met in one session with 5 members (3 in-person and 2 virtual) and 9 guests (7 in-person and 2 virtual). A quorum was achieved.

Minutes of the May 9, 2022 meeting were approved.

The group discussed the content of the paper and agreed the paper should be more than a summary of the report. The paper will provide expanded examples on how to apply the information in the report and will focus on relay settings that are affected by dynamic performance of generator controls. The examples will compare settings accounting for dynamic control performance versus static setting calculations to demonstrate why it is important to

account for control performance to mitigate the potential for over-protection or under-protection of the generator. The examples will include dynamic simulations using RTDS or other tools.

The group discussed whether the intended audience of protection engineers have the ability to perform dynamic simulations. The group concluded that it is important to demonstrate situations in which consideration of dynamic control performance is necessary regardless of whether the protection engineer can perform the simulations. Protection engineers can obtain assistance with simulations, but only if they understand the benefits.

The group discussed re-engaging liaisons with the Excitation Systems and Controls Subcommittee and the Power Systems Dynamic Performance Committee of the IEEE.

Phil Tatro will draft an introduction explaining the purpose of the paper and update the outline based on discussion at the meeting. Mike Basler and Juan Gers will search available information to work a real case that can be used in the paper.

Next meeting:
Single session with accommodations for 40 people and a computer projector is requested. Please avoid conflicts with J17.

J27: Summary Paper - Revision of C37.106, Guide for Abnormal Frequency Protection for Generating Units
Chair: Bracy Nesbit
Vice Chair: Jay Mearns
Output: Summary Paper
Established Date: May 11, 2022
Status: 1st Meeting September 13, 2022
Expected Completion Date:

Assignment: Write a summary paper of IEEE Standard PC37.106 Guide for Abnormal Frequency Protection for Power Generating Units.

WG Report

Attendance: 6 members and 5 guest attended. 9 people in-person and 2 people virtually

- WG discussed that attendees to designate on the sign-in roster or verbally if they want to be a member
- Reviewed Will English's contributions. Not comments at this point of the paper development.
- Existing assignments to for paper sections are still in progress

  Jason
  Scenarios that cause excessive V/Hz
  Describe the damage resultant from V/Hz

  Ritwik
  Show the minimum continuous capability limits from C57.12.00. Explain the associated voltage rating and voltage drop effects. How different manufacturers provide no-load vs full load etc.

  Jay

Abnormal Frequency Protection
- Protection Methods. Over/underfrequency, accumulator, torsional mode protection.
- Supervision
- Tripping Practices
- Load Shedding, Regional requirements, and Coordination Considerations

Raju
Annex A – Steam Turbine Generator

Derrick
Annex B – Hydraulic Turbine Generator

- Bracy quickly reviewed added text sections from the Guide and requested members to review and comment. New Assignments:
  Bracy
  V/Hz Reset
  Effect on Generator and capability
  Effect on Turbine and capability

  Doug
  V/Hz Supervision
  V/Hz Tripping Practices

  Derrick
  Voltage Transformer Capability Requirements

- Rob Messel commented on the V/Hz is off when in manual. The WG discussed how this may be emphasized without changing the paper
- The WG pointed out there will be no need for references since the Guide has all associated references
- The WG discussed we will review the progress at the January meeting to check the progress in order to be ready for an abstract or completed paper by early September.
- The initial plan is to be prepared to present paper at the Texas A&M Conference and later at Georgia Tech Conference.
- Derrick will research on the paper page requirements
- Assignments will be due the first week of December and reminders sent out in November.

Next meeting:
Single session. With room for 15 and a projector.

JTF28: Prepare J6, J14 Papers for Publication
Chair: Zeeky Bukhala
Vice Chair: Open
Established Date: May 11, 2022
Status: Did not meet
Expected Completion Date:

Assignment: Address potential copyright issues arising from the use of significant word-for-word sections of IEEE transactions papers on which the reports were developed. Appropriate citation and formatting of the word-for-word sections and figures will be added. Format both papers in PES format.

WG Report
Working Group did not meet at September PSRC.

Next meeting:
Single session. With room for 10 and a projector. Request no conflict with J21, J22.

Liaison Reports:

Electric Machinery Committee – M. Yalla – C50.12 working group is revising sections on stator and rotor thermal curves that impact our guides. Dr. Yalla has requested a copy of their draft for J Subcommittee review.

Industry Applications Society (IAS) / Industrial & Commercial Power Systems (I&CPS) - M Donolo - No report. Derrick Haas volunteered to be the liaison and provide future reports.

Nuclear 1E WG – Gary Kobet – 741 was just approved by SA in March 2022 and is now in mandatory editorial review. Open phase detection is mentioned in clause 4.0 and 5.1.2. There was some discussion of expanding this material in future revisions, either in an appendix/annex of 741, or creating a new IEEE Guide, or just have 741 refer to the IEEE PSRC K11 report.

Old Business:

None.

New Business:

Membership Updates – At his request, Dennis Tierney was removed from J Subcommittee membership as he has retired and will no longer be attending. Chris Ruckman, Luis Polanco, Michael Reichard and Sudhir Thakur are now non-voting members. New members Shane Haveron, Jason Buneo, Bracy Nesbit, Doug Weisz and JC Theron were all welcomed as new J Subcommittee members.

Adjournment:

Motion to adjourn was made by Jason Eruneo and seconded by Steve Conrad. Meeting was adjourned at 2:35 PM CDT.

K Substation Protection Subcommittee Meeting Notes – Adi Mulawarman

Scope: Evaluate and report on methods used in protective relaying of substations and the consumer or independent power producer, associated equipment and performance of these protective systems. Develop and maintain relaying standards that relate to this equipment and the utility-consumer interface.

Chair: Adi Mulawarman

Vice-Chair: Brandon Davies

- Met Wed September 14,- 2022
- Introductions
- Check for quorum (23 out of 31 members, need 16 for quorum)
- Approval of agenda (Ben Kazimier motioned, Jeff Barsch seconded, approved unanimously)
- Approval of previous meeting minutes (Hillmon Ladner motioned, Sebastian Billaut seconded, approved unanimously)
- Advisory Committee items of interest
    - Please submit Working Group Meeting Minutes by September 22.
    - 160 in person attendees and 317 total.
    - Over 20 first time attendees
    - Reminder to show participation slide at all meetings and patent and copyright slide on all PAR related Working Groups.
    - Completed working group work, please inform Cathy Dalton for publicity
    - Note to working group chair, if you have a hybrid meeting and are not able to attend in person, please ensure you have someone in person to set up the meeting.
    - NERC and IEEE PES are looking for support from multiple technical committees for upcoming joint effort to develop new document related to EMPT modeling of IBR. PSRC would like to be represented by 6-8 interested individuals with experience in this area. If you have interest, please reach out to Adi who will provide more information and get you in touch with PSRC leadership who will be selecting the final attendees.

- Published guide! (PAR)
    - Nothing to report since last meeting
- Completed summary paper/ppt/report
    - Nothing to since last meeting.
- WG near completion:
    - PAR-WG plan to be completed end of 2023.

possibly K26 (shunt reactor protection)

    - Presentation for Main Committee on the revision of Bus protection guide is tentatively on schedule for May 2023. (previously Jan 2023)
- Established WG's continuing work: (6 WG)
    - K12 – Static Shunt Compensators
    - K25 – Shunt Capacitors
    - K26 – Shunt Reactors
    - K27 – Utility-Consumer Interconnections
    - K29 – Reducing outage durations
    - K31 – Breaker Failure
    - (K10 disbanded 2022 Sept meeting)

K10 SCC21 Distributed Resources Standard Coordination
Chair: R. Benjamin Kazimier
Vice Chair: Wayne Stec
Secretary : Matt Garver
Established, 1999
Output: Standard through the SCC 21
Expected Completion Date: 20xx
Assignment: To interface with SCC21/P1547 in order to reduce unnecessary delays by getting PSRC input into the process without having to wait for after-the-fact coordination.

K10 met Wednesday from 8am to 9:05am in-person and by web meeting. There were 13 attendees present. Benjamin Kazimier chaired and presided over the meeting.
The following updates were given:

- IEEE Distributed Resources presentation from SC21
  - SCC21 is transitioning to a full Standards Committee, SC21
- IEEE 1547 revisions and addendums were covered.
  - 1547.10 is being started (Smart Network Gateway Project)
- IEEE P2030 is going slowly. Need to organize group structure to see through to completion as 2030 is slated to be done in 2 years.
- CTF49 update was given by K10 chair.
  - K10 to disband and reform under B Subcommittee.
- A presentation was made by Mark Siira SCC21 Chair: Whitepaper on Advanced Inverters
- Wayne Stec is stepping down from Vice Chair. Mat Garver will transition into the Vice Chair role when K10 is reformed under the B Subcommittee.
- Open discussion

K10 chairman made a motion for WG to be disbanded upon acceptance to the B SubComm. This motion was seconded by Don Lukach.
SA liaison – Don Lukach then made a motion at the main committee to create B11. That motion was approved anonymously.
There is no meeting scheduled for K10 at the JTCM and future meetings. Refer to B11 meeting for attending the new working group.

K12: PC37.431.20 IEEE Guide for Protecting Transmission Static Shunt Compensators
Chair: Satish Samineni
Vice Chair: Martin Best
Secretary: -
Output: Guide
Established Date: 2013
Expected Completion Date: 2021
Draft: 23
Assignment: To work jointly with Substations WG I9 to write a guide for protecting transmission static shunt compensators. PSRC WG K12 will provide guidance and review on topics that are already covered in other IEEE guides to prevent overlap and identify areas where interpretation of existing guides is necessary to meet the specific application challenges unique to transmissions static shunt compensators.

PSRC WG K12 did not meet, but the group did meet virtually with WG I9.

K22: C37.234, IEEE Guide for Protective Relay Applications to Power System Busses

Chair: Abu Bapary
Vice Chair: Alla Deronja
Secretary: Alla Deronja
Output: Guide for Protective Relay applications to Power System Busses
Established Date: January 2017
Expected Completion Date: December 2021 (Completed)
Draft: Final
Assignment: Revise and ballot IEEE Standard C37.234 prior to its expiration in 2019

Brief Summary:

Call to order

The IEEE patent and policy slides were presented. There were no responses or questions regarding the slides.

The meeting was attended by 7 voting members, 2 non-voting members and 8 guests.

Quorum was not achieved. Therefore, the May 2022 WG meeting minutes will be routed for an approval via email.

The guide revision was published by the IEEE-SA in February of 2022, and the WG is working on developing a Power Point presentation for the PSRCC Main Committee. The target is May 2023.

Technical topics:

1.) The WG reviewed the present draft of the presentation. A couple of assignments remain outstanding. The due date for the contributions is November 15, 2022.
Action Items:
- Ian Tualla will provide a slide for high-impedance bus protection method elevation in bus differential protection hierarchy.
- Abu Bapary (with Ratan Das' review) will provide a slide(s) for possible enhancements to centralized and decentralized bus protection systems.
- Alla Deronja will reach out to Ilia Voloh if he could provide material for a slide for fiber-optic CT application for bus protection.
- Jun Versosa will provide a slide(s) on new technologies considerations in bus protection (IEC-61850).

2.) The complete presentation draft will be sent to the WG members for review on December 1, 2022.

3.) The received WG comments will be reviewed at the JTCM 2023 meeting. The WG commits to make a presentation at the May 2023 PSRC meeting.

Recesses and time of final adjournment: 11:50 am 09/13/2022

Next meeting: We plan to have a meeting at the JTCM January 2023 meeting. Please avoid conflicts with C48, D47, K31, and I2.

K25: PC37.99 IEEE Guide for the Protection of Shunt Capacitor Banks

Chair: Meyer Kao
Vice Chair: Rick Gamble
Secretary: NA
Output: Guide
Established Date: January 2019
Expected Completion Date: 2023
Draft: 1.6
Assignment: Revise and Update C37.99, IEEE Guide for the Protection of Shunt Capacitors

Formalities:

- The WG met via a Virtual/Face-to-Face Meeting on 9/13/2022 from 3:40 to 4:50 PM CST.
- Officer presiding – Meyer Kao
- Officer recording minutes – Rick Gamble
- The meeting was called to order by the Chair
- Introductions were made
- The meeting was attended by 10 members (6 in person, 4 online) out of 22, and several guests. Quorum was not met. Minutes will be sent out via email for approval.
- The Chair reviewed the patent copyright slides

The current Chair, Meyer Kao, announced that he is stepping down. Rick Gamble, current Vice Chair/Secretary, will be Chair with Main Committee Officer approval. The PAR will need to be extended next year and myProject will need to be updated. New Vice Chair and Secretary roles will be announced.
The Chair discussed the simplified calculation examples provided by Bogdan Kasztenny's recently published paper, and how that fits in the guide. The appendix of Bogdan's paper could be directly added as an appendix to the guide if the WG desires. A one page introduction would be included in the body of the guide. The existing numerical charts will remain in the guide. This information would be supplementary. Discussion surrounding moving the existing tables to an appendix was had, but the WG is unclear on which direction this will go. Review of Bogdan's paper by the WG membership will move that conversation forward at a later meeting.
Russ Patterson provided an overview of his thesis paper on two-stage cap banks.
Melvin Joseph moves to adjourn, Rick Gamble seconds.

Assignments:

- Taylor Raffield to add information to Section 10 regarding references to sizing reactors. Pratap Mysore to review.
- Claire Patti and Rick Gamble to work on formatting and updating the tables in Section 8 and Table C.1 for consistency. Andrew Nguyen to work with Claire and Rick on working up Visio Diagrams with corresponding variables.
- Meyer Kao to work on adding numerical examples to the annex. Rick Gamble to review.
- Muhammad Hamid, Claire Patti and Russ Patterson to work on formatting tables after receiving updated template.
- Pratap Mysore, Dean Sorensen, Russ Patterson to get with Jeff Nelson to discuss unfused capacitor banks.

Next Meeting:

- The next meeting will be in January 2023. Single session, 25 participants, overhead projector. Avoid meeting conflict with D35, D42

K26: C37.109 IEEE Guide for the protection of Shunt Reactors

Chair: Kamal Garg
Vice Chair: Ilia Voloh
Output: Guide
Established Date: Aug 2019
Expected Completion Date: 2023
Draft: V 3.3.1, September 13, 2022
Assignment: Revise and update the C37.109 Guide

Meeting Notes:

1. Introduction and agenda (33 participants and 13 members). Reached quorum (Total 19 members). Minutes approved for June 23, 2022 web meeting. Motion by Rafael Garcia and second by Steve Conrad.
2. Kamal gave progress update on comments and comments resolution tracking. Comments in the draft also included from 6 non-voting members. Total approximately 400 comments are logged and recorded so far.
3. Kamal showed comments files and explained resolution. However, there are still some concerns on Draft from some members.
4. Ilia presented some changes in protection sections mainly on overcurrent and differential on EHV reactors.
5. CT saturation section and Xcel Energy reactor misoperation. Pratap and Ilia explained DC and CT saturation. Normann has some comments which Pratap and Normann discussed. Added in Annex F.
6. Qun presented on AEP shunt reactor misoperation on CT saturation and 87Q. Guide suggests 87Q should not be used, as it does not provide any benefit for reactor protection.
7. Charles Henville presented on Turn-to-Turn protection using directional overcurrent. Ilia discussed the section update on this. Dean has some comments on the order of this section. Dean comments addressed and Charlie is doing additional review on this section.
8. Dean has some additional comments on documents regarding cleanup, grammar, and additional technical clarifications. Some other members also expressed some concerns and proposed additional improvements. Ilia, Kamal, Pratap and Gary with work with Dean Miller, Ritwik and others to address the concerns, before going for Ballot.
9. Ritwik presented on fresh look on shunt reactors. Good interest in this topic. Ritwik is also helping K26 group with comments resolution. Thanks, Ritwik, for the help.
10. Inrush/energization will be discussed further in WG and I2 for approval. After further discussion, it was decided not to add this as new definition and only a note is added in Annex F. If any further correction is needed, will be discussed during next WG meeting.
11. Two definitions Neutral reactor (fourth-leg reactor) and Split-phase reactor are pending I2 approval since October 2021 (Submitted after WG approval). Ilia and Kamal working with Adi and I2 leadership to get this resolved. No new additional definition is being proposed by K26 except the two proposed in October 2021.
12. Additional meetings will be required to meet the ballot schedule for 2023.
13. Adjourn 4.52 CDT.

K27: C37.95 IEEE Guide for Protective Relaying of Utility-Consumer Interconnections
Chair: Paul Elkin
Vice Chair: Hillmon Ladner
Secretary: NA
Output: Guide
Established Date: January 2020
Expected Completion Date: December 2024
Draft: 1
Assignment: Review and update C37.95 IEEE Guide for Protective Relaying of Utility-Consumer Interconnections

10th WG Meeting

1. Welcome
2. Patent and Participant Behavior Slides
   - The patent slides were presented, and no one responded with a patent challenge.
   - Participant Behavior Slides were discussed with the WG.
3. Quorum
   - 11/21, Quorum Achieved
4. Approve Agenda
   - Motion – Steve Klecker, Second – Ted Warren, no opposition or discussion.
5. Approve Minutes from past meetings
   - Discuss Approval Status
   - All meeting minutes have been approved except the July 2022 meeting minutes. We will seek email approval by our next web meeting.
6. Follow up on Assignments Received
   - 4.3.11 - Dean Miller
     - WG agreed to add writeup.
     - Paul Elkin will add some additional discussion (see notes)
   - Section 7 – Gopal Gajjar
     - Pending: New Assignment from July Meeting on IBR for section 7
   - Section 8.4.3 Anti-Islanding Ted Warren and Juan Piñeros
     - WG agreed to add writeup. See notes.
   - Section 9 – Suggested addition by Juan Pineros
     - Will discuss next meeting.
7. Continue Guide Editing
8. Set online meeting date (will coordinate over email)
9. Motion to Adjourn
   - Motion – Steve Conrad, Second – Dean Miller, no opposition or discussion.

Notes:

- WG agreed on including write up in section 4.3.11 discussing considerations for transformers that are a source of ground currents. We will need to work on a few updates:
  - Remove “line section” from the figure and just name as T-Line 1 and T-Line 2 to avoid confusion. The reader may assume it is still the same line if we don’t. We might need minor text updates to support this change.
  - Grounding on customer side is determined by needs of the process in the consumer’s facility. We could possibly add a note to clarify the figure. The goal of the discussion is to show the high side is a source of ground current.

- We will add clarifying text stating the connections should be a discussion between the consumer and the utility serving. It can also include a clarification that a ring bus could be requested instead of a straight bus.
- Check with Jeff Barsch regarding a possible reference to the line guide.

- WG agreed on replacing the anti-islanding section (8.4.3) with the material provided for review.
  - The WG worked on the text to fix grammar
  - We will decide if we should keep the delta star section (out of scope?). And if we keep if we should change to grounded Y. Note to follow up on a typo in that section.
- The WG went back to Section 4.3.11 and made a quick addition to state transformer phase angle and "phasing" should be matched.

Requirements for next meeting:

- Room for 30 and a projector.

K29 WG: Write PES technical report based on K3 report entitled 'Reducing outage durations through improved protection and autorestoration in distribution substations'.

Chair: Sebastien Billaut
Vice Chair: Mohamed Zedeh
Secretary: Lalitha Devarakonda
Established: 2019
Output: Revised technical report to the K Subcommittee
Expected Completion Date: December 2023
Assignment: Create a PES technical report based on the K3 report entitled 'Reducing outage durations through improved protection and auto restoration in distribution substations'.

Meeting Notes

K29 met Wednesday, September 14th 2022 at 9:20 CT with total 14 attendees, 4 via Webex and 10 in person.

Chair, Sebastien Billaut presided over the meeting. He brought the meeting to order and showed the agenda. The Chair and K Subcommittee Vice Chair and Host of the session, recorded the minutes. The host moderated the Chat window.

With 6 voting members the Quorum was reached, and we were able to approve the sept 21, Jan 22 and May 22 minutes of meeting.

- 2 attendees requested to become members. (Don Ware and Sudarshan Byreddy)

We reviewed the assignments for review of the existing document.

- Hillmon agreed to review the existing report with a focus on section 6.
- Don Ware agreed to lead Section 3 of the existing subjects.
- Hillmon agreed to follow up on section 12 of the new topics.

Don Ware discussed the importance of commissioning and in-service reading to substation reliability. As well as the physical security of the station.

The meeting adjourned 1st Don Ware, and 2nd Hillmon Ladner-Garcia.

For the next meeting, we will need a projector and a room for 20. Avoid conflict with D35, D38, D30, D42, D44, K22, K27, C44, H45

K31 : Revision to C37.119 IEEE Guide for Breaker Failure Protection of Power Circuit Breakers.

Chair : Vahid Madani
Vice Chair : Brandon Davies
Established: 2022
Output: Guide
Expected Completion Date: 2026
Assignment: Revise C37.119-2016, IEEE Guide for Breaker Failure Protection of Power Circuit Breakers
Draft: 0.1

Summary:

Call to order, Chair's remarks.
The WG met with 32 attendees (17 virtual and 15 in person). Eight (8) of 19 working group members were in attendance and quorum was not met. Meeting minutes will be distributed for approval via email.
Agenda was presented and reviewed - No updates or suggestions were made to the agenda
Patent Slides were presented, no patents were identified
Copyright and Attendee Ethics slides were presented reviewed
PAR Purpose and Scope were reviewed
Approval of July web meeting minutes was completed via email
Three members have shown interest to participate and volunteer for contributing.
Request to avoid conflict with C26 and C50

Details:

Chair mentioned that there will be a vacancy for our WG secretary. Chair thanked JAson Eruneo for his support to get the WG started and setting up the iMeet. As attendees may have noticed, we as members of IEEE SA are getting more and more SA requirements to keep track of our work, and follow a certain process. The operation manual provides some of these tasks. Jason is Chair of two WGs in PSRC, and will have a lot of work associated with those. Also, K31 WG efforts are starting to take off thanks to Jason's initial efforts.
Chair mentioned the secretary position is a good learning opportunity for newer PSRC members. The position has some expectation related to managing process like keeping iMeet Central current timely amongst other tasks. In case any of the WG members is interested, please let the Chair know.
Outstanding work assignments were discussed. The group discussed that section 10 and the Bibliography that still need reviewers.
Adi Mulawarman and Gene Henneberg reviewed their contribution to section 6.16 related to BF scheme for SIPS schemes.
The group reviewed All Deronja's contribution on Breaker Failure considerations for Breaker Low SF6. The group discussed options and practices that WG is aware of. The option actions include immediate Trip on low-low SF6 trip level including, block trip, or to allow BF scheme to operate normally following a trip/BFI condition and bypassing breaker failure timer to allow immediate trip following a trip/BFI condition. Some

additional edits and clarifications to the section were suggested. Chair will coordinate with All.
Kamal Garg reviewed his contribution related to alternate methods of sensing BF conditions and the use of non-current based BF fault detectors used for applications related to IBR sites. The group discussed adding an additional BF application example as Annex B. An assignment is made to develop this section, Theresa Bowie has volunteered to work with Adi and Kamal.
The group discussed addition of a new section related to breaker failure on applications with Zone Boundary CTs location on only one side of the breaker, for example in live tank breaker designs with freestanding CT's or switchgear with CTs on Cables. This topic is not currently discussed in the existing guide, but issues related to Zone Boundary CTs are mentioned in the bus protection guide. The group will review and discuss in more detail on future meetings.
A brief discussion about next web meeting and assignments that are due.
Motion to Adjourn Brandon Davies, seconded by Adi Mulawarman.

New Assignments:

- Review and Update Section 10 – Adi Mulawarman and Alexis Mezco
- Develop new IFR application example in Annex B providing examples of alternate sensing methods for IBR applications - Adi Mulawarman, Kamal Garg, Theresa Bowie

Working group requests all review assignments completed and submitted by November 10, 2022 to allow discussion in January meeting.

Liaison Reports:

T&D Committee, Capacitor Subcommittee, **Pratap Mysore,**
http://grouper.ieee.org/groups/td/cap/

- Pratap was not in attendance, no report was given.

Old Business

None

New Business

Ben Kazimier motioned to disband K10 contingent upon acceptance of formation of a new working group for liaison with 1547 within the B Subcommittee. Don L. seconded. The subcommittee discussed the intent and scope of this proposed new working group. The motion carried unanimously.

The chair of K25, Meyer Kao has reached out to the K subcommittee about stepping down as chair of K25. K leadership has identified a proposed new chair and is working with the PSRC officers on approval of the proposed candidate.

Items of General Interest

Sebastian Billaut discusses work he is doing related to high penetration of IBR to transformer inrush. He may potentially present his findings at a future K SC Meeting.

Adjourn

Hillmon Ladner-Garcia motion to adjourn; Kamal Garg seconded.