POWER SYSTEM RELAYING AND CONTROL COMMITTEE
OF THE IEEE POWER AND ENERGY SOCIETY
MINUTES OF THE MEETING
January 11-14, 2021, WebEx Virtual Meeting, Rev. 1

I. Call to order / Introductions: Murty Yalla

Chair Murty Yalla, called the meeting to order at 1:10 pm on Thursday, January 14, 2021.

Due to the meeting being virtual via WebEx, the tradition of all attendees introducing themselves was skipped. Similarly, the tradition of having all first time attendees reintroduce themselves was also skipped. A quorum check was conducted, and it was verified that quorum was met. Attendance was recorded via a WebEx report. Attending this Main Committee meeting were 101 voting members (of 133 Main Committee voting members), 1 non-voting member, and 149 guests for a total attendance of 251.

II. Sponsors

Because this meeting was conducted as a virtual meeting, there were no sponsors for coffee breaks.

III. Approval of Minutes / Financial Report: Michael Thompson

A motion to approve the minutes of the September virtual meeting of the PSRC Committee was made and seconded. The motion was approved unanimously.

The PSRC committee financial status is fine. Attendance was good for the September virtual meeting and expenses were low.

IV. Chairman's Report: Murty Yalla

We had 439 participants for our January 2021 virtual (online) meeting, including 64 first time attendees.

Attendees came from the following 22 countries:
Austria, Belgium, Canada, Chile, China, Columbia, France, Germany, India, Italy, Japan, Netherlands, New Zealand, Philippines, Portugal, Saudi Arabia, South Korea, Spain, Switzerland, UAE, UK, and USA

V. Reports of Interest

A. Technical Paper Coordinator's Report: Murty Yalla

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

IEEE PES General Meeting 2021 (July 25-29, 2021) – Due to COVID Virtual meeting

The conference theme is: Managing Energy Business During a Pandemic

- Total 24 papers received. 12 papers accepted.
- PSRC Committee sponsored 2 panel sessions.
  - Protection challenges with high penetration of Inverter Based Resources (IBRs) – Part I: Transmission System
  - Protection challenges with high penetration of Inverter Based Resources (IBRs) – Part I: Distribution System
- For more information, visit www.pes-gm/2021

B. Future Meetings: Murty Yalla

- May 2021 Meeting; Virtual; May 3-6, 2021.
- September 2021 Meeting; TBD; September 20–23, 2021
- January 2022 Meeting; Garden Grove, CA; January 9-12, 2022.
- May 2022 Meeting, Reno, NV; May 9-12, 2022.

Details are posted on the PSRC website.

C. CIGRE B5 Activities Report: Rich Hunt

New Working Groups

The two newest working groups are:

- B5.73 Experiences and Trends related to Protection Automation and Control Systems Functional Integration
- B5.74 Busbar Protection Considerations When Using IEC 61850 Process Bus

New Publications

Technical Brochure 819 IEC 61850 based substation automation systems – Users expectations and stakeholders interactions. Available on e-cigre. Free download for CIGRE members.

2021 CIGRE Centennial Session, Paris, France, August 2021

The CIGRE 2021 Centennial Session is to be held in Paris from 21 to 25 August 2021.

The Centennial Session will use the same format as the normal General Session, and will use all the technical papers originally submitted for the 2020 General Session.

The Preferential Subjects for this session were:

- PS 1 Human Aspects In Protection, Automation And Control Systems (PACS)
- PS 2 Communications Networks In Protection, Automation And Control Systems (PACS): Experience And Challenges

There are 2 papers in B5 from US authors.

2022 CIGRE General Session

The preferential subjects for the 2022 CIGRE General Session will be:

- PS1: ADDRESSING PROTECTION RELATED CHALLENGES IN NETWORKS WITH LOW-INERTIA AND LOW FAULT-CURRENT LEVELS
    - Asset protection challenges and system protection challenges
    - Protection schemes: Best practices, role of grid codes and impact of inverter characteristics and specifications
    - New asset protection principles, advancements in inverter technologies, system monitoring and state estimation for aiding asset and system protection
- PS2: APPLICATIONS OF EMERGING TECHNOLOGY FOR PROTECTION, AUTOMATION AND CONTROL
    - Virtualization; digital twins, Protection Automation and Control functions independent of hardware, centralized protection systems
    - New protection principles and monitoring principles for AC and DC grids including use of new sensors and better use of today's sensors and process interfaces
- PS 3: Integration of Intelligence on Substations (Common PS with B3)
    - Data analytics, remote supervising & monitoring and autonomy application
    - IoT and Machine learning applications based on Protection Automation and Control data including asset management, monitoring and data analysis
    - Expectations and benefits from digital substation and IEC 61850 principles and applications to substations

2021 CIGRE Grid of the Future Conference, Providence, RI.

The 2020 CIGRE Grid of the Future Conference, scheduled to be held in October, is postponed until October 17-20, 2021, and will be held in Providence, RI. The GOTF presents papers over 5 CIGRE Study Committees, and includes a NGN (next generation engineer) paper contest.

For complete details on the CIGRE Grid of the Future, visit the website at https://cigre-usnc.org/grid-of-the-future/.

For more information on CIGRE B5 activities, please contact me directly. CIGRE membership is by country, so if you live outside the U.S., I can put you in touch with the Regular Member for your country.

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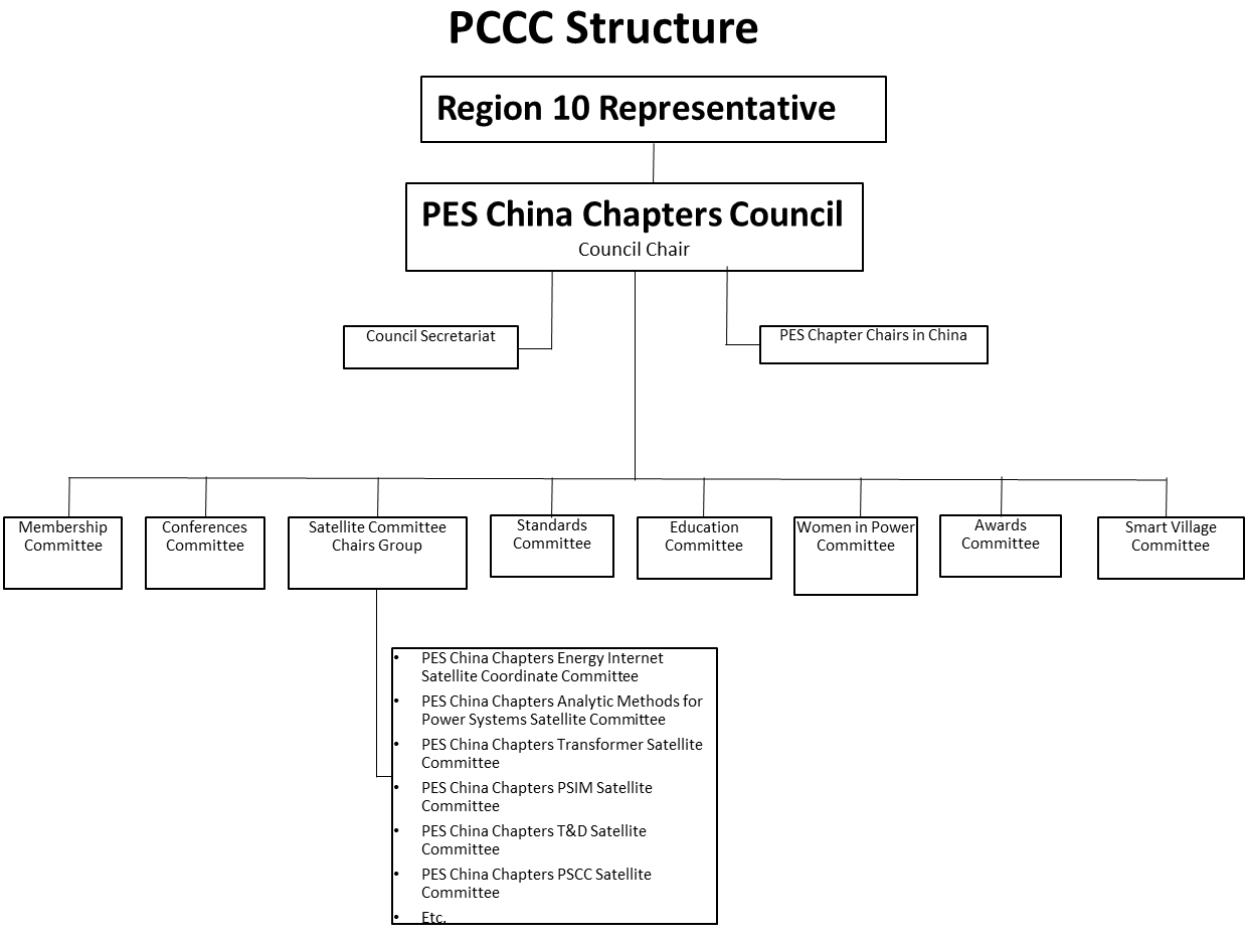
IEEE PES Report: Vijay Vittal

Motions Passed by Governing Board

- The IEEE PES Governing Board to request that the IEEE SA Board of Governors change the designation of an entity standard to be different from the designation of an individual standard and include a preamble describing the entity standard.
- This motion was passed unanimously by the IEEE PES Governing Board

IEEE PES China Chapters Council Satellite Committees

- Based on discussion at the Technical Committee retreat and the subsequent discussion with a few technical committees that wanted clarification on the mode of interaction and appropriate designation of these satellite committees, these satellite committees will be referred to as IEEE PES China Chapters Council Satellite Committees
- The interaction will be through liaisons appointed to each committee, subcommittee, working group, and task force



D. IEC Report: Eric Udren

TC 95, Measuring Relays and Protection Systems

- IEC TC 95 creates IEC 60255 series protection system standards – electrical and physical environment type testing, design, safety, and functional behavior. Technical work is carried

out by Maintenance Teams (MTs) and by Working Groups led by Convenors. Dr. Murty Yalla of PSRC is Chair of TC 95 and Secretary is Thierry Bardou of France. There are 22 participating member nations.

The Technical Advisory Group (TAG) to the US National Committee (USNC) of IEC for TC 95 meets as a part of PSRC WG I4, *International Standards Development*, creating US comments and votes on TC 95 standards drafts and process documents at each stage of international development. Eric Udren is the Technical Advisor (TA) to the USNC for TC 95. Deputy Technical Advisor (DTA) is Normann Fischer. The TC 95 TAG Administrator is Pacific Northwest National Laboratory (PNNL), under the US Department of Energy. The TAG Secretary is Jeff Dagle of PNNL. Eric has reported on the trend of growing collaboration between PSRC and IEC TC 95 – visible in coordinating working groups and joint developments.

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* – US commented on new CD 12/20.
- 60255-27 Ed 3 - *Safety requirements* – US commented on new CD 12/20.
- 60255-26 Ed 4 - *EMC requirements* – new CD or CDV expected soon.

Functional standards:

- 60255-187-1 – *Functional standard for motor, generator, xfmr percentage differential relays* – CDV going to FDIS.
- 60255-187-2 – *Functional standard for busbar differential relays* – early.
- 60255-187-3 – *Functional standard for line differential relays* – advanced work headed for CD with PSRC inputs.
- 60255-216-1 – *Requirements for relays with digital I/O* (e.g. MUs) – Draft in circulation. TC 95 proposes bringing PSRC H47 into JWG.
- New JWGs planned for HVDC protection and traveling wave prot/FL.

Plenary Meeting, Nov 5-6, 2020

- Virtual meeting – 16 nations; US delegation of 4.
- Strategic business plan update with US contributions
- US helped define new TC 95 Scope proposal:
    - Standardization of measuring relays, protection equipment and protection functions embedded in any equipment or systems used in various fields of electrical engineering covered by IEC, including combinations of devices and functions which form schemes for power system protection. TC95 scope includes control, monitoring, and process interface related functions and equipment used with protection systems (such as automatic reclosing, fault location, teleprotection or process data interfaces, and fault recording); as well as protection and protection related functions of distributed energy resources (DER) or inverter based resources (IBR).
    - The concepts and definitions described in the standards developed by TC95 are intended for all power system protection engineers, dealing with the various activities related to protection functions and protection relays. These include specification of functional and product design requirements and design qualification type tests. These

requirements and type tests can be used with interpretation for FAT (Factory Acceptance Tests), SAT (Site Acceptance Tests), commissioning and maintenance tests.
    - Excluded from TC 95 scope are the following: All devices covered by standards within the scope of other IEC Technical Committees, for example instrument transformers.
- JWGs with other TCs for TW prot/fault location and for HVDC protection.
- JWGs with PSRC for 216-1 relays with digital I/O [H47] and for revision of C37.111/60255-24 COMTRADE [H TBD].
- COMTRADE approach now like that for just-published single international Synchrophasor Standard 60255-118-1 (dual logo)

TC 95-PSRC Standards Collaboration

- New TC 95 *functional* standards help developers create & demonstrate relays that reliably meet application needs.
  Substantial US contributions to international writing teams.
  PSRC WGs formed to specifically contribute to selected projects.
- Revisions to TC 95 *product design and type testing* standards improve robustness and safety of products.
  Substantial US contributions and comments to international writing teams.

PSRC is aligning IEEE standards with IEC methods to achieve a single test setup/procedure and a single test (most cases) to meet IEC and IEEE requirements – *reduce effort and cost for manufacturers as we get better products.*

- *IEEE PSRC and IEC TC 95 are collaborating more than ever to bring the best relays and applications internationally.*

E. Standards Coordinators Report: Don Lukach

- Big thank you to SC and WG Chairs for processing PARs last few months! You did outstanding! All PARS that were to expire in 2020 are accounted for.
- Next NesCom/ RevCom submittal deadline is Feb 12
- P&Ps are under review and expect more guidance on their application in the next few months.
- Summary information on our PARs can be found in the Main Committee Minutes and in IEEE SA myProject.

This report summarizes the status of PAR related projects as of the January 2021 meeting.

A virtual Standard's Coordinator meeting was not held in January. Rather, all PARs that needed actions were individually addressed before and during the PSRC meeting week.

Main Committee PAR Submissions:

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

Published PAR projects since September 2020:

None

Projects currently in Balloting

Project Number	Project Title	Project Status
PC37.91	Guide for Protecting Power Transformers	SA Ballot: Comment Resolution
PC37.235	Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes	SA Ballot: Recirculation Review
PC37.110	Guide for the Application of Current Transformers Used for Protective Relaying Purposes	SA Ballot: Comment Resolution
PC37.242	Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control	SA Ballot: Recirculation Review
PC37.233	Guide for Power System Protection Testing	SA Ballot: Invitation Review
PC37.234	Guide for Protective Relay Applications to Power System Buses	SA Ballot: Invitation
PC37.120	Protection System Redundancy for Power System Reliability	SA Ballot: Invitation
PC37.92	Standard for Analog Inputs to Protective Relays From Electronic Voltage and Current Transducers	SA Ballot: Comment Resolution

PAR Expiration dates and their Status:

Project Number	Project Title	Expiration PAR Date	Project Status
P1646	Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation	31 Dec 2021	Draft Development
PC37.101	Guide for Generator Ground Protection	31 Dec 2021	Draft Development
PC37.102	Guide for AC Generator Protection	31 Dec 2021	Draft Development
PC37.110	Guide for the Application of Current Transformers Used for Protective Relaying Purposes	31 Dec 2021	SA Ballot: Comment Resolution
PC37.120	Protection System Redundancy for Power System Reliability	31 Dec 2021	SA Ballot: Invitation
PC37.233	Guide for Power System Protection Testing	31 Dec 2021	SA Ballot: Invitation Review

PC37.234	Guide for Protective Relay Applications to Power System Buses	31 Dec 2021	SA Ballot: Invitation
PC37.235	Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes	31 Dec 2021	SA Ballot: Recirculation Review
PC37.242	Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control	31 Dec 2021	SA Ballot: Recirculation Review
PC37.249	Guide for Categorizing Security Needs for Protection and Automation Related Data Files	31 Dec 2021	Draft Development
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 2021	Draft Development
PC37.91	Guide for Protecting Power Transformers	31 Dec 2021	SA Ballot: Comment Resolution
P1613	Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus	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	Draft Development
PC37.1.2	Guide for Databases Used in Utility Automation Systems	31 Dec 2022	Draft Development
PC37.104	Guide for Automatic Reclosing on AC Distribution and Transmission Lines	31 Dec 2022	Draft Development
PC37.106	Guide for Abnormal Frequency Protection for Power Generating Plants	31 Dec 2022	Draft Development
PC37.2	Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations	31 Dec 2022	Draft Development
PC37.251	Standard for Common Protection and Control Settings or Configuration Data Format (COMSET)	31 Dec 2022	Draft Development
PC37.300	Guide for Centralized Protection and Control (CPC) Systems within a Substation	31 Dec 2022	Draft Development
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
PC37.92	Standard for Analog Inputs to Protective Relays From Electronic Voltage and Current Transducers	31 Dec 2022	SA Ballot: Comment Resolution

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
PC37.252	Guide for Testing Automatic Voltage Control Systems in Regional Power Grids	31 Dec 2023	Draft Development
PC37.99	Guide for the Protection of Shunt Capacitor Banks	31 Dec 2023	Draft Development
PC37.113	Guide for Protective Relay Applications to Transmission Lines	31 Dec 2024	Draft Development
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
PC37.90.3	Standard Electrostatic Discharge Tests for Protective Relays	31 Dec 2024	Draft Development
PC37.95	Guide for Protective Relaying of Utility-Consumer Interconnections	31 Dec 2024	Draft Development

All PSRC PAR-Related Projects:

Project Number	Project Title	Project Status
PC37.1.2	Guide for Databases Used in Utility Automation Systems	Draft Development
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	Draft Development
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
P1613	Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus	Draft Development
PC37.90.3	Standard Electrostatic Discharge Tests for Protective Relays	Draft Development
PC37.114	Guide for Determining Fault Location on AC Transmission and Distribution Lines	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	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
C37.108	Guide for the Protection of Network Transformers	Completed
C37.106	Guide for Abnormal Frequency Protection for Power Generating Plants	Completed
C37.90.3	Standard for Electrostatic Discharge Tests for Protective Relays	Completed
C37.110	Guide for the Application of Current Transformers used for Protective Relaying Purpose	Completed
C37.109	Guide for the Protection of Shunt Reactors	Completed
C37.101	Guide for Generator Ground Protection	Completed
C37.102	Guide for AC Generator Protection	Completed
C37.90.2	Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers	Completed
C37.90	Standard for Relays and Relay Systems Associated with Electric Power Apparatus	Completed
C37.231	Recommended Practice for Microprocessor-based Protection Equipment Firmware Control	Completed
1646	Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation	Completed
C37.92	Standard for Analog Inputs to Protective Relays From Electronic Voltage and Current Transducers	Completed
C37.111	Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems	Completed
C37.233	Guide For Power System Protection Testing	Completed
C37.234	Guide for Protective Relay Applications to Power System Buses	Completed
C37.235	Guide for the Application of Rogowski Coils used for Protective Relaying Purposes	Completed
C37.99	Guide for the Protection of Shunt Capacitor Banks	Completed
C37.101-2006/Cor 1	Guide for Generator Ground Protection - Corrigendum 1: Annex A.2 Phasor Analysis (Informative)	Completed
C37.96	Guide for AC Motor Protection	Completed

C37.2	Standard Electrical Power System Device Function Numbers, Acronyms and Contact Designations	Completed
C37.91	Guide for Protecting Power Transformers	Completed
C37.90.1	Standard Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus	Completed
C37.110-2007/Cor 1	IEEE Guide for the Application of Current Transformers Used for Protective Relaying Purposes - Corrigendum 1: Corrections to Equation 18 and Equation 19	Completed
1613	Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Electric Power Substations	Completed
C37.104	Guide for Automatic Reclosing of Circuit Breakers for AC Distribution and Transmission Lines	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
1613a	IEEE Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Electric Power Substations Amendment: Adding of one definition, DC power supply requirements (5.1), and Annex E- History	Completed
C37.242	Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMU) for Power System Protection and Control	Completed
C37.243	Guide for Application of Digital Line Current Differential Relays Using Digital Communication	Completed
C37.239	Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems	Completed
C37.114	Guide for Determining Fault Location on AC Transmission and Distribution Lines	Completed
C37.232	Standard for Common Format for Naming Time Sequence Data Files (COMNAME)	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	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	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
PC37.91	Guide for Protecting Power Transformers	SA Ballot: Comment Resolution
C37.250	Guide for Engineering, Implementation, and Management of System Integrity Protection Schemes	Completed
PC37.249	Guide for Categorizing Security Needs for Protection and Automation Related Data Files	Draft Development
PC37.2	Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations	Draft Development
PC37.235	Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes	SA Ballot: Recirculation Review
PC37.110	Guide for the Application of Current Transformers Used for Protective Relaying Purposes	SA Ballot: Comment Resolution
C37.248	Guide for Common Format for Naming Intelligent Electronic Devices (COMDEV)	Completed
PC37.242	Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control	SA Ballot: Recirculation Review
PC37.108	Guide for the Protection of Secondary Network Systems	RevCom Agenda (26 Jan 2021)

PC37.233	Guide for Power System Protection Testing	SA Ballot: Invitation Review
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
PC37.234	Guide for Protective Relay Applications to Power System Buses	SA Ballot: Invitation
PC37.102	Guide for AC Generator Protection	Draft Development
P1646	Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation	Draft Development
PC37.120	Protection System Redundancy for Power System Reliability	SA Ballot: Invitation
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
PC37.104	Guide for Automatic Reclosing on AC Distribution and Transmission Lines	Draft Development
PC37.106	Guide for Abnormal Frequency Protection for Power Generating Plants	Draft Development
P2030.12	Guide for the Design of Microgrid Protection Systems	Draft Development
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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

F. PSCC Committee Report: Mark Benou, Secretary PSCCC

- January virtual event – 26 sub-groups, 3 subcommittees. Great participation with many new voices in our meetings!

- C0's WG for C93.5, Standard for PLC Transmitters/Receivers, has been successfully balloted and it has been submitted to RevCom.
- P0 will make motion to MC to Revise IEEE/IEC Dual Logo Standard IEC/IEEE 61850-9-3 Edition 1: Communication networks and systems for power utility automation – Part 9-3: Precision time protocol profile for power utility automation
- P13 has become a TF and will write a technical report, A Beginners Guide to IEC-61850
- F0 is to ballot IEEE 1138 Standard for Testing and Performance for Optical Ground Wire (OPGW) for Use on Electric Utility Power Lines in Q1 or Q2
- S0's WG, S1, Revision of IEEE 1686 IED Cyber Security Capabilities is finalizing remaining WG comments and is preparing for the ballot phase.
- S6: IoT for connected home - Communication and cybersecurity requirements, completed the IoT report and S0 subcommittee has approved the report for publishing.

G. P2800 Report: Manish Patel

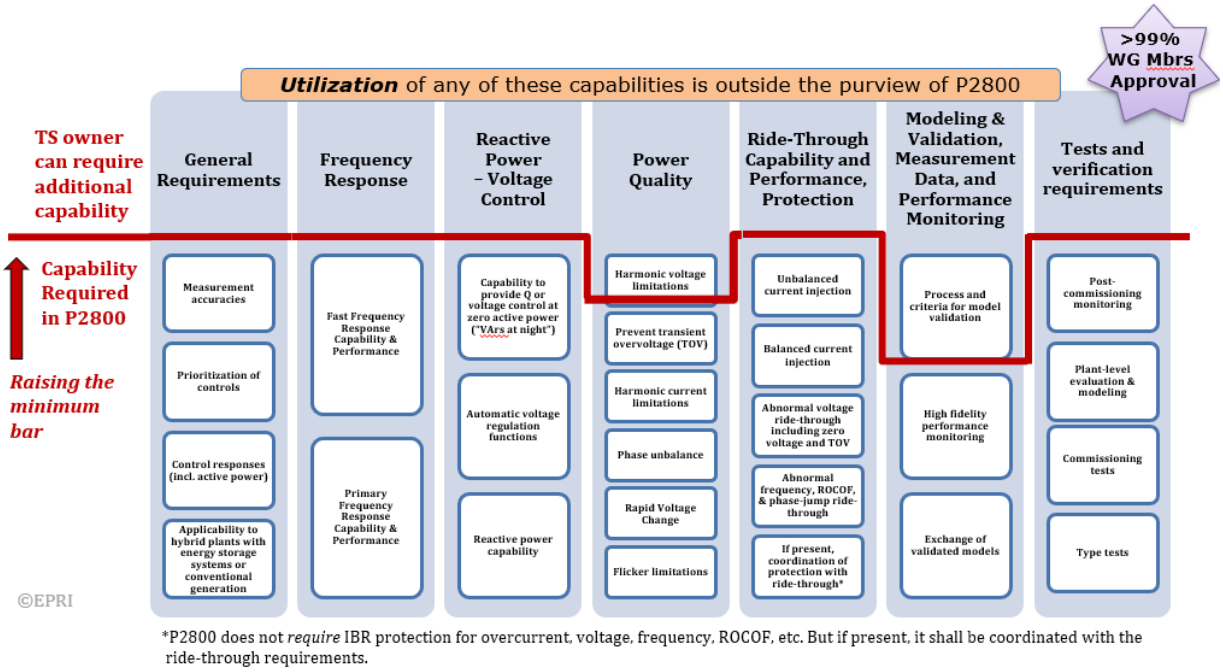
IEEE P2800: Interconnection Requirements for BPS-Connected Inverter-Based Resources

Please visit the public website at https://sagroups.ieee.org/2800/ for the latest on future meetings, timeline and milestones.

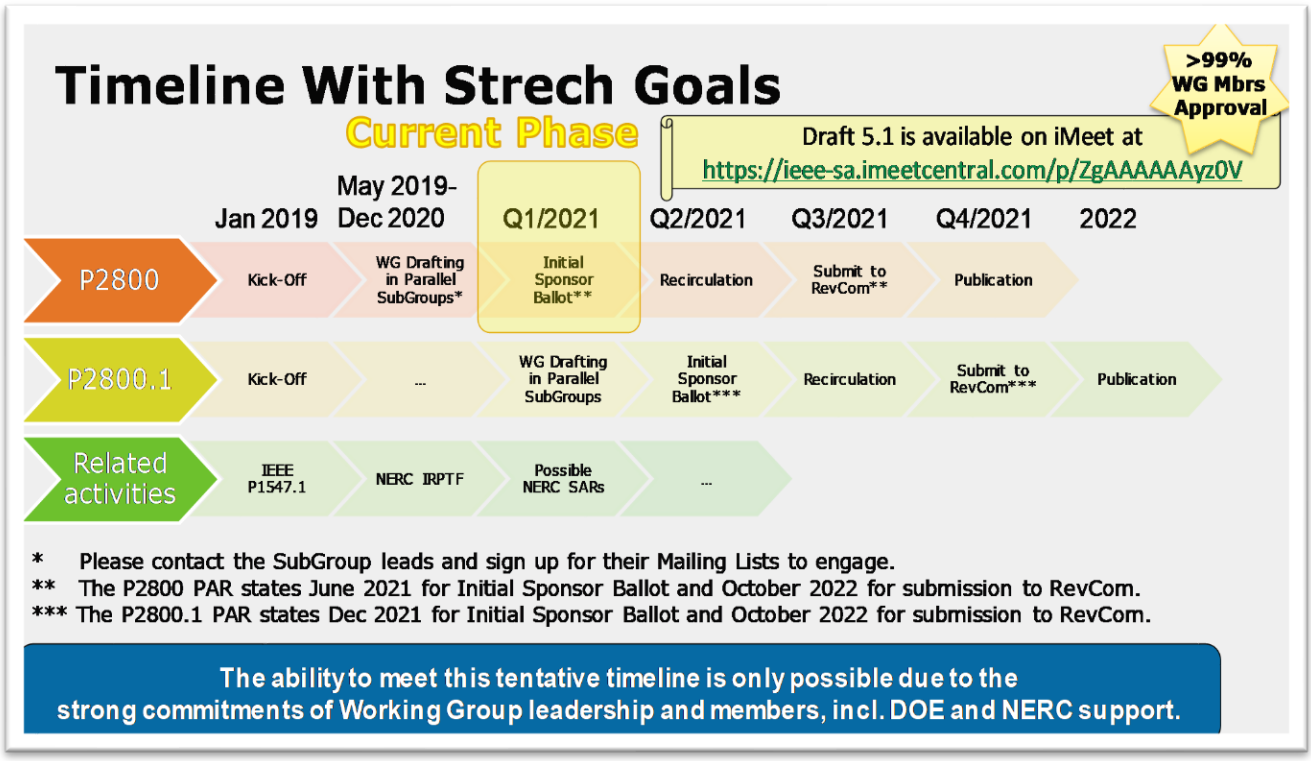
What to expect from IEEE P2800

- **Value**
  widely-accepted, unified **technical minimum requirements** for IBR simplification and expedition of technical interconnection negotiations
- **Specifications** for performance and functional capabilities functional default settings and ranges of allowable settings measurement data for performance monitoring and model validation required type and commissioning tests, and other verifications means
  - but not their detailed procedures (➔ IEEE P2800.1)
- **Applicable to** BPS-connected, large-scale wind, solar, energy storage and HVDC-VSC

IEEE P2800 Technical Minimum Capability Requirements – Draft 5.1



*P2800 does not *require* IBR protection for overcurrent, voltage, frequency, ROCOF, etc. But if present, it shall be coordinated with the ride-through requirements.



Next Deliverables, Milestones and Meetings

Deliverable	Important Dates

Milestone: Voting WG Members vote on Draft 5.1 to go to SA ballot	Dec 14, 2020 (Draft 5.1 Posted) • SG Redlines + resolved comments	Jan 6, 2020 (WG Voting Closes) • Voting WG Members update votes & comments • Approved with >99% to move into SA ballot
Sponsor Approve WG Draft 5.1	January 2021* • Jan 11-22, 2020: ED&PG Wind and Solar Subcommittee electronic vote • Jan 11-14, 2020: IEEE JTCM – coordinate with joint sponsors • ~Jan 25, 2020: ED&PG AdCom	
Mandatory Editorial Coordination (MEC)	February 1, 2021* (30 days), start the MEC process	
Ballot Group Formation	February 1, 2021* (30 days), release call to join ballot group	
Comment Resolution Group (CRG) Formation	February 1, 2021* (30 days), release call to join CRG	
Stakeholder Webinars	February 2021* Webinars for national and international stakeholders • Objective is to raise awareness for the open ballot group formation • Review i) purpose and scope of standard and ii) key draft requirements • Provide step-by-step instructions for how to join the ballot group (possibly live demo) Three joint webinars: • #1 Joint NERC-NATF-NAGF-EPRI Webinar for Transmission Planners • #2 Joint IEEE-ESIG-PSERC-CURENT Webinar for Subject Matter Experts & Academia • #3 Joint SEIA-AWEA Webinar for OEMs & Developers	
Milestone: SA Initial Ballot + Public Review	March 1, 2021* (30 days for SA ballot, WG/CRG resolves comments, 60 days for public review)	
Recirculation 1	June 2021* (10 days + comment resolution)	
Recirculation 2	July 2021* (10 days + comment resolution)	
Recirculation n-th	Aug 2021* (10 days + comment resolution)	
Milestone: Submission to RevCom	Aug 13 / Sep 10 / Oct 18, 2021*	
Milestone: Publication	December 2021*	

H. NERC Report: Rich Bauer

Two new NERC draft Reliability Guidelines have been recently posted

- Model Verification of Aggregate DER Models used in Planning Studies, posted for comment

October 15

- Performance, Modeling, and Simulations of BPS-Connected Battery Energy Storage Systems and Hybrid Power Plants, posted for 45 day comment period December 15

Several SARs are proposed that would modify existing standards

Standard Drafting Teams (SDTs) have been formed and are working on a number of Standard Authorization Requests (SARs)

- PRC-005
  - Maintenance requirements for protection functions in AVR control systems
- MOD-032 – update: the Standards Committee has rejected this SAR
  - Inclusion of DER data in model requirements
  - Include Distribution Provider as an applicable entity
- Transmission Connected Dynamic Reactive Resources
  - Include synchronous condensers, SVCs and STATCOMs in the MOD-025, MOD-026, MOD-027, PRC-019 and PRC-024 Standards

The NERC System Protection and Control Subcommittee (SPCS) has submitted two SARs. The Standards Committee is scheduled to consider these SARs 1/20/2021. The SARs are;

- PRC-019
  - Specify Requirements Inverter-Based Resources
  - Determine if Steady State Stability Limit should be a part of the required coordination
- PRC-023
  - Remove OOSB Requirement R2- the language in the requirement is misleading and appears to require OOSB to be set inside the tripping element, which defeats out of step blocking. SPCS recommends removing the requirement.

The Inverter-Based Resource Performance Task Force **Is working on an EMT Guideline report**

Two important Lessons Learned have been published

- LL20201101 – Cold Weather Operation of SF6 Circuit Breakers
- LL202001001 Single Phase Fault Precipitates Loss of Generation and Load

VI. B: Advisory Subcommittee Reports

Chair: Murty Yalla
Vice Chair: Michael Thompson

- **Update on Entity Standards Development**
  IEEE PES Governing Board is looking at a proposal to differentiate between regular standards and entity standards with a preamble at the beginning of the standard.
- **Update on the PSRC China Chapter**
  We will be having liaison relationship instead of forming a separate committee

Roy Moxley

We were all saddened to learn that **Roy Moxley** passed away in December due to complications of Covid-19. Roy had a nearly 40 Yr. career contributing to the electric power system industry up to his retirement in 2018. He served the PSRC committee for many years.

The IEEE PSRC Committee conveys our sincere condolences to Beth and rest of the family.

A. B1: Awards and Technical Paper Recognition Working Group

Chair: Hugo Monterrubio
Vice Chair: Mal Swanson

We will not be issuing or announcing PSRC awards during virtual meetings including this one. We believe that award recipients deserve their peer recognition in a face to face ceremony. All new and pending PSRC awards will be issued at our next PSRC physical meeting during the previously announced new Awards Ceremony section of the Monday reception dinner.

January 2021 Meeting Minutes:
The B1 Working Group met virtually on Monday January 11, 2021 with 13 members. All the SC's were represented in this meeting. The September 2020 meeting minutes were discussed and approved.

The following items were discussed during this meeting:

1. The WG reviewed and provided updates to the WG Matrix. The WG continues to maintain a list of completed working groups that have been disbanded since our suspension of face-to-face meetings to make sure all pending awards and recognitions are accounted for. Pending awards will be delivered once we resume the face-to-face meetings during our awards ceremony.
2. IEEE PSRC Career Service Award - This award is intended for PSRC members that have or are about to retire from attending PSRC meetings and that have a minimum of 15 years of active participation in our meetings with a proven track of contributions and mentoring of fellow PSRC members. The WG identified potential candidates and made nominations, the results will be kept confidential until the award is announced and issued.
3. Discussion and updates on IEEE PES Individual Award nominations. WG members continue their work in trying to nominate a select number of PSRC members for IEEE and PES level industry related individual awards. The names of these nominees are kept confidential and will be announced if and when an award is issued.

Respectfully Submitted
Hugo Monterrubio, B1 Chair

B. B3: Membership Working Group

Chair: Mal Swanson

Vice-Chair: Cathy Dalton

Assignment: Assist in searching for new attendees.

Requesting support from attendees' employers.

Attendance during the January Joint remote meeting was 432, which is a new record in attendance for us.

Out of 64 new attendees, 30 were in our remote 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.

C. B4: O&P Manual Revision and Working Group Chair Training Working Group

Chair: Phil Winston

No report.

D. 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.

No report.

E. B8: Long Range Planning Working Group

Chair: Pratap Mysore

No report.

F. B9: Web Site Working Group

Chair: Rick Gamble

No report.

VII. Items of Interest from the Main Committee Meeting: Michael Thompson

System Protection "C" Subcommittee Report on WG progress of note – Fred Friend

C25: Report on Protection of Wind Electric Plants WG resolving PSRC Officer comments

C26: C37.242 C37.233 Power System Protection Testing Guide
Formation of balloting body underway – closes February 3
Approved to ballot by Subcommittee via email

C28: C37.242 Guide to the Synchronization, Calibration, Installation and Testing of PMUs for Power System Protection and Control
Re-circulation ballot ends on January 14. Two negative ballots resolved – changed vote to approve

C31: C37.120 Protection System Redundancy for Power System Reliability
Formation of balloting body formed with 117 registered
Approved by Subcommittee via email to ballot

C36: Summary of Role of Protective Relays in the Smart Grid
Unanimous working group approval to send to Subcommittee

CTF41: Investigation of Distribution PMU Requirements. Elevated to Working Group (C41)
WG Assignment: Prepare a technical report on the performance requirements for Distribution PMUs.

CTF44: Investigate the possibility of preparing one journal paper and one conference paper exclusively based on the material from WG C24 report. Elevated to Working Group (C44)
WG Assignment: Prepare a summary paper for IEEE Transactions on Power Delivery based on the contents of the report prepared by the C24 working group.

CTF45: Investigate additional need for protection practices for interconnecting solar or other inverter based generation to utility transmission systems (continuation of WG C32). Elevated to Working Group (C45)
WG Assignment: Prepare a technical report on protection practices for interconnecting solar or other inverter based generation to utility transmission systems from work of WG C32.

New Task Force:

CTF46: Investigate preparing a summary report and/or presentation from the work of C28, revision of IEEE C37.242, IEEE Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control

Line Protection "D" Subcommittee Report on WG progress of note – Bruce Mackie

D28: C37.230 Guide for Protective Relay Applications to Distribution Lines – Approved – Should be Published very soon

D46: Started to create summary paper, Thanks to Brian and Claire

D45: Working Group created to document protection methods used to reduce wildfire risks due to transmission and distribution lines.
Jonathan Sykes – Chair
Scott Hayes – Vice Chair

Relaying Communications "H" Subcommittee Report on WG progress of note – Aaron Martin

IEEE PSRC SC H is responsible for 16 (out of 60) IEEE PSRC Standards.
It currently has 16 active Working Groups (WGs): 8 are producing IEEE PSRC Standards and 8 are generating IEEE PSRC and PES Reports.

H6: **H**as finished and published Report on "IEC 61850 Application Testing", it was approved by PSRC Officers. Chair: C. Sufana. This WG first met on March 11, 1999.

H17: Submited draft report to HSC on "Establishing Links between COMTRADE, IEC 61850, and CIM" for initial approval

H22: HSC Passed motion to submit IEEE Guided PC37.249 Guide for Categorizing Security Needs for Protection Related Data Files is starting to form IEEE-SA Sponsor Ballot Pool. Chair: A, Makki

H32: Requests to give a presentation at the next MC meeting on the technical report Channel Performance Considerations for Ethernet Circuits Applied to Teleprotection

H47: **I**s continuing work on a report on Impacts of IEC 61850 sampled values, GOOSE and PTP time synchronization on protection and control applications using process bus. It also **asking for contributions from protection experts** regarding the impact to specific schemes. Chair: M. Kanabar.

H51: HSC Passed motion to Revise**:** IEEE Standard PC37.239, Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems, with the following Assignment, Scope, and Purpose. Chair: M. Adamiak

H-SC: **P**asses Motion to form TF to revise C37.232 IEEE Standard for Common Format for Naming Time Sequence Data Files. Chair: (A. Makki)

Relaying Practices "I" Subcommittee Report on WG progress of note – Jim Niemira

19 Active WG and TF (including 2 new TF added today)

- I31 – IEEE 1613, I37 - IEEE C37.90, I36 – C37.90.2

Minor revisions to align statements of PAR titles, scope, and purpose were approved at SC level and approved by REVCOM

I35: IEEE PC37.2 Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations -- Revision of C37.2-2008
Final Draft Approved by WG.
I SC Approved formation of balloting body.

I29: PC37.110 - IEEE Draft Guide for the Application of Current Transformers Used for Protective Relaying Purposes – Revision of C37.110-2007

- reconciling ballot comments.

I32: A Survey of Protective System Test Practices

- Soliciting PSRC community to identify survey respondents.
- Plan to solicit additional survey respondents through PES database.

ITF46: Review *IEEE C57.13.3-2014 - IEEE Guide for Grounding of Instrument Transformer Secondary Circuits and Cases* (expires 2024) and determine need for WG to revise.

ITF47: Review *IEEE C37.231-2006 – IEEE Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control* (expires 2022) and determine need for WG to revise.

IEEE P1854 (T&D Sponsor, co-sponsor by PSCC and PSRC) still looking for a PSRC WG home

- Expect this will in H SC.

Rotating Machinery "J" Subcommittee Report on WG progress of note – Gary Kobet

J12: (improved generator ground fault) report is on the PES website, could make MC presentation in May 2021

J13: (generator modeling) report has been sent to MC officers for review/comment, could make MC presentation in September 2021

J17: Revise C37.102 AC generator protection and J19 Revise C37.106 Abnormal Frequency Protection should be balloting this year

J16: Revise C37.101 Gen ground protection working

JTF3: Revise C37.96 Motor protection – Recommended we proceed with PAR, present guide dated 2012, TF disbanded, now J22 WG

J21: Motor protection tutorial – in process, will be working closely with J22

Two other task forces Investigation of the need for a Generator Condition Monitoring WG and investigation on the need for a disturbance recording WG, both working

Substation Protection "K" Subcommittee Report on WG progress of note – Jeff Barsch

K WGs near the finish line:

K16: Power Transformer Protection
Recently completed recirculation

K18: Secondary Networks
Recently completed recirculation

K24: Summary paper for PST guide

K28: Transactions paper for GMD impact on protective systems

Established K WGs continuing work:

K10: SCC21 DER std coordination

K12: Static Shunt Compensators

K25: Shunt Capacitors

K26: Shunt Reactors
- Going to ballot

K22: C37.234, "IEEE Guide for Protective Relay Applications to Power System Buses" January 16 deadline to join balloting body

New K WGs:

K27: C37.95 - Utility-Consumer Interconnections

K29: Reducing outage durations through improved protection and autorestoration in distribution substations

G. Motions:

There were no motions.

H. Presentations: Murty Yalla/Michael Thompson

C37.245, Guide for the Application of Protective Relaying for Phase Shifting Transformers, WG K24 / K1

- **Lubomir Sevov and Brandon Davies**

Modification to Fault Study Programs for WT Generators, WG C24

-- **Dr Sukumar Brahma**

I. Adjournment:

At the completion of the meeting, a motion to adjourn and seconded. The motion carried and the meeting was adjourned.

VIII. Subcommittee Reports

C: System Protection Subcommittee

Chair: Fred Friend
Vice Chair: Michael Higginson

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.

Meeting Minutes

The System Protection Subcommittee of the PSRC met on January 14, 2021 via WebEx.
The participants introduced themselves, a quorum was achieved (40 of 61 members and 49 guests), and the September 2020 minutes were approved (Rafael Garcia made motion, Matt Black seconded).

Advisory Committee Items of Interest

- WG agendas are required to be posted at least two weeks prior to the meeting.
- WG meeting minutes due to Mike and Fred by Friday, January 22. Please use the new template and include your assignment.
- First-time attendees need to create 123Signup PSRC account.
- A custom web page is available for each WG, if the WG Chair wishes to use it. Contact Rick Gamble, webmaster@pes-psrc.org
- 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.
- Don Lukach is developing a meeting guideline presentation.
- Registration for this meeting was about 432, including 64 first time attendees.
- WG Reports should follow the IEEE Style Manual for word usage (Clause 10.2).
- WG officers should request certificates for their members upon completion of their work. Hugo Monterrubio can address any open questions.
- The Awards Ceremony will take place during the Monday night reception for the May and September meetings when we can resume in-person meetings.
- A file share application for non-PAR working groups has been developed.
- All are reminded and encouraged to apply for Senior Membership in the IEEE, if you are eligible.
- New templates for the O&P and P&P have been approved and are coming soon. Additional information is expected to follow.
- There is a review process in place for Entity standard development, and IEEE is working on facilitation.
- A new China PSRC Satellite was formed. They may establish liaisons with each subcommittee.

Working Group Reports

The minutes of the Working Groups are attached.

Old Business

There was no old business.

New Business

Task Force CTF-41 requested to be elevated to a working group. The motion was not opposed, and this will become C-41. The working group will be led by Ken Martin as Chair and Nuwan Perera as Vice Chair.

Task Force CTF-45 motioned to be converted to a working group. The motion was not opposed, and this will become C-45. The working group will be led by Ali Hooshyar as Chair and Manish Patel as Vice Chair.

Allen Goldstein motioned to create a new Task Force to produce a summary report for C28's work. This was seconded by Farnoosh Rahmatian. The Subcommittee chair granted this request and formed new CTF-46. The Chair will be Allen Goldstein.

A summary of C32's completed work will appear in the March PACWorld magazine.

Working group H41 is updating IEEE Std 1646, "Draft Standard for Power System Communication Delivery Time Performance Requirements". TW Cease, working group vice chair, and Dennis Holstein, working group chair, are requesting feedback on the ¼ cycle time allowance referenced in this standard. Please send your feedback to them at twcease@ieee.org or holsteindk@ocg2u.com.

General Discussion

There was no general discussion.

Sukumar Brahma motioned to adjourn, and Farnoosh Rahmatian seconded. The meeting was adjourned at 10:02 AM.

Working Group Minutes

C-23: Coordination of Synchrophasor Related Activities

Chair: Allen Goldstein
Vice Chair: Gustavo Brunello
Output: Ongoing Liaison
PAR and PAR expiration: N/A
Expected Completion Date: Ongoing Liaison
Draft: N/A

Assignment: The ongoing task force will provide three main functions: -Liason 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: Web-Meeting, On January 13, 2021 at 2:20pm CT

Attendance: Seven (7) members
Fourteen (14) guests

Call to order
Officer presiding: Allen Goldstein
Officer recording minutes: Gustavo Brunello

Quorum was reached

Call for Patents: N/A

Summary of Activities and Discussions
1-Allen provided an overview of the C23 work group scope

2-Allen provided a summary of related activities at IEEE

3-Allen presented of NASPI organization and the five task teams (see PowerPoint)

4-New Business:

- Evangelos Farantatos will present PMU related activities at EPRI during our next meeting May2021

- Deepak Maragal asked if there was any installation of PMU using PTP and PPS. Allen to ask within NASPI

- Krish: is NASPI CRSTT thinking of any application for PMUs in the control room? For example, under oscillations conditions, what operator should do? A discussion ensued, Vahid named some utilities using PMU in real time

- Dinesh Gurusinghe - Any ongoing works on sampled value input PMUs? Discussions followed about PMU sample values. Looking for NASPI leadership in the application of PMU

5-Next Meeting: if in person meeting, the WG needs room for 30 people and PC projector with HMDI inputs. No conflict with other Synchrophasor related activities

Adjourn at 3:20pm

C-25: Protection of Wind Electric Plants

Chair: Martin Best
Vice Chair: Amin Zamani
Secretary:
Output: Report
Established Date: January 2015
Expected Completion Date: January 2021
Draft: 6.5
Assignment: Write a report to provide guidance on relay protection and coordination at wind electric plants. This report will cover protection of generator step up transformers, collector system feeders, grounding transformers, collector buses, reactors, capacitors, main station transformers, tie lines and points of interconnection, and associated arc flash issues. Although the report will address coordination with wind turbine generator protective devices and static VAR sources, the protection of the wind turbine generators and static VAR sources will not be included.

Working Group C25 met virtually on January 11, 2021 at 1:10 PM CST with 15 members and 35 guests.

Meeting Agenda

1) Introductions
2) Review September 2020 meeting minutes and update of report progress to date.
3) Review initial comments from PSRC Officers.
4) General Discussion
5) Adjourn

Summary of Meeting Discussion

a) Since the attendee list was available and to save time, no formal introduction was done. The meeting started with the review of September 2020 minutes.

b) The status of the report was discussed first. The Chair announced that all comments from the WG voting members were addressed, and all members approved the revised version of the report (Draft 6.5).

c) One of the PSRC officers (Michael Thompson) has provided comments on the latest draft of the report (Draft 6.5). The WG then spent time to review these comments based on some of the responses from the chair.

d) One major comment from Michael was that the citations to references were scrambled – this issue is already fixed in the revised version.

e) Jim V. will send a write-up to Martin regarding the explanation of thermal soil resistivity. It was agreed to keep it general.

f) Fig. 2 includes a combination of European and IEEE symbols. It was agreed to revise transformer symbols (using IEEE symbols).

g) Circuit Breakers are not normally used on the LV side of the step-up transformer at a main collector substation. Explanation will be added to describe that disconnect switches (either hand or motor operated) are used – no change to figures.

h) Fig. 3 – Explanation will be added about why Zig-Zag transformers are used.

i) Fig. 2 and Fig. 3 are not consistent (e.g., change Zig-Zag TX in fig. 3 to grounding Transformer, add MV label, etc.)

j) Fig. 4. (a) is OK – no need to change.

k) Text in Section 3.1.21 was revised with the help from WG members.

l) At the close of the meeting the members decided that the remaining comments will be addressed afterwards, and the C25 chair/vice-chair will send a revised version to the WG for their feedback on responses.

C-26: C37.233, Power System Protection Testing Guide

Chair: **Don Ware**
Vice Chair: **Matt Black**
Secretary: **Zach Zaitz**
Output: **Revise Guide**
Established Date: **January 2016**
Expected Completion Date: **November 2021**
Draft: **4.2**
Assignment: **Complete revised Guide by end of 2021**

Working group C-26 did not meet during this meeting.

C-28: C37.242 Guide to the Synchronization, Calibration, Installation and Testing of PMUs for Power System Protection and Control

Chair: Allen Goldstein
Vice Chair: Harold Kirkham
Output: IEEE Guide, C37.242
Established Date: September 2015
Expected Completion Date: May 2021
Draft: D5
Assignment: Revision of C37.242 Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control

Meeting Date and Time: Web-Meeting, On January 11, 2021 at 10:20 am CT

CALL TO ORDER Allen Goldstein

INTRODUCTIONS AND QUORUM 7 of 18 members, 27 guests. Quorum not in attendance. Introductions were not made but the meeting system provided a list of attendees Allen Goldstein

CALL FOR PATENTS Slides Shown, no response Allen Goldstein

CHAIR'S REMARKS: Recirculation 2 is scheduled to close 14 January. So far, all votes are "yes" except 2 abstentions. 2 Comments were received and both are editorial. Expect to go to RevCom after recirculation closes.

APPROVAL OF PREVIOUS MINUTES Yes (via email after last meeting) Allen Goldstein

The chairman presented a summary of the present situation of C28. He noted that the second recirculation closes in 3 days. The two "no" votes were both changed to "yes". Two comments were received and have been addressed in the next revision. We expect to be able to report to C Subcommittee that the draft will go to RevCom after the ballot closes.

The chair thanked those who participated in the online meeting to get the draft to recirculation 2.

New Business

The creation of a summary paper was discussed. There was some support for one and no opposition.

A discussion of where a summary paper would be published with consideration of transactions which are sometimes difficult due to their requirements for uniqueness. Magazines were discussed as was conferences.

It was agreed that a new task force would be requested at C subcommittee meeting to study the formation of a working group to draft a summary paper.

Adjourn

NEXT FACE TO FACE MEETING May 2021

C-29: 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 2022
Draft: 1.05
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 single WebEx session on Tuesday, January 12, 2021, 8:00-9:00 AM CST with 27 attendees (7 Voting Members and 20 Guests). Kevin Jones, Chair, presided over the meeting. Mike Kockott, Vice Chair, recorded the meeting minutes.

Kevin reviewed the minutes from the September 2020 WebEx meeting, then asked for a motion to approve. Jonathan Sykes supported this motion, with second from Rob Fowler. As no objections were raised, the minutes from September 2020 were approved.

Kevin then gave some background into the origins and motivation for the formation of WG C29.

The WG D29 tutorial will serve as a reference document to guide the content that needs to be covered in the C29 report. D29 is now moving forward rapidly. Also, J5 removed testing from their scope and made the content they'd already written available to C29.

Kevin next led a review of the latest revision of the draft report. Thanks to Gene Henneberg for submitting his writing assignment for section 1.4. Kevin integrated this in the draft report, and in so doing the draft report version changed from 1.04 to 1.05.

When submitting writing assignments, Kevin asked those submitting to submit these to himself or Mike, to please use track changes, and to rename the file submitted by adding the initials of the contributor to the file name.

While reviewing the latest revision of the draft report, Kevin requested volunteers for writing assignments.

Jared Candelaria offered to write section 2.1 Sequence of Static Points.

Ritwik Chowdhury offered to integrate, as it best fits into the C29 draft report structure, the material from J5. Kevin will send him the latest draft 1.05 to work with.

More volunteers are needed to advance the C29 report. Kevin issued an open invitation to all to please feel free at any time to volunteer to contribute. Any volunteers wishing to do so to please send an email to Kevin or Mike stating on which report topic they wish to contribute.

Daniel Lebeau asked if anybody has experience with RelaySimtest from Omicron. Ritwik responded that he has used RelaySimTest, but not for power swings. He thinks there is room for EMT type of tests, and that this would be an option if the equipment and expertise are available.

Related to section 2, Type of Tests, Ryan McDaniel raised the point that to know the required type of test, the specific function (algorithm) to be tested needs to be understood, and he wondered how this was being addressed in the report. This must be borne in mind and addressed accordingly by those undertaking the writing assignments.

Kevin will send out links to the latest C29 and D29 drafts, and will also resend out the link to his COMTRADE Power Swing calculator.

As there was no further business, Kevin thanked all and adjourned the meeting.

C-31: Guide for Protection System Redundancy for Power System Reliability

Chair: Solveig Ward
Vice Chair: Alla Deronja
Secretary: Alla Deronja
Output: Guide
Established Date: September 2017
Expected Completion Date: December 2021
Draft: 9.1
Assignment: Development of a guide for protection system redundancy

Working group C-31 did not meet during this meeting.

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 2021
Draft: D2
Assignment: Support the development of this IEEE recommended practice in cooperation with PELS, IAS, and IES efforts

Webex Meeting 13 January 2021, 08:00 – 09:00 CDT [13:00 – 14:00 GMT]. All working group officers were present. The chair presided over the meeting and the secretary recorded minutes.

A call to order of the meeting was made with 7 members, 1 corresponding member and 21 guests in attendance.

A quorum was achieved with approval of the agenda and approval of the minutes from previous meetings.

Patent slides were shown and all participants asked to speak up about any patent claims at this time. 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 present situation of C33. Ali Dehkordi (chapter lead from P2004) contacted SEL for contributions to this appendix. The group reviewed the contributions and proceeded with recommendations to update the draft and review before the May meeting.

C33 working documents have been placed on the IEEE SA Collaboration site for P2004 under the folder for C33 Task Force documents.

Action Items:

Review of the status of writing assignments:

Assignments for Chapters 5, 6, and 7 in support of P2004 have been submitted. Dean, Sakis, Aaron will attend a meeting with the P2004 chapter leads on January 29th2021.

Review of Annex F:

- 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.11: Aaron to add discussion of adjacent generators.
- F.12: Aaron to include discussion of secondary burden and remanence (ref. IEC 60255-187-1).
- 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.

Between now and the May meeting if deemed necessary a doodle poll will be conducted to determine the time and date for a virtual meeting.

New Business

Members or guests that do not have access to the P2004 IMeet central websapce were asked to contact the officers of C33 to gain access. Dean Ouellette has forwarded requests to the P2004 officers.

Meeting was adjourned at 08:45 am CDT.

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 2022
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 11 voting members and 61 guests (72 total). Chair Kevin Jones presided over the meeting. Vice Chair Gary Kobet recorded the minutes. The meeting was called to order by Kevin Jones on Wednesday, January 13, 2021 at 0910 CST. The minutes from the September 13, 2021 WebEx meeting were reviewed and approved.

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

- C24 Modification of Commercial Fault Calculation Programs with Wind Turbine Generators - Michael Higginson: Completed, disbanded, posted to PSRC website, new WG C44 working on transactions paper. Will be removed from this TF.
- C25 Protection of Wind Electric Plants - Dean Miller: Resolving PSRC officer comments, then paper posted to PSRC website.
- C32 Impact of Inverter Based Resources on Utility Transmission System Protection - Mike Jensen: Completed, disbanded, posted to PSRC website, CTF45 additional investigations.
- C38 Guide for the Design of Microgrid Protection Systems - Mike Higginson: Draft nearly complete, WG ballot prior to May, IEEE SA ballot by end of year.
- ADD CTF45
- D29 Tutorial on Setting Impedance-Based Power Swing Blocking and Out-of-Step Tripping Functions on Transmission Lines - Kevin Jones: Still working on model to ensure convergence, added capacitors, hopefully better by May. Tutorial/philosophy section is focus. Testing section later.
- D38 Impact of High SIR on Distance Relaying - Christopher Walker: Draft 0.3, section addressing IBR effects on SIR. Target finish 2023.
- D41 Coordination of Activities Related to Line Protection Inverter-Based Sources - Evangelos Farantatos: Disbanded due to confidentiality concerns, remove from this TF.
- J18 Investigate the effect sub-synchronous oscillations due to inverter based resources (IBR) on rotating machinery protection and control- Normann Fischer – obtaining models to determine effects
- NERC – no update
- P2800/P2800.1
    - Steve Miller, Murty Yalla – how to differentiate between regular standards (2800) and entity standards (2800.1), possible renaming/renumbering of 2800.1.
    - Manish Patel – P2800 – Draft 5.1 has reached 99% WG approval, now seeking IEEE-SA ballot. Pending approval from a sponsoring committee (ED&PG), goal is to form a balloting pool no later than February 2021 and open the initial ballot and public review in early March, 2021.

In order to receive the invitation to join the IEEE-SA ballot pool for P2800, please express your interest for P2800 in IEEE myProject, as outlined on slides 10 and 11 of the instructions to get involved on the project website (http://sagroups.ieee.org/2800/wp-content/uploads/sites/336/2021/01/IEEE-P2800_General-Information.pdf [sagroups.ieee.org]).

Cal-ISO formed group to look at IBR integration, met since December 1, Mike Jensen to keep this group apprised. Large battery storage installations underway in California.

Chair Kevin Jones adjourned the meeting at 1010 CST.

C-36 IEEE Transaction Paper Development from C2 Report: Role of Protection Relaying in the Smart Grid

Chair: R. Benjamin Kazimier
Vice Chair: Steve Klecker
Secretary: Steve Klecker
Output: Paper
Established Date: January 2018
Expected Completion Date: January 2022
Draft: 5.2
Assignment: To develop an IEEE transactions paper based on the C2 report "Role of Protective Relays in the Smart Grid"

C36 met on Wednesday, January 13, 2021, by web meeting from 1:10PM to 2:10PM. There were 10 voting members, 2 non-voting members, and 19 non-members present. Benjamin Kazimier chaired and presided over the meeting. Steve Klecker recorded the minutes.

The working group reviewed the latest 5.2 draft. No changes were suggested or made. A vote was taken and draft 5.2 passed unanimously with all 10 voting members present. Fred Friend will submit the paper to the C subcommittee for voting.

Additional notes:

The working group agrees to keep the group open and active for the purpose of creating presentations for submitting C2 or the C36 transaction paper, as appropriate, to various conferences. The list of conferences with possible volunteers was also updated by Taylor Raffield. Assignments are given in the section below.

Conferences for Possible Submission of C2/C36 Work with Volunteers:
Edison Electric Institute – Rob F.
Cigre-Grid of the Future – Alex A.
IA/NE – Ben M.
MIPSYCON – Steve K.
GA Tech – Taylor R – backup Alex A.
Texas A&M – Volunteer needed
WPRC – Steve K.

PAC World Americas – Taylor R. – backup Alex A.
PAC World Global – Alex A.?
APAP – Alex A.
DPSP – Alex A.
IEEE General Meeting – Volunteer needed
IEEE T&D – Volunteer needed
PSRC C2 – Taylor R. – backup Alex A.

Writing/Work Assignments:
Taylor Raffield: Create 2 versions of the conference presentations, for 15 and 30 minutes long. Alex Apostolov will review them.
Taylor Raffield: Will coordinate submissions to the conferences.

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: 0.8
Expected Completion Date: February 2022
PAR Expiration Date: December 2022
Assignment: To create P2030.12, Guide for the Design of Microgrid Protection Systems

January 12, 2021 Meeting Minutes Online Meeting

Officer Presiding: S. S. (Mani) Venkata
Minutes Prepared By: Michael Higginson / Geza Joos

This meeting was an online meeting (WebEx). It was chaired by S. S. (Mani) Venkata.

The meeting commenced at 3:30 PM central time. There were 60 attendees, with 22 voting members, 8 non-voting members, and 30 non-members. Quorum was met.

The working group began with introductory remarks by the Chair. The patent slides were reviewed, and no concerns or comments were raised.

Minutes for the September 2020 meeting were reviewed. Ratan Das motioned to approve the meeting minutes. The motion was seconded by Sukumar Brahma, and the minutes were approved by the working group without opposition.

The working group reviewed the agenda for this meeting. Sukumar Kamaladasan motioned to approve the agenda. The motion was seconded by Jim Van de Ligt, and the agenda was approved by the working group with no opposition.

Michael Higginson started the discussions on the guide by discussing the status of the guide and stating the following: (a) the guide is nearly completed and most of the sections have been completed and reviewed; (b) our PAR expires at the end of 2022; (c) it is expected that all outstanding writing assignments will be completed within the next month; (d) this will be followed by a full review of all sections by all the working group members, with an internal ballot and comment resolution, a process that should be completed by end of 2021; (e) the requirements and process for submission to the IEEE SA Mandatory Editorial Coordination; (f) the IEEE SA balloting process would begin in early 2022.

The following questions were raised, and comments made: (a) consider the final review by smaller groups: this will be revisited; (b) the timeline, which appears reasonable.

The working group reviewed progress on the draft guide. Updates and discussion, and commitments and action items were as follows:

- Section 4:
  - The new definition section, including revisions since our last meeting, was accepted. The question of the connection point to the distribution was revisited; the following were considered: PCC, commonly used for DER as in IEEE Std 1547, and for industrial installations as in IEEE Std 519; POI, as used in IEEE Std 2030.7, Standard for microgrid controllers. Working group members agreed we do not want to use PoC, but expressed support for both PCC and POI.
  - **Action Item:** Working group members with an opinion on whether to use PCC or POI, please email your perspective to Ward Bower and/or working group leadership.
  - It was pointed out that rather than using the term mixed mode for microgrid operation, the nomenclature of IEEE Std 2030.7 should be used; two modes are defined in this standard: dispatch mode, which applies in steady state grid connected or islanded mode, and transition mode, for changing from grid connected to islanding modes.
  - **Action Item:** The working group leadership needs to consult the IEEE SA style manual on the use of footnotes.
- Section 5:
  - This section is accepted by its lead author and considered complete.
- Section 6:
  - There were several updates to this section since the last meeting. These updates have been integrated into the latest draft.
  - **Action Item:** Mike Bloder to resolve remaining open comments from Mani Venkata in draft.
- Section 7:
  - **Action Item:** The working group discussed comments about selectivity needs in microgrid protection. Matthew Reno took the action item to address this in section 7, in coordination with the commenter.
  - **Action Item:** Black Start in Section 7.1.3 will be completed by Michael Higginson. It was noted that the Black Start discussion in Section 5.4.2 is purely descriptive and a discussion in Section 7.1.3 is appropriate.

- **Action Item:** Section 7.6 on Fault Location in microgrids was discussed with reference to the use of FLISR (not required), data available and the use of PMUs, and other considerations. Mohammad Zadeh, Lalitha Devarakonda, Yuan Liao, and Sukumar Brahma volunteered to draft this section.

- Section 8:
  - This section had been updated by Ratan Das and Sakis Meliopolous. The section is nearly complete, pending some comments from Mani Venkata.
  - **Action Item:** Ratan Das volunteered to address the remaining open comments on this section.
- Section 9:
  - This section is accepted and considered complete. Some of the original sections with no content, 9.4, 9.5, 9.6 and 9.7 were moved to Section 5.
- Section 10:
  - This section is accepted and considered complete.
- Section 11:
  - The working group discussed the role this section plays in our guide, and where we should take it. This discussion will be continued at our next meeting.
- Section 12:
  - It was pointed out that it is unclear how and why the DMS should interact with the local microgrid protection system. Section 12 will be revised in accordance. Information in this section, in Table 1 among others, will be included in other sections as appropriate. It is pointed out that the issue of importance is the interaction and coordination of the microgrid protection system with the microgrid controller not with the DMS. This section may be removed as result of the review.
  - **Action Item:** Geza Joos volunteered to review the section, with comments and proposed edits for discussion at our next meeting.
- Sections 13 and 14:
  - These sections will be reviewed in the next meeting.

Action items on the guide: (a) individual commitments and action items should be completed within one month; (b) the revised document will be circulated; (c) a meeting may be needed before the normally scheduled PSRCC meeting, see below, to resolve the outstanding issues and finish the review of the complete document.

The next regular meeting is planned for May 2021 (PSRCC meeting). There may be a meeting scheduled between now and this May 2021 meeting as needed.

Finally, the meeting was adjourned at 5:40 PM central time.

C-39: IEEE PC 37.252 Guide for Testing Auto Voltage Control Systems in Regional Power Grids

Chair: **Xiaopeng Li**
Vice Chair: **None**

Secretary: **Zhenyuan Zhang**
Output: **Guide**
Established Date: **February 2019**
Expected Completion Date: **December 2022**
Draft: First edition draft.
Assignment: SGCC, SWJTU and THU are to sort out the necessary testing items of the AVC system. UESTC, XJTU, and CQU are to refine the testing procedures of the AVC system. SCU is to establish a Benchmark model for testing the AVC system.

Working group C-39 did not meet during this meeting.

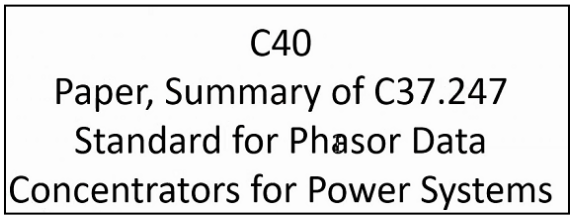
C-40 Paper, Summary of C37.247 Standard for Phasor Data Concentrators for Power Systems

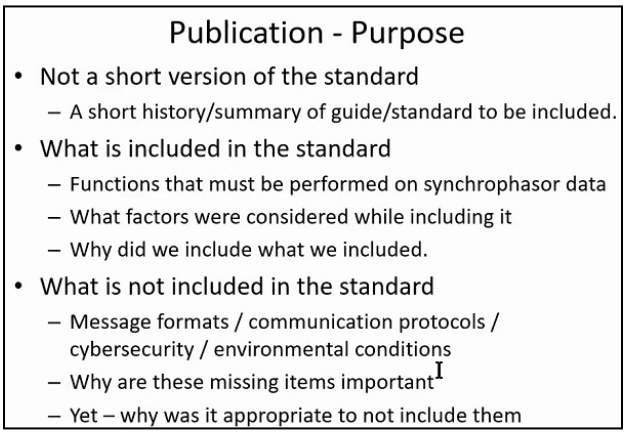
Chair: Vasudev Gharpure
Vice Chair: Mital Kanabar
Secretary: Mital Kanabar
Output: Tutorial planned (Paper, Presentation in future)
Established Date: January 2020
Expected Completion Date: December 2022
Draft: 1.01
Assignment: Develop a publication (transaction and/or conference), a tutorial and a presentation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

13 Attendees (1 member, 12 guests): The meeting attendee snapshot is included below.

- IEEE copyright slides were shared.
- No introductions performed for the remote meeting.
- A tutorial for the general meeting 2021 is currently being worked on. The proposal was submitted last year in September 2020.
- We have not heard back from PES if it has been accepted.
- Two members volunteered to contribute (Krish Narendra and Jayaprakash Ponraj.
- Proposed tutorial outline is shared with the WG.

Yi Hu	Quanta Technology
Jeff Dagle	Pacific Northwest National Laboratory
Deepak Maragal	New York Power Authority
Allen Goldstein	NIST
Farnoosh Rahmatian	NuGrid Power Corp
Jayaprakash Ponraj	
Mahendra Patel	EPRI
Xiawen Li	Dominion Energy
KRISH NARENDRA	EPG
Daniel Lebeau	CIMA+
Vasudev Gharpure	Quanta Technology
Gustavo Brunello	Consultant
Peiman dadkhah	NuGrid power





CTF-41 Investigate performance requirements for Distribution PMUs

Chair: K. Martin
Vice Chair: N. Perera
Secretary: D. Gurusinghe
Output: Recommendation on starting a working group
Established Date: September 2019
Expected Completion Date: January 2021

Assignment: Task Force CTF41 will examine the measurement performance requirements for PMUs that are intended for use in distribution systems and make a recommendation to either use the present standard 60255-118-1, update the present standard 60255-118-1 with special requirements, or initiate creation of a completely new standard. CTF41 will also review frequency and sample value measurement requirements and recommend updates to the 60255-118-1 if they seem warranted.

Task force CTF41 met on Tuesday, January 12, 2020 at 9:10am (CDT) with 6 members and 35 guests via WebEx. Ken Martin (Chair) welcomed participants. Ken briefed the objective of the task force and proposed recommendation to the C subcommittee. There was no quorum, so the TF did not address approval of the agenda or previous minutes.

Krish asked to clarify proposed objectives. He highlighted that communication is a part of distribution PMUs, however, proposed objectives only focuses on measurements perspectives. Allen pointed out communication is out of the scope. Krish and Gustavo stated we should consider communication issues. Mahendra agreed and he highlighted to address functional requirements but not protocols. Eric stated communication is important but it is a big project and it will change the nature of this WG as we already separated communication aspects. Allen agreed with Eric and highlighted three reasons to exclude communications (adding communication aspect is a big project, focus will go away and communication purview is on the different committee-PSCCC). Thomas stated proposed WG would focus on applications and list performance requirements.
Gustavo pointed out the payload of the existing standard is big and it is required to loose data.

Mahendra added to address functional needs of collective data. Eric disagreed and pointed that functional needs of data transport is not necessary as it could be treated as a black box. Tony mentioned the WG should specify characteristics of the black box with particular information, otherwise it does not add any value to the reader. Ken agreed with Tony as the new WG don't change the existing standard, however, if we add new requirements such as power quality measurements then we should add new communication needs.

Tony highlighted the WG should clearly separate measurement and communication requirements. Ken suggested to add an objective to exclude communication requirements. Tony proposed to include transport characteristics but not details. Ken agreed to add a summary of communication aspects. Eric suggested to short list communication characteristics. Vahid emphasized the new WG is established for PMU performances. Krish stated the new WG is going to produce a report. Therefore, get enough information for a performance standard. Vahid stated adding clarifications to objectives would be fine. Allen suggested to remove the last objective, which focused on advertising the new WG outcome and it is out of the scope. Vahid highlighted the WG may only collaborate with NASPI. Allen added that the TF already collaborates with NASPI and agreed to remove the last objective. Fred emphasized this is not a part of the technical report. Ken agreed and removed the last objective.

Fred suggested following assignment. "Prepare a Technical Report for the Measurement Performance Requirements for PMUs in Distribution System Applications". The TF members agreed and accepted. Recorded by Dinesh Gurusinghe.

C-42: Write A Summary Paper for C37.250 Guide for Engineering, Implementation and Management of System Integrity Protection Schemes

Chair: Gene Henneberg
Vice Chair: Yi Hu
Established Date: September 2020
Expected Completion Date: December 2022
Draft: 0
Assignment: Write a conference paper summarizing the new C37.250 Guide for Engineering, Implementation and Management of System Integrity Protection Schemes.

Working Group C-42 met in web session on January 12, 2021 beginning at 1:10 pm CDT with 24 attendees. Yi Hu presided for Gene Henneberg. This was the first meeting of this new working group. We did not introduce participants since the complete attendee list, including affiliations, was subsequently provided to the chair.

The WG explored the potential conferences that this paper should be targeting to which led to the following potential conferences: WPRC, Texas A&M Relaying conference, Georgia Tech Relaying conference, PAC World Conference, IEEE GM, IEEE T&D. Chairs will gather abstract/paper submission deadlines of these conferences for setting up the paper development/submission schedule.

The table of content of the published standard was briefly reviewed, followed by a review and discussion of a preliminary paper outline sent before the meeting. WG attendees agreed this outline can be used to put the initial draft paper together. Using introduction text and the SIPS definition as starting text for section I was proposed. A point was made that the paper needs to have a targeted length as conferences typically will limit the number of pages. A 6-8 pages draft paper length could be a good target that can be easily tailored to a specific conference's limit.

A call for volunteers to help write this paper was made. Dean Miller, Alfredo De La Quintana, Fernando Calero, Ramakrishna Gokaraju, Erin Jessup, Peiman Dadkhah, Vahid Madani, Mehrdad Majidi, Robin Byun, and Wladimir Quishpe have agreed to volunteer. An initial assignment was made in the draft outline. Chairs will update the outline based on the discussion at the meeting and send to volunteers to add initial text. Target to have initial draft text for assigned sections send back to Chairs in two months.

A call for volunteers to put together a draft presentation slides was not made. WG will decide this later once the person who will make presentation at a specific conference has been decided. Also, whether it is an IEEE or a non-IEEE conference will affect if some of the materials in the C37.250 can be directly used in the slides deck or not.

Meeting adjourned at 2:00 pm CDT.

Meeting minutes by Yi Hu 01/12/2021.

The next Working Group meeting is scheduled in conjunction with PSRC meeting in May 2021.

Avoid conflict with PSRC B2/PSCC A2TF, PSRC CTF41, C23 and C43 sessions and PSCC P8TF, P9 and P10, B1, B10, and AdCom

C-43: Investigate interest in the use of Artificial Intelligence and Machine Learning for Protection and Control Applications

Chair: Yi Hu
Vice Chair: Adi Mulawarman
Output: Report
Established Date: January 2021
Expected Completion Date: December 2022
Draft: 0
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 single WebEx session on January 13, 2021 with 58 attendees. Yi Hu and Adi Mulawarman presided the meeting. No round-the-table introduction of attendees was taken due to time constraints. Complete information of all attendees, including affiliations, was recorded by the WebEx, and subsequently provided to the Working Group chairs.

Chair briefly reviewed WG C43 assignment and the plan to complete the first report in two years and update every two years as the development in this field is fast moving. A call for volunteers to make presentations at next PSRC meeting was made. The following presentations have been proposed:

- Neural network for High Z detection – Alex Apostolov
- AI on detecting challenging fault, incipient fault – Daqing Hou
- AI to detect secondary arc-extinction – Jorg Bluemschein
- Use of synchrophasor and AI/ML to detect Voltage Instability – Athula Rajapakse
- Challenges of AI/ML implementation – Sukumar Brahma

WG chairs will follow up with presentation proposers for including these presentations in next meeting's agenda.

The WG reviewed preliminary outline of the report and discussed what should be the main objectives and scope of the report. Discussion indicated there are applications already implemented and many potential areas where AI/ML can be applied to improve the P&C such as post-event analysis, SIPS, challenging relaying problem for existing technologies, etc. Practical applications of AI/ML in P&C also face many challenges. Based on the discussion, WG decided the initial focus should be to clearly define the main objectives in the introduction section and the scope of the report, and then finalize the organization of the report for assigning WG members to work on different sections.

A call for signing up as WG member to participate in and contribute to the report preparation was made. 24 attendees (see list on next page) have signed up. The following WG members have volunteered to work on the introduction and scope sections:

- Introduction: Jayaprakash Ponraj
- Scope: Jayaprakash Ponraj, Abder Elandaloussi, Juan Piñeros, Athula Dayanart Rajapakse

Meeting adjourned at 11:20 AM CST.

Next meeting: Double session to be held in conjunction with PSRC May 2021 virtual meeting.

Avoid PSRC B1, CTF41, C42, K18, D47/DTF47, D39, and D42, PSCC P9 and P10, and PSRC B2/PSCC A2TF

CTF44: Investigate Interest in Summary of "Modification of Commercial Fault Calculation Programs for Wind Turbine Generators" Report

Chair: Sukumar Brahma (Clemson University)
Vice Chair: Evangelos Farantatos (EPRI)
Output: Recommendation to C Subcommittee
Established Date: September 2020
Expected Completion Date: January 2021
Draft: N/A
Assignment: Investigate the possibility of preparing one journal paper and one conference paper exclusively based on the material published in the WG C24 report

CTF-44 met virtually from 2:20 to 3:20 pm CST on Monday, 1/11/2021 with 20 attendees. It was decided that a working group be formed with the following assignment:

Assignment: To prepare a summary paper for IEEE Transactions on Power Delivery based on the contents of the report prepared by the C24 working group.

Some attendees volunteered to be members of the working group. Ritwik Chowdhury agreed to prepare an outline of the paper. It will be circulated among the members of the working group for further edits.

If approved, the WG will need a room of 30 with a computer projector (in case of physical meeting).

Please avoid conflict with C38, CTF34, CTF45, B10 and C25, in that order.

CTF-45: Protection and short-circuit modeling of systems with high penetration of inverter-based resources

Chair: Ali Hooshyar
Vice Chair: Manish Patel
Output: Make a recommendation to the C subcommittee regarding whether a new working group should be established to investigate the protection of systems with high penetration of inverter-based resources (IBRs).
Established Date: September 2020
Expected Completion Date: January 2021
Draft: N/A
Assignment: To investigate whether there is interest in investigating protection and short-circuit modeling of the systems with high penetration of IBRs, and if there is interest, to make a recommendation to the C subcommittee regarding the proposed assignment of a new working group.

Task Force CTF-45 had a WebEx meeting on January 12, 2021 with 78 attendees. No round-the-table introduction of attendees was taken due to the online format of the meeting. Complete information of all attendees, including affiliations was recorded by WebEx and subsequently provided to the task force chair.

a) **Officer presiding:** Ali Hooshyar (Chair)
b) **Officer recording minutes:** Ali Hooshyar (Chair) and Manish Patel (Vice Chair)
c) **Call to order:** Ali Hooshyar (Chair)

d) **Chair's remarks:** Ali Hooshyar informed the meeting attendees of the background, objective, and intended assignment of the task force: Since the IBR penetration level keeps increasing, there is a need to look at the IBR impacts on the protection of the entire system, rather than just the IBR tie-line. The objective of the task force is to investigate if there is enough interest to establish a new working group to report on the protection and short-circuit modeling of systems with high penetration of IBRs. The assignment is to make a recommendation to the C subcommittee to create a new working group. If such a recommendation is made, the C subcommittee is informed about the assignment of this new working group.

e) **Results of call for quorum:** N/A

f) **Approval of Agenda (motion and second):** No formal agenda for this CTF-45 session

g) **Approval of Minutes of previous meetings (motion and second):** N/A

h) **Summary of discussions and conclusions including any motions:** The meeting started by the Chair's opening remarks about the background of this task force, the motivation behind recommending this task force to the C subcommittee, and its objective. Then, Fred Huang made a presentation on IBR integration with the ERCOT system. The presentation covered the historical statistics and projections for IBR integration with the ERCOT system. There was also a discussion about some of the operational challenges of IBR integration from a stability and system inertia perspectives. This was followed by a second presentation by Manish Patel (Vice Chair) on the uncertainties that high IBR penetration in the coming years can present to protection systems. Some of the differences between the fault responses of IBRs and synchronous generators were shown. In addition, the simulation results from IBR models provided by the vendors for the recent Sandia National Lab project were also shown to the attendees. Then, the attendees engaged in an open discussion to explore if there is interest in investigating the effects of high IBR penetration on protection and short-circuit modeling. There was a strong interest among the attendees to establish a new working group. There was a discussion on the exact wording of the assignment. The assignment was also modified to mention that the proposed working group is going to continue the works of previous IBR-related working groups, namely C32 and C24. Ritwik Chowdhury made a motion to recommend a new working group to the C subcommittee. The motion was seconded by Normann Fischer. The motion was passed without objection. The assignment of the proposed working group is "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".

i) **Action items:** To make a recommendation to the C subcommittee to create a new working group with the proposed assignment.
   a. The recommendation for a new working group was made at the C subcommittee meeting, and it was approved. The new working group will be C45.
   b. The Chair and Vice Chair of the new working group will be the Chair and the Vice Chair of the task force. The secretary of the new working group will be Ritwik Chowdhury.

j) **Items reported out of executive session (if such sessions have occurred):** N/A

k) **Recesses and time of final adjournment (if different from our published face-to-face meeting agenda):** N/A

l) Next meeting date and location (if different from our published face-to-face meeting schedule): N/A

D: LINE PROTECTION SUBCOMMITTEE

Chair: Bruce Mackie

Vice Chair: Meyer Kao

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.

- The Subcommittee meeting met virtually via WebEx on Thursday, January 14, 2021 from 09:10 to 10:10 AM CST.
- Officer presiding – Bruce Mackie
- Officer recording minutes – Meyer Kao
- The Subcommittee meeting was called to order by the Chair
- The virtual meeting was attended by 35 members and 49 guests. Quorum was met.

  New Line Protection Subcommittee Members: Sebastien Billaut and Greg Ryan
- Minutes from the September 2020 virtual meeting were approved - motion made by Adi Mulawarman and seconded by Steve Conrad.
- Agenda for the D Subcommittee January 2021 virtual meeting was approved - motion made by Phil Winston and seconded by Sebastien Billaut.

The Chair reviewed items of interest from the Advisory Committee.

- WG Chairs: please send up to date minutes to Chair and VC
- Reminders:
  Presentations for future meetings/webinars
  Please send out agendas one month prior to the meeting
  Template for Technical Reports (including Tutorials)
- Reminder of Meeting Minutes format for WGs
- Reminded subcommittee members on 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: ve.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 (Hugo Monterrubio) 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) 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
  - For all future in-person PSRC May and September meetings our Monday night Welcome Reception will feature an Awards Ceremony. Please take this into consideration when making travel plans for future PSRC meetings. Don't miss this opportunity to help recognize or be recognized for the work that our Committee and fellow PSRC members do throughout the year.
- Rick Gamble is contact for D SC (Webmaster): www.pes-psrc.org

- SA Documents are reviewed for terminology – Important for Subcommittee to review technical reports
- Recognized the need for a file share application for non-PAR WG's - https://www.pespsrc.org/psrcsharefile.html
  Russ Patterson discussed the who can access and how WG Chairs can share files with members and guests of WG
- New Style Manual Published in 2020
- Reminder to apply for Senior Membership in IEEE
- New Templates Approved for O&P and P&P
- Attendance 432 with 64 first timers
- Future Meetings
  May 3-6, 2021 – Virtual
  Future Meetings TBA
- The PSRC is international and open to anyone who cares to attend.
  Russ Patterson discussed there is an 800 member "PSRC China Satellite" group that was to be inserted into the PSRC structure. However, in November 2020 the PSRC leadership (and many others in sister committees) voiced concerns over this disruption of our existing committees. The PES Technical Council then voted against inserting satellite committees into existing technical committee structures. The PSRC officers stressed that PSRC is already open to anyone who wants to attend.
  In chat of this Virtual meeting, Jonathan Sykes stated: The PES Governing Board is aware of the requests coming out of China in respect to satellite councils and the technical council and the GB are addressing the questions and concerns. China and region 10 are some of our fastest growing regions in the PES.

IEEE Standards Documents currently involved with WGs in D Subcommittee

Number	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
C37.143	2015	Guide for Application of Digital Line Current Differential Relays Using Digital Communication
C37.104	2012	Guide for Automatic Reclosing on AC Distribution and Transmission Lines
C37.230	2007	Guide for Protective Relay Application to Distribution Lines Working groups gave reports on their activity

Reports from the WG Chairs:

D28: Review of C37.230 Guide for Protective Relay Applications to Distribution Lines

Chair: Brian Boysen
Vice Chair: Claire Patti
Assignment: To review and revise C37.230-2007, "Guide for Protective Relay Applications to Distribution Lines" to correct errors and address additional distribution line protection related topics.

Did not meet Chair request the WG to be opened until publishing of the document is complete.

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

Vice Chair: Normann Fischer
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.

Working Group D29 met via WebEx in a single session with 16 voting members, 6 non-voting members and 36 guests (58 total). Kevin Jones, Chair, presided over the meeting. Normann Fischer, Vice Chair, recorded the meeting minutes. The meeting was called to order by Kevin Jones on Monday, January 11, 2021 at 1420 CST. Kevin led the review of the minutes from the September virtual meeting, then asked for a motion to approve. Jörg Blumschein motioned to approve, with second from Normann Fischer. As no objections were raised, the minutes from September were approved.

1) The chair gave an update on the test system and stated that the model is working well with up to 25% inverter-based resources (IBR's).
2) The chair reviewed the latest document (Draft 1_04) and update the attendees with respect to the changes made to the document.
3) The chair stated that the document is progressing well. New writing assignments were assigned with respect to:
    a. The introduction section will be reviewed by Melvin Joseph and Art Buanno.
    b. The Definitions section will be updated/expanded/reviewed by Abu Zahid.
    c. Section 3, "Power Swing Phenomenon", will be reviewed by Gopal Gajjar, Muhammad Hamid, Zhiying Zhang and Ramakrishna Gokaraju.
    d. Section 4, "Conventional Impedance Relay Power Swing Detection Methods", will be reviewed by Ramakrishna Gokaraju and Matchyaraju Alla.
    e. Section 7, "Conventional Impedance Relay Power Swing Settings Philosophy", will be reviewed by Qun Qiu, Muhammad Hamid, Kanchanrao Dase, Gopal Gajjar and Ramakrishna Gokaraju.
4) Manish Patel gave a presentation that asked the question "How should inverter based resources" be modelled /represented in out-of-step studies. Manish will write a couple of paragraphs to be considered for inclusion in the tutorial on the subject.

Kevin Jones adjourned the meeting at 1520 CST.

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

Chair: Karl Zimmerman
Vice Chair: Ted Warren
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 at 2:20 PM on January 13, 2021 with 43 attendees, including 13 of 24 voting members. Thus, a quorum was established.

Chair, Karl Zimmerman presided over the meeting. He brought the meeting to order, and showed the agenda, and guidelines for IEEE working group meetings. Vice-Chair Ted Warren recorded minutes, and D SC V-Chair Meyer Kao moderated the Chat window.

The Chair reviewed previous activities, including the Working Group title, output, and assignment. The Chair also reported that Draft 6.0 is available on the pes-psrc web site.

S. Billaut and Daniel Lebeau presented and discussed their write-up on the impact of CT saturation on distance elements. This included a proposed solution of adding timers to ride through a Zone 2 drop out during a fault. They also created some tables to show magnitude and angle errors based on CT saturation voltage and X/R ratio.

Ryan McDaniel and Jared Candeleria discussed some changes to Section 3.0 on Quadrilateral Element Design and Polarizing, including some comments to the existing section and an added section on how polarizing affects the tilt of the reactance line. There was some discussion on this section regarding different approaches used by different designers.

Meeting was adjourned.

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 will not meet in May. The plan is to meet in September.

D35: Evaluation of Transmission Line Pilot Protection Schemes

Chair: R. Gamble
Vice Chair: Brandon Lewey
Assignment: Prepare a technical report to the line protection subcommittee to evaluate advantages and disadvantages of common transmission line pilot protection schemes, including step-distance, 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, January 12, 2021 at 8:00am remotely via WebEx with 20 members and 34 guests.

The WG discussed next steps in bringing the report to completion. A few pilot schemes will be added solely for discussion purposes. References and citations are being provided by the contributing members

on their respective sections and figures within the report needs to be revised to follow PSRC Standard symbols. A separate meeting will be held to discuss the summary table with those volunteering to contribute.

Several assignments were made, some new and some old.

Draft 10 will be distributed to working group members for review.

For the next meeting, WG D35 will need a room for 40 and a computer projector, unless meeting remotely.

Action Items:

- Contributing Members – cite references in respective sections
- Scott Cooper – add a paragraph regarding Traveling Wave in Section 2
- Art Buanno – add a paragraph regarding PUTT Schemes in Section 2
- Contributing Members – finalize the Summary Table
- Rick Gamble – revise all diagrams to match PSRC Standards

D37: Impact of Series Compensation on Transmission Lines

Chair: M. Kockott
Vice Chair: Luis Polanco
Secretary: Nuwan Perera
Assignment: Prepare a report on the impact of fixed series compensation on transmission line protection.

D37 met as scheduled on Monday, 11 Jan 2020, 1.10-2:10 PM with 32 attendees (12 Members and 20 Guests).

Previous meeting minutes have been reviewed and approved.

WG reviewed the list of writing / review assignment. New/ revised Assignments Writing Assignments
Section 3.4: Bank unbalanced protection

- Provide a draft: Mukesh Nagpal

Section 5.2.1: Considerations for protection settings

- Provide input for section 5.2.1 based on field reported events/failures - Luis Polanco

Section 5.4: In-service period, from perspective of line protection
Provide a draft: Nuwan Perera
Section 5.3: Requirement/benefit of performing staged fault testing

- Provide a draft: Mike Kockott to work with Aaron Martin

Section 6.2: Impact on faulted phase selection (distance vs current differential)

- Provide a draft: Jackie Wilson, Kanchanrao Dase, Athula Rajapakse

Section 6.3: Impact of system topology and operating configurations on fault location determination

- Provide a draft: Nuwan Perera Reviews Assignments

Section-3

- Normann Fischer

Section-4

- Mike Kockott

Section-5

- Nuwan Perera

Section-6.1

- Jayaprakash Ponra

Action items

- Volunteers to provide their feedback to Secretary: April 16
- Secretary to send the updated draft (1.05): April 23

With no further business, the meeting was adjourned.

Requirements for May 2021 meeting: single session, room for 25 attendees plus a projector (not applicable for WebEx meetings).

D38: Impact of High SIR on Line Relaying

Chair: Chris Walker
Vice Chair: Greg Ryan
Assignment: Prepare a technical report to the line protection subcommittee to evaluate the impact of high SIR on line protection.

64 total participates in attendance. 25 Voting Members, 10 Non-Voting Members, & 29 Guests.

Chris opened the meeting at 10:20AM CST. We approved previous minutes. Chris updated the group on where we stand with the current draft. We had 2 assignment turned in prior to today's meeting from Charles Sufana and Abu Zahid but those have not yet been incorporated into the current draft. Chris then went through the writing assignments and due dates.

Pratap spoke up and has written a paper that will help with this paper. Pratap will update pertinent sections based on that paper and other sections may benefit from review/rewrite based on that paper.

Bogden also has written a paper that is waiting for peer review and then will send to Chris to help with this report as well.

Chris will incorporate the sections we have received recently and send out the latest draft to the working group within two weeks. All outstanding assignments are due by 4/1/21 to be incorporated prior to the May meeting.

Volunteers
Taylor Raffield volunteered to review a section as needed.
Melvin Moncey Joseph volunteered to review a section as needed.
Alla Deronja volunteered to review a section as needed.
Josh Lamb volunteered to review a section or the paper as a whole.
Karl Zimmerman volunteered to review any section or overall.
Romula Bainy volunteered to review any section.
Femi Oyebanjo EM relay review and other sections as needed.
Pratap and Rick will work on writing Operating Speed and Electromechanical Relays Section.

Steve Klecker volunteered for the Line Differential Section.
Nabil El Halabi Fares Volunteer for Application Example Section

Chris will organize the volunteers that agree to review sections as needed and let them know which sections require review. After discussing the report outstanding sections and volunteers Chris adjourned the meeting.

D39: Revise C37.104 IEEE Guide for Automatic Reclosing of Circuit Breakers for AC Distribution and Transmission Lines
Chair: Manish Patel
Vice Chair: Brandon Armstrong
Assignment: Revise C37.104 Guide for Automatic Reclosing of Line Circuit Breakers for AC Distribution and Transmission Lines.

The working group met via a conference call on January 12th, 2021 at 9:10 am CT with 22 members and 53 guests. Quorum was met (based on attendee list provided by webex meeting log). The meeting minutes for September 2020 were approved.

Presiding Officer – Manish Patel
Meetings recorded by – Manish Patel

In November 2020, the Chair had asked the voting WG members to review and vote on draft 1.1. The chair clarified that the WG vote was requested to approve to move the draft standard to the sponsor for IEEE Standards Sponsor Ballot. The chair noted that 23 out of 34 voting members casted vote. Results are noted below:

Approve – 12 votes
Approve with comments – 9 votes
Disapprove with comments – 2 votes

In summary, majority of voting members responded and more than two-thirds of responders casted vote to approve/approve with comments. The WG plans to review and resolve comments in upcoming months via web meetings (to be arranged by the Chair).

The WG used rest of the meeting time to review received comments and revised following definitions. Manish Patel via Addis Kifle will send revised definitions to the I2 WG for review and feedback.

autoreclosing: The closing of an interrupting device in order to restore a~~n~~ power system element to service following an automatic tripping of that device. ~~Autoreclosing does not include automatic closing associated with shunt or series capacitor banks or shunt reactors.~~

delayed autoreclosing: Refers to autoreclosing of an interrupting device ~~circuit breaker~~ after a time delay that is intentionally longer than that for high speed autoreclosing.

high-speed autoreclosing: ~~Refers to the autoreclosing of a circuit breaker after a necessary time delay to permit fault arc deionization with due regrard to coordination with all protective systems. This type of autoreclosing is generally not supervised by voltage magnitude or phase angle.~~ A type of autoreclosing

that has minimal time delay to allow for fault arc deionization and to acheive the fastest possible restoration time.

D42: Revise C37.113, Guide for Protective Relay Applications to Transmission Lines
Chair: Jeff Barsch
Vice Chair: Rick Gamble
Secretary: Josh Lamb
Assignment: Revise C37.113-2015, IEEE Guide for Protective Relay Applications to Transmission Lines

a) Officer presiding – Jeffrey Barsch, Rick Gamble, and Josh Lamb
b) Officer recording minutes – Josh Lamb
c) Call to order – Jeff Barsch
d) Chair's remarks – Covered the IEEE Code of ethics, IEEE SA Copyright policy, Patent slides
e) Results of call for quorum – Quorum Achieved 30 of 43
f) Approval of Agenda (motion and second) – Daniel Lebeau Motioned to approve Sebastien Billaut second. Agenda approved.
g) Approval of Minutes of previous meetings (motion and second) – Alla Deronja Motioned to approve, Steve Conrad Second. Minutes approved.
h) Brief summary of discussions and conclusions including any motions.
    a) Reviewed list of Writing assignments (complete by April 15th send comment via new document)
        i. iMeet central is set up.
        ii. Section 6.6 (Multiterminal line protection) – Sebastian Billaut, Kamal Garg, Jim van de Ligt, Pratap Mysore, Qun Qiu, Vamsi Vasireddy; assigned Qun Qiu as lead
        iii. Section 6.7.2 (Load encroachment and loadability) – Abu Bapary, Rafael Garcia, Steve Klecker, Alexis Mezco; assigned Rafael Garcia as lead
        iv. Loss of potential overcurrent scheme – Daniel Lebeau
        v. Section 6.5 (Ground directional polarization) – Jorg Blumschein, Madhap Paudel, Karl Zimmerman – lead not assigned
        vi. Long Radial Taps – Taylor Raffield, Chris Walker; assigned Chris Walker to lead
        vii. Dual element spot network – Abu Zahid
        viii. Section 6.2 (Enhance zone 2 protection section) – Alla Deronja, Nathan Gulczynski, Federico Lopez, Abu Zahid; assigned Nathan Gulczynski to lead
        ix. Resistive Reach for Ground Quadrilateral Distance elements – Sebastian Billaut, Daniel Lebeau; assigned Daniel Lebeau to lead
        x. Section 5.10 (parallel lines feeding a load) – Silviu Boanta, Arun Shrestha, Abu Zahid; assigned Arun Shrestha to lead
        xi. Section 5.2 (SIR and voltage discrimination) – Chris Walker
        xii. Torque and voltage control for phase time overcurrent relays – Jeff Barsch, Steve Conrad, Ilia Voloh; assigned Ilia Voloh to lead
        xiii. Figure updates – Steve Conrad, Charlie Sufana, Walter McCannon; assigned Walter McCannon to lead
        xiv. 4.1 – 4.5 - Mohammed Hamid, Femi Oyebanjo to review
        xv. 4.6 – 4.8 – Alla Deronja, Nabil El Halabi Fares, Don Lukach to review
        xvi. 5.1 – 5.5 – Kamal Garg, Onur Usmen to review
        xvii. 5.6 – 5.8 - Jim O'Brien, Chris Walker to review
        xviii. 5.9 – 5.13 - Mike Kockott, Ilia Voloh to review

xix. 6.1 – 6.2 – Brandon Lewey, Bruce Mackie to review
xx. 6.3 – Rick Gamble, Hardesh Khatri to review
xxi. 6.4 – need a volunteer to review
xxii. 6.7 – need a volunteer to review
xxiii. 6.8 – 6.9 – Jorg Blumschein, Mike Kockott to review
xxiv. – 6.11 – need a volunteer to review

b) Ilia Voloh and Kamal Garg suggested that more information should be added regarding subsynchronous resonance and how it affects line protection.
c) Use of Loss of Potential Overcurrent Protection presentation by Ted Warren

i) Motion to Adjourn – Sebastien Billaut First, Second – Abu Zahid

D43: Effect of Distribution Automation on Protective Relaying (Report)
Chair: Greg Ryan
Vice Chair: TBD
Assignment: Update the technical report "Effect of Distribution Automation on Protective Relaying".

Working Group D43 met virtually on January 13, 2021 at 09:10-10:10AM CST. There were total of 28 attendees in the meeting, 17 members and 11 guests.

Meeting Agenda

1) Introductions/Sign-up sheet/roster
2) Review Working Group Membership and Membership Process
3) Discuss status and assignment of report
4) Discuss updates to report
5) Discussion of next steps
6) Adjourn

Summary of Meeting Discussion

a) Since the attendee list was available and, to save time, no formal introduction was done. The meeting started with the review of September 2020 minutes.
b) The current Roster includes all the guest who attended the TF meeting as the member. Membership continuity will be treated similar to PAR-related activities (2 attendance out of last 4 meetings).
c) The scope of assignment was created based on the discussion on September meetings with the proposed additions by members (distance protection application in distribution systems,

telecommunication requirements, DTT for DERs, microgrids, etc.). It was also agreed to first revise report and then investigate the possibility of creating a guide.

d) It was discussed to start with the current report structure and identify the list of items to be added to the outline. Subsequently, the outline will be revised as a whole.

e) Matthew B. mentioned that Annex B has some related information to Sections 2.1 & 2.2 (History Section)

f) The Chair went through the existing report, and a list of volunteers to review various sections was created (task assignment).

g) Don L. recommend that all reviewers be Cognizant of the language to be used in creating this report. The suggestion was to use the same language as guide and PAR-related documents. There is a presentation on the knowledge-based section of the PSRC website with examples (https://www.pes-psrc.org/kb/PAR%20Word%20Use.pdf).

h) Reviewer to send their comments/revisions to officers by April 1, 2021.

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

Chair: S. Billaut
Vice Chair: Karl Zimmerman
Assignment: Revise C37.114, IEEE Guide for Determining Fault Location on AC Transmission and Distribution Lines

Working Group D44 met Wednesday at 15:30CT with 62 attendees, via the virtual online Webex.

Chair, Sebastien Billaut presided over the meeting. He brought the meeting to order, and showed the agenda, IEEE copyright guidelines, and guidelines for IEEE working group meetings. Vice-Chair Karl Zimmerman recorded minutes, and he and D SC Vice Chair Meyer Kao moderated the Chat window.

The Working Group D44 attendees, included 19 out of 35 Voting Members present, so a quorum was established.

The Chair presented inquired about voting to approve the minute of the September 2020 meeting. The Mike Bloder moved to approve and James O'brien was second there was no opposition to approving the minutes.

The Chair then reviewed the assignment list and tentatively all were set with a may 2021 deadline.

The Chair then presented the 3 contributions that are posted on imeet.

- Yu liu and Yuan Liao provided review on the section 4 and 7 of the existing documents. Other reviewers were invited to add their comments to their comments.
- The next contribution was from Yuan Laio and was related a variation of the 2 ended method based on negative sequence quantities which did not require knowledge of the line impedance.
- The last contribution was also from Yuan Laio was related to microgrid and traveling wave fault location for one.

Both the later contribution generated discussion on whether they belonged in a guide: Several WG members, including Ritwik Chowdhury and Mohammad Zadeh, expressed that a guide should include methods that are applied or practiced in actual power systems. Karl Zimmerman suggested there may be

a place for new or developing approaches under “other technologies” the consideration appeared to be accepted. The Chair left the discussion open ended for a later resolution.

There was a discussion involving using Fault Circuit Indicators and communications to identify a faulted section of a distribution line.

Karl Zimmerman presented a spreadsheet for processing the calculation of the 2 ended method.

Tony Seegers motioned to adjourn, he was seconded by Daniel Sabin, with no opposition the meeting was adjourned.

DTF45: Investigate the need to create report on reduction of forest fire hazard
Chair: Bruce Mackie
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.

Task Force DTF45 met virtually on Tuesday, January 12, 2021 at 2:20pm CDT in a single session with 72 attendees. All attendees were considered members of this task force.

Minutes of the September meeting were approved upon motion of Jonathan Sykes and second by Jalal Gohari after one spelling correction. The presentations from the previous meeting were summarized.

A discussion ensued regarding IEEE agreement to perform a legal review of the document when a draft is completed.

Upon motion by Normann Fischer and second by Joe Xavier, the task force approved the recommendation to the subcommittee to form working group D45, Protection Methods to Reduce Wildfire Risks due to Transmission and Distribution Line. Upon motion by Mike Messinger and second by Normann Fischer, the task force approved the following proposed assignment for the working group: Prepare a technical report to the line protection subcommittee to document protection methods used to reduce wildfire risks due to transmission and distribution lines. The chair of the task force stated two volunteers have been selected to lead the working group. The chair will be Jonathan Sykes and the vice chair will be Scott Hayes.

Jonathan Sykes and others discussed the benefits of the paper.

Based on the recommendation of the DTF45, a new working group is to be formed, with motion by Alla Deronja and seconded by Jorg Blumschein. The motion passed. The assignment of the working group will be “Prepare a technical report to the line protection subcommittee to document protection methods used to reduce wildfire risks due to transmission and distribution lines”

The new D45 working group will be chaired by Jonathan Sykes with Scott Hayes being the Vice Chair.

DTF46: Create a summary paper on C37.230 Guide for Protective Relay Applications to Distribution Lines

Chair: Brian Boysen

Vice Chair: TBD
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.

- The task force (TF) met via web meeting on Wednesday January 13, 2021 10:20 am CST.
- There were 22 people in attendance. Attendance list attached in a separate file.
- The Agenda was presented.
- The TF discussed the status of IEEE37.230-2021 which was approved in December and is currently going through technical revision by IEEE with a tentative issue date in Mid March 2021.
- The TF recommended forming a working group with an assignment to develop a Working Group (WG) to write a summary paper for IEEE 37.230-2021. The specific assignment recommended by the working group is "To develop a summary paper for IEEE C37.230-2021, "IEEE Guide for Protective Relay Applications to Distribution Lines". 11people volunteered to become members of the new working group.
- The TF reviewed the IEEEE 37.230-2007 summary paper which could be used as a starting point for the IEEE 37.230-2021 summary paper.
- The following people volunteered for writing sections for the new Summary Paper. Assignments are due 4/1/2021. Word format is fine.:
    - Brian Boysen: Section 1: Introduction
    - Patrick Carroll: Section 2 (Clause 4 from IEEE C37.230) : Fundamentals
    - Bruce Mackie: Section 3 (Clause 5 from IEEE C37.230) : System Configuration and Components
    - Juan Gers: Section 4 (Clause 6 from IEEE C37.230): Protective Schemes
    - Qun Qiu: Section 5 (Clause 7 from IEEE C37.230): Criteria and Examples
    - Josh Lamb and Brian Boysen: Section 6 (Clause 8 from IEEE C37.230): Special Applications
    - Brian Boysen will compile writing assignments into the proper Summary Paper Template which is believed to be the IEEE PES Technical Paper format which will be confirmed by Bruch Mackie.
- Assuming a Working Group is formed, the working group will meet for its first meeting at the May 2021 PSRC Meeting. Request is for a single session.

Based on the recommendation of the DTF46, a new working group is to be formed, with motion by Brian Boysen and seconded by Charlie Sufana. The motion passed. The assignment of the working group will be "Create a summary paper on C37.230 IEEE Guide for Protective Relay Applications to Distribution Lines"

The new D46 working group will be chaired by Brian Boysen.

DTF47: Investigate the need to revise C37.243 IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication \
Chair: Alla Deronja
Vice Chair: TBD
Assignment: To investigate a need for revision of the IEEE Guide C37.243 and make a recommendation to the D subcommittee.

The SC D Task Force 47 met with 55 participants on Wednesday, January 13, 2021, at the winter virtual PSRC meeting.

The chair explained the purpose of the task force and presented an agenda for the meeting. The original version of the guide considered for revision was published in 2015 and will become inactive in 2025.

The task force reviewed the guide's Scope and contents. There is presently no purpose in this guide.

The chair presented possible additions and revisions that may be considered in the future revision of the guide such as adding a line current differential (LCD) function based on the Travelling Wave method and restructuring Clause 6 Communication scheme design to make it more user-friendly for protection engineers with little or no experience in communications.

The TF participants brought additional topics such as PMU-based LCD protection schemes, expanding on a topic of non-conventional instrument transformers such as Rogowski coils used for LCD, and adding material on utilizing the current differential function for networked distribution lines.

Based on these ideas, the task force concluded a revision of the guide should be made. Then, the task force reviewed the title and the scope of the guide and, also, proposed a purpose that was crafted from the introduction to the guide and modified.

It appears there is a significant interest among the TF participants to support this project as members of the future working group. The task force agreed to meet again at the PSRC May 2021 meeting to finalize the revision guide's title, scope, and purpose.

The assignment of the future working group will be to revise C37.243 IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication.

A PAR to initiate the project will be submitted to IEEE-SA after the TF meeting in May.

TF participants interested in continuing as future WG members are asked to review the present version of the guide and suggest additional new or revision topics to the TF chair.

We request a meeting at the PSRC May 2021 meeting. Please avoid conflicts with C31 and K22.

Liaison Reports
T&D Committee / Distribution Subcommittee

The T&D Committee / Distribution Subcommittee meeting was held virtually during JTCM, January 11 - 15, 2021. The next planned meeting will occur during the IEEE Virtual GM Meeting, 25 - 29 July 2021.

The Distribution Subcommittee is comprised of working groups focused on Distribution Reliability, Switching and Overcurrent Protection, Smart Distribution, Distributed Resource Integration, and Voltages at Publicly and Privately Accessible Locations. Additional information is available from: https://cmte.ieee.org/pes-dist/

The following are items of interest to the Line Protection Subcommittee:
Working Group on Smart Distribution https://cmte.ieee.org/sdwg/
Sal Martino, Chair Fred Friend, Vice-Chair Kate Cummings, Secretary

P1854: Smart Distribution Application Guide has been published.
Scope: This guide categorizes important smart distribution applications, develops descriptions of the critical functions involved, defines important components of these systems, and provides examples of the systems that can be considered as part of distribution management systems or other smart distribution systems. The Guide was published on August 31, 2019. As a result of comments received during the balloting, a new PAR has been approved with PSCC and PSRC as joint sponsors.

Volt-VAR Optimization Working Group https://site.ieee.org/pes-vvtf/
Mike Simms, Chair Suresh Gautam, Vice-Chair John Sell, Secretary

P1885 'Guide for Assessing, Measuring and Verifying Volt-Var Control Optimization (VVO) on Distribution Systems' was balloted and approved. The working group is working toward publication.
Scope: This guide provides practical methods for assessing, evaluating and verifying the benefits and impact of electric power demand, energy consumption and loss reduction of volt-var control optimization on electric power distribution systems.
Purpose: The purpose of this guide is to provide practical methods to estimate and verify the potential energy savings, demand reduction and loss reduction that can be achieved with distribution system VVO methods. This guide establishes uniform methods for distribution system modeling/measurements, load modeling/measurements, and performing assessment studies and pilots to forecast and verify the benefits.

Working Group on Switching & Overcurrent Protection http://grouper.ieee.org/groups/td/dist/sop/
Fred Friend, Chair Clay Stocklin, Vice Chair Joe Viglietta, Secretary

P1806 "Guide for Reliability Based Placement of Overhead and Underground Switching and Overcurrent Protection Equipment" was re-balloted and the working group is addressing comments.
Scope: This guide provides analytical techniques to assist in the placement of switching and overcurrent protection devices on medium voltage distribution circuits for reliability purposes.
Purpose: This guide provides means and methodologies for proper placement of switches and protective devices to achieve the desired performance characteristics and reliability for medium voltage distribution circuits, including feeder and branch line equipment, with operating voltages up to and including 38 kV. Drivers for device placement, such as reliability and operational considerations are identified. Various types of switching and overcurrent equipment are covered such as: manual switches, automated switches, reclosers, sectionalizers, and fuses. Impacts on reliability and device placement are addressed for factors such as fault rate, interruption duration, exposure miles, customers affected and distribution automation.

There are two Task Forces in the Distributed Resources Integration Working Group working on Microgrid Design Considerations in collaboration with PSRC C38 working group and the Energy Storage task force.

Old Business: None

New Business: None

General Discussion: None

Adjournment Motioned by Jonathan Sykes, seconded by Greg Ryan

H: RELAYING COMMUNICATIONS SUBCOMMITTEE

Chair: Aaron Martin

SC H met on January 14, 2021 via WebEx with 36 members and 59 guests present comprising a quorum.

Announcements:

a. New items from September 2020 AdCom Meeting

b. New items from Awards and Recognition Meeting: None

c. New from Standards Coordination Meeting: No meeting

d. New items from SC and reminders carried from prior meetings:
   i. Formation of H WG for P1854
   ii. WG officers to attend Stds Coordination meeting
   iii. SC Members are required to Vote on Reports
   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

WG business:

The below 4 motions were carried electronically prior to the meeting

Motion: WG H22 motions to submit IEEE Guide PC37.249 Draft 8.14, Guide for Categorizing Security Needs for Protection Related Data Files, to IEEE-SA for Sponsor ballot.
Motion made by WG H22 Chair Amir Makki, seconded by Mark Adamiak. Motion was approved with 34 (of 41 SC H Members) in favor, 0 opposed, 2 abstained.

Motion: WG H51 motions to revise: IEEE Standard PC37.239, Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems, with the following Assignment, Scope, and Purpose.

Proposed Title: IEEE Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems
Output: IEEE Standard, Project Number: PC37.239
WG Assignment: Revise IEEE Std C37.239-2010, IEEE Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems, with the following Assignment, Scope, and Purpose.
Proposed Scope: This standard defines a format for files containing event data such as sequence Sequence of events Events or fault summary reports collected from power systems or power

system models. The format is intended to provide an easily interpretable form for use in exchanging data.

Proposed Purpose: This standard defines a common format for the data files needed for the exchange of various types of power network events in order to facilitate event data integration and analysis from multiple data sources and from different vendor devices. The flexibility provided by digital devices in recording network fault event data in the electric utility industry has generated the need for a standard format for the exchange of data. These data are being used with various devices to enhance and automate the analysis, testing, evaluation, and simulation of power systems and related protection schemes during fault and disturbance conditions. Since each source of data may use a different proprietary format, a common data format is necessary to facilitate the exchange of such data between applications. This will facilitate the use of proprietary data in diverse applications and allow users of one proprietary system to use digital data from other systems.

Chair: Mark Adamiak

Motion made by Mark Adamiak and seconded by Amir Makki. Motion was approved with 36 (of 41 SC H members) in favor, 0 opposed, 0 abstained.

Motion: Motion to form a Task Force to review revision of C37.232 IEEE Standard for Common Format for Naming Time Sequence Data Files (COMNAME)
Motion made by Amir Makki, seconded by Theo Laughner. Motion was approved with 35 (of 41 SC H Members) in favor, 0 opposed, 1 abstained.

Reports from the WG Chairs

H6: IEC 61850 Application Testing

Chair: C. Sufana
Vice Chair: B. Vandiver
Output: Report
Established: 1999
Expected completion date: September 2020
Draft: 17.6

Assignment: Write a report to the H Subcommittee on application testing of IEC-61850 based protection and control systems. Emphasis will be on the GOOSE functions.

There were 7 voting members, 4 non-voting members, and 29 guests present.

The technical report Application Testing of IEC 61850 Based Systems PES-TR84 is now finished and has been published. It can be found 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)

For those that the are interested, the first document H6 published may be found on the PSRC webpage at: DRAFT H6 PAPER (pes-psrc.org)

The WG decided to develop a summary transaction paper for the technical report. Peiman Dadkhah indicated that he would take a look at what could be put into a summary paper. Charlie is looking for other volunteers to work on a summary paper.

Charlie also indicated that he is putting together a PowerPoint presentation for a possible future MAIN Committee meeting

The WG will meet at the next PSRC meeting to go over the summary paper.

H17: Establishing links between COMTRADE, IEC 61850 and CIM
Chair: C. Brunner
Vice Chair: A. Apostolov
Output: Report
Established: 2010
Expected completion date: May 2021
Assignment: Develop a standards approach to link IEC 61850, CIM and COMTRADE so that the COMTRADE channels can be associated to a node in the power network.

The meeting was attended by 5 members and 13 guests.
The WG reviewed the last changes on the draft report and agreed to have the report submitted to SC H for circulation.

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

Chair: A. Makki
Vice Chair: Cesar Calix
Secretary: Hugo Monterrubio
Ballot Administrator: Rick Cornelison
Output: Guide - PC37.249
Established: January 2014
Expected Completion Date: December 2020
Draft: 8.14

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

The WG met on time. Quorum was established with 8 votes out of 12 members present. The WG chair informed that there were no minutes to approve since we didn't meet last September. He announced that our PAR has been extended to December 31, 2021.

Meeting Activity:
1. Reviewed & addressed Craig Preuss comments.
2. Reviewed and discussed figures and images included in the document to verify that they are properly edited (cropped for compliance with new copyright rules).

3. Volunteers to lead the balloting pool activity and to submit the results to the IEEE SA: Amir Makki, Cesar Calix, Thomas Cease and Hugo Monterrubio. Activity will start right away with a goal to have this done within a few months.
4. Tony Johnson made a motion to use draft 8.14 as the version to initiate balloting process. The motion was seconded by Hugo Monterrubio. The motion was voted and it passed with 8 votes out of 12 members in the WG.

Craig Preuss amended to this motion to specify a Clean Copy of revision 8.14. The amendment was seconded by Hugo Monterrubio and passed without objection.

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

Chair: Mario Capuozzo
Vice Chair: Benton Vandiver
Secretary: Zach Makki
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.

H27 met with 10 voting members and 14 guests present.

The four slides related to patent declaration provided by IEEE-SA for standards development meetings were presented by the chair. The chair provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) of which the participant is personally aware and that may be essential for the use of that standard. No patent claims were provided in response by attendees.

Minutes from the last meeting on 2020 November 18 were reviewed and approved.

Discussion focused on how COMSET files would be classified as a new type of IEC 61850 file or as a new version of an existing SCL file type defined by IEC 61850. That is, the discussion focused on the relationship of COMSET to the following IEC 61850 file types: IED Capability Description (ICD) files, Substation Configuration Description (SCD) files, and Instantiated IED Description (IID) files.

The WG discussed plans to submit COMSET upon completion to IEC Technical Committee 57 for consideration for inclusion in the next edition of IEC 61850.
Other topics discussed during the meeting included whether to include a new “isDefault” element and whether there needed to be a quality flag on settings.

In IEC 61850, the normal representation of analog values is referenced to the primary side of a PT or CT. The meeting discussed issues that arise from the need to also represent values in per unit or referenced to a transducer secondary. As with the last meeting, the attendees at this meeting generally agreed that

implementation of this option would increase the amount of complexity for reading and writing COMSET files, but it would also increase willingness to adopt COMSET. The WG seemed to agree that COMSET would need to offer options for both primary and secondary. The WG discussion focused on the need to convert between primary and secondary values. If a user stores primary values, then the user needs to provide the extra information to convert to secondary.

The following action items were identified during the meeting:

1. The WG chair will make another draft of IEEE PC37.251 and will post it on the iMeet Central website.

2. All WG members should review the draft and provide comments to the chair.

H30: <u>IEC 61850 User Feedback</u>

Chair: D. Maragal
Vice Chair: A. Martin
Secretary: D. Tessier
Output: User Feedback
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.

Deepak Maragal shared Link for H30 IEEE-SA and presented site.

Deepak Maragal reviewed minutes form November 24th meeting.

Deepak Maragal brought up new item : Cyber security implications of Simulation Mode.
Alex Apostolov explained that WG10: 10-3 is focused on user rolls. Both discussed roll of H30.

Backward Compatibility Issues with SCT & ICT.
Newer tools cannot open older files or edit them. Proposed solution to archive the SCT & ICT software installation files for future reference/use. Jess Silvia mentioned that firmware be included in process.

Herb Falk said that a backward compatibility test is required for SCT and ICT and said it was available in edition 2.1 test procedures This is about to released for servers. IEDs and ICTs have to be tested at the same time. This is part of the server compliance testing. This is already SCT and ICT testing. Deepak request that UCA present what testing is available in terms of SCT and ICT testing.

SV streams may have impact on highspeed protection when “glitch” may occur in stream. Discussion regarding the use of back up merging units streams to increase reliability. Deepak explained that the subject is meant to help build a more robust digital system. Herb stated that 90-20 identifies this specific use case.

Business Case – Deepak Maragal presented a table that describes the quantification of applying 61850 functions vs. conventional. Herb made the point that each of these attributes depend on the type of application of in 61850. Alex A. referred to a PAC magazine edition dedicated to the business case for 61850. Alex to share with Deepak who will put the link on the IEEE-Imeet site. Craig Preuss mentioned that during the drafting of 2030.100 that there was a lot of resistance to detailing business case for 61850 and was ultimately paired down. Herb F. mentioned that IEEE anti-trust rules don't allow the discussion of costs.

Opensource Projects and Tools
Herb F. mentioned he maintains a Wireshark version called Skunkworks. http://www.otb-consultingservices.com/home/shop/skunkworks-network-analyzer/

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 of protection functions.

Meeting was attended by 13 members and 2 Guests.

This meeting highlighted and discussed the two major concerns of existing logical node model:
1. Duplication of Attributes
2. Inconsistent representation and overloading of attributes

Duplication of Attributes
In continuation to the previous presentation nearby Alex Apostolov on nesting of logical nodes, the author presented the model of existing PDIS logical node, where in the PIOC element for SOTF function could be separated from the existing model. Following items were discussed in detail with regard to the PDIS logical model:

Phase Distance parameters are same as Ground Distance except the ClcSrc : Duplication of parameters

There is nowhere wherein Phase and Ground Distance elements are instantiated in the same LN

External Sync has nothing to do with PDIS
An alternate model was proposed and discussed wherein the timer elements and the PIOC-SOTF were nested, restraint element were nested from harmonic elements

Inconsistent representation and overloading of attributes
The differential element PDIF attributes were analyzed and compared against its usage for Transformer differential, Bus differential, Line differential, Capacitor bank Voltage differential applications. The following attributes were analyzed in detail:

87V characteristics is different from Rest
87L Characteristics is different from Rest
87T always has 2nd harmonic Restraint/block
87G can have 5th Harmonic Restraint/Block

The need for splitting these elements attributes separately from general comprehensive PDIF logic node was highlighted.

Chair (Deepak) would compile these attributes and indicated conducting the Webex sessions and discussing these attributes in a comprehensive manner for consensus with H31 WG.

H32: Performance considerations for Ethernet circuits applied to teleprotection

Chair: K. Fodero
Vice Chair: W. McCannon
Output: Report
Established: September 2014
Estimated Completion Date: December 2020
Draft: 10

Assignment: Develop a report on the use of Ethernet transport for teleprotection services and line current differential protection. This report will define the channel performance requirements for Ethernet transport systems / circuits that carry pilot protection communications.

The WG met on Wednesday, with 8 members and 20 guests in attendance.

The WG reviewed the published document and discussed the content and flow of the PowerPoint presentation for the main committee meeting in May.

Content owners were identified for the presentation:
Craig Palmer, Tom Dahlin, Galina Antonova

H40: Databases used in SAS

Chair: T. Laughner
Vice Chair: M. Capuozzo
Output: Guide
Established: 2017
Expected completion date: December 2022
Draft: 2

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

The WG met on Wednesday, with 3 members and 7 guests in attendance.

Chair then reviewed the history of H40, changes in leadership, change to the output of the group, as well as the 2 year PAR extension that was just approved. New expiration date is 31 Dec 2022.

- Along with PAR extension, PAR was modified from a practice to a guide.

Chair reviewed the latest draft of the Guide, starting with the overall structure of the document.

- Question was raised about the purpose of the Guide.
- Chair explained that the real goal of the Guide is to help bring database vocabulary to the protection engineer so that they can have more informed discussion with IT.
- Chair notes that IT has invaded the protection engineering realm, and so these engineers may need information to help them make decisions about setting up database solutions.

Question raised about Chapter 4, are all of the use cases in there? Chair notes that if we had a model section, it would go into Chapter 4.

- Chair notes that we may wish to do so.
- Jayaprakash Ponraj offered to help with this new models section.

Chair observed that the different database types have various requirements/pros/cons. Thus, the purpose for Chapter 7 is to help the protection engineer determine the appropriate requirements.

It is clarified that this Guide would work for an entire utility, but Chair notes that we are talking more about OT personnel, not IT. "Stakeholders" are the people in the field.

Scott Mix says we need to be careful not to get lost in the weeds, focus on aspects for field devices (IED, HMI).

Again a question was raised about the purpose of the guide. Chair responded.

- Part of the purpose comes from NASPI/Synchrophasor work - Anthony Johnson.

Tony Seegers offered to compare our definitions against IEEE library.

In section 4, we want to provide a reference architecture for each database type. If we are storing measurements, looks more like a database. If we are talking about files, more object storage.

- We need reference architectures for Section 4.
- Vicechair asked what is intended by reference architecture. Chair brought up example of an AWS information-flow architecture.
- Chair proposed that we preamble section 4 with a data at rest vs data at motion discussion.

Chair continued reviewing the draft guide.

We had a discussion about Cost, and whether or not to write a section about cost/resources. This section could get tricky, as the IEEE might frown upon pricing suggestions.

Anthony Johnson suggests we keep it high level, or take it out completely. There was agreement on this.

Chair brought up discussion of members taking action items.

- Jayaprakash Pronaj offered to handle Section 4 with the addition of models.

Chair proposed next meeting for February 23 2021 at 2:00 PM Eastern.

Jackie Wilson offered to tackle a section. Either 6 or 7 or both.

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: D4E2

Assignment: Revision to IEEE Standard 1646-2004

The WG met on Tuesday, with 8 members and 9 guests in attendance. A quorum was present. This was the 16th meeting. Attendees introduced themselves and affiliation.
The call for patents was presented – no response.
The copyright slides were presented.
The agenda was reviewed and approved without change.
Past minutes were approved.
Those attending focused on the following topics:
Jun Verzosa presented his version of the concept of communication delivery time. A discussion followed including a discussion of the IEC's 3 ms requirement. It was determined that no mention of IEC would be included the document.

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

Chair: A. Martin
Vice Chair: R. Mackiewicz
Output: Guide
Established: May 2018
Expected completion date: January 2022
Draft: 1.3

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

The meeting was called to order by the Chair at 4:32 PM CST with x members and y guest in attendance. A quorum was present. Dave Dolezilek of SEL and Alex Apostolov of OMICRON requested membership

and were eligible. Therefore, membership was acknowledged by the Chair. This was the sixth official meeting. Introductions were skipped.

The call for patents was presented – no response.

Copy right slides were reviewed without comment

The agenda was reviewed and approved without change.

Past minutes were reviewed and approved with motion by Scott Mix and 2nd by Ralph Mackiewicz.

Chair requested that any eligible guests who wish to become members should contact the Chair to become members. Otherwise, they will remain guests.

The Chair set a deadline to complete all unassigned and incomplete sections by May 2020 meeting so that a draft can be prepared for the September 2020 meeting.

Ralph Mackiewicz requested that a formal convention be specified for use throughout the document to use when referring to GOOSE, R-GOOSE, SV, and R-SV. It was decided to use "GOOSE/SV" to refer to all of these combined. All such conventions should be included at the end of Chapter 3 in the Guide.

Ralph Mackiewicz raised a question about the use of Endnotes or footnotes for non-normative references. Scott Mix pointed out that Annex B Bibliography should be used although it is unclear exactly how to do that. All agreed that is the proper approach.

The remainder of the meeting involved the review of the 1.5 draft document outline and work assignments:

Chapter 5 is approximately 33% completed by Ralph Mackiewicz and will be incorporated fully into the draft by the deadline.

Aaron Martin combined his own and Craig Preuss' contributions and reorganized Section 7.3 for better document flow.

The diagrams used in Section 8.1 showing LGOS and LSVS processing are copied directly from the IEC 61850 documents. However, they are critical to be included in the Guide so Aaron will work with IEEE SA to obtain permission from IEC to use these diagrams in the Guide. Christoph Brunner requested that he be copied on the correspondence so that he could support the request to IEC as convener of IEC TC 57 WG 10. This also applies to other diagrams in the Guide that came from the IEC standards.

It was pointed out that the section on LSVS subscription monitoring (8.1.2) included attributes and descriptions that were not part of the standard. A discussion was made about the suitability of including

non-standard attributes in the Guide. Jean-Sebastien Gagnon pointed out that there is a GOOSE/SV validation Task Force currently in process at IEC TC 57 WG 10 that will likely result in extensions to the LSVS, although there is no way to know if the exact attributes described in the current draft would be the result of that work. Although no firm consensus was voted upon, many agreed it would be important for the guide to include descriptions of gaps in the current standard to consider when implementing the monitoring suggested by the Guide. But, the Guide itself is not an effective way to suggest modifications to the standards. An appendix or other mechanism was suggested. Aaron Martin pointed out that H30 would accept this input (Deepak Maragal, Chair of H30 agreed) and Christoph Brunner and Herb Falk suggested these could also be submitted to or the User Feedback Task Force of IEC TC 57 WG 10. The issue was tabled for resolution at a later meeting.

Bharat Nalla volunteered to work on LTRK and LCCH contributions.

Alex Apostolov agreed to review the existing simulation content to ensure relevance and consistency with LGOS/LSVS contributions.

The Chair announced plans to have at least one on-line meeting prior to the next PSRCC meeting in May. A motion was made to Adjourn by Ralph Mackiewicz and 2nd by Scott Mix. Meeting was adjourned at 5:31 CST.

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: May 2018
Expected completion date: December 2022
Draft: 2.0

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

The WG met on September 23, 2020 with 17 members and 48 guests. Chair started the meeting by discussing the IEEE patent policy and other guidelines for WG meetings. No additional comments were received for the August 2020 minutes of meeting approved earlier via email.

Chair went through the project plan – it appears that we are going to meet our PAR deadline of publishing the guide by end of 2022.

Due to the presence of large number of guests, and many first-time attendees to WG H45 meeting and to PSRC meeting, the outline is reviewed. Some discussions were held on the outline – however, no additional suggestions were received on the outline which vindicate year-long effort by WG to develop a good outline. Chair then went through the Draft 2.0 which was posted in iMeet Central on September 16 – comments are due from members by October 30, 2020.

All coordinators will follow-up for pending assignments. All pending assignments are due by November 6, 2020.

We will meet virtually during the PSRC meeting in January 2021. We will prefer the present slot (second on Wednesday morning).

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

Chair: M. Black
Vice Chair: C. Preuss
Secretary: S. Haveron
Output: Recommended Practice
Draft: 0.4
Established: September 2018
Expected Completion Date: January 2023

Assignment: Produce a Recommended Practice for Human-Machine Interfaces (HMI) used in Substation Automation Systems

The chair called the virtual meeting to order on Wednesday 1/13/21 at 13:10 CST. There were 31 attendees: 12 out of 20 voting members (including 1 new member [Jackie Wilson]) and 19 guests, achieving a quorum. Minutes from the meeting in September '20 were approved with Craig Preuss making the motion to approve and Jay Anderson seconding the motion.

After limited introductions, the agenda, patent and copyright slides were reviewed with no comments received. There were no presentations or old business items for this meeting and new business to discuss included a review of the restructured draft document, acknowledgement of writing contributions received, and a call for volunteers for writing assignments.

The Vice-Chair discussed difficulties with the old draft document opening in protected view, which would hinder writers from editing it directly, and security problems with templates and documents that include macros which cause issues with email attachments and even downloads from iMeetCentral. Versions of Microsoft Word and the use of pdfs for reviewing purposes were also discussed.

The Vice-Chair presented the new draft document which has better structure and flow and uses ideas from ISO/IEC 12207 and ISO/IEC/IEEE 24748-1 regarding systems and software life cycle processes and management. In particular, a table was helpful to capture all elements in this iterative process, and also clarified which parts are in or out of scope of H46, from specification to design to implementation to maintenance, and so on.

The need for expandability and maintainability were stressed, for example when adding a new bay in a substation, and ownership of the software which may require changes should be considered through all stages of any project. Tony Johnson offered to try to write this up.

HMIs which include real electrical models, connectivity, transformer impedance, and how these are kept up to date was brought up and Konstantin Gerasimov offered to contribute.

Nirmal Nair offered to write up EMS operation modes, for example study mode.

The Vice-Chair also brought up HMI philosophy, style guides and toolkits and the 30-60-90% design process. Jay Mearns offered to write something on philosophy and to continue with any other writing tasks needed.

Steve Klecker and Xiangyu Ding will help to review the document as needed.

The Chair thanked the volunteers and asked for writing assignments be completed by early April if possible, for their contributions to be included in the draft document before the May meeting.

There were a number of first-time attendees who actively participated and took assignments, and the virtual format is working well. Their help and input are much appreciated.

Future meetings are:

- May 3-6, 2021
  Nashville, TN*virtual*
- September 20-23, 2021
  TBD
- January 9-12, 2022
  Garden Grove, LA
- May 9-12, 2022
  Reno, NV

Jay Anderson made a motion to adjourn and was seconded by Tony Johnson. The motion was approved, and the meeting adjourned at approximately 14:10 CDT.

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

Chair: M. Kanabar
Vice Chair: A. Riccardo
Secretary: D. Ouellette
Output: Report
Completion Date:
Draft: 0.2

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.

H47 met on Tuesday – 47 attendees

Proposed membership list based on contributions

WG members suggested few edits in assignment WG members submitted review comments on early draft of IEC 60255-216-1 document circulated by Eric Udren

We have received volunteers to contribute from utility to are testing P&C application

We are seeking liaison for Subcommittee-D, K, and J to review and contribute specific sections on Line, substation & machine

Non-PAR activity, but WG member requested space in iMeet

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

Chair: G. Stoedter
Vice Chair: TBD
Secretary: L. Erichsen
Output: Report
Completion:
Current Revision:

Assignment: Develop a report/tutorial on switched networks from a pilot protection application point of view for the benefit of relay engineers.

The WG met on Wednesday 1/13/2021 via virtual meeting, with 23 attendees (8 members and 15 guests).

Attendee introductions were skipped. Attendance list was determined from WebEx Attendance records sent after the meeting.

Guidelines for IEEE SA meetings and IEEE SA Copyright Policy were not reviewed since this is not a standards work group and in the interests of time.

The goal of this meeting was to begin to construct an outline for the report that is to be produced. However, the bulk of the time was spend on discussion of the work group title, assignment and minor modifications were made to all three. The changes to these items is reflected above in this document. The attached document can be reviewed if interest in the exact changes from initial to final is desired.

The first assignment for members was to read the WG H32 Report – Channel Performance Considerations for Ethernet Circuits Applied to Teleprotection. It is unclear whether any members other than those members who were part of WG H32 read the document.

Eric Udren suggested that all members read WG P6 Report entitled, “Application of Ethernet Networking Devices Used for Protection and Control Applications in Electric Power Substations” prior to the next meeting for an introduction to the topic. Eric was asked and agreed to make a presentation based on this report at the next WG meeting scheduled for May 2021.

H50: Requirements for Time Sources in Protection and Control Systems

Chair: D. Ouellette
Vice Chair: J. Anderson
Output: Report
Completion Date: December 2021
Current Revision: 1.4

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.

Webex Meeting 13 January 2021, 11:30 – 12:30 CDT [16:30 – 17:30 GMT]. All WG officers were present. The chair presided over the meeting and the vice chair recorded minutes.

The Vice-chair requested the meeting be recorded; no attendees objected. Recording will be erased following revising the minutes.

A call to order of the meeting was made with at least 12 members, 0 non-voting member, and 13 guests in attendance. Attendance has been recorded in 123Signup. A quorum was achieved with 12 out of 20 members present.

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.

Minutes from the September meeting was approved following a motion by Rich Hunt, seconded by Eric Udren.

Presentations:
none

Old Business
The Scope and Assignment was reviewed.

New Business
Bill Dickerson was removed from the VM list since he has retired from active participation in the PSRC.
Work was continued reviewing and editing Draft 1.3a.

A couple of discussion items:
The WG reviewed an Outputs contribution from N. Kraemer.
There was considerable discussion concerning time source reference terminology. The existing text used UTC, Satellite, GPS, etc. The sense of the group was that “Traceable” seemed preferred.

Discussed signal distribution media: fiber, twisted pair, coax, etc.
Reviewed outputs contribution from N. Kraemer.

Monitoring: Ya-Shian and Jay agreed to assist Aaron. Add sections on interface (contact, DNP, SNMP, etc.) and what can be monitored (equipment alarms, consistency checking of multiple sources, etc.).
Some discussion on testing: it may be difficult for end users to perform detailed testing, making Conformance (ICAP) testing more important (C. Huntley).
Action Items:

The following writing assignments are in progress.
Security: Tony Johnson
Inputs to clocks: Jay Anderson
Outputs: A section was received from Nicholas Kraemer. The group decided to expand the Output section. Jay Anderson to add bullet items for additional discussion.
Ya-Shian Li-Baboud to contribute to sections 3 and 5
Jack Wilson to contribute to Applications
Yuchen Lu also offered to contribute as needed
Can clocks communicate their own accuracy: Nick Kraemer
Event Logging & Monitoring: Aaron Martin, Jay Anderson, Ya-Shian LiBaboud
Testing: Rich Hunt
The Draft will be rev'd to 1.4.

Meeting was adjourned at the scheduled time. Motion to adjourn by Allen Goldstein.
A WebEx meeting may be planned for between now and the next PSRC meeting in May (also virtual). A doodle poll will be used to schedule the interim workgroup meeting.

Note: files for the H50 workgroup are stored in iMeet Central at:
https://ieee-sa.imeetcentral.com/psrcc-h50/folder/WzIwLDEyNTQ5NTk4XQ

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

Chair: M. Adamiak
Vice Chair: N/A
Output: Standard Revision
Completion Date: December 2021
Current Revision: 2010

Assignment: Review the existing standard and determine whether a revision of the COMFEDE standard (C37.239-2010) is needed

This was the formational meeting of the H51 WG with the purpose of revising the IEEE C37.239-2010 COMFEDE standard. The individuals who signed up to be members include:
Mark Adamiak – Chair
Amir Makki
Benton Vandiver
Deepak Maragal
Eric Thibodeau
Jean Sebastian Gagnon
Shane Haveron
Zach Makki

Dan Sabin

The Revised C37.239 PAR (with minor revisions) had been developed in HTF51 and approved. The WG petitioned the H Sub-committee to vote on the acceptance of the revised PAR.
Again, the WG did not anticipate major revisions to the standard but updating the document to address new PSRC naming conventions was discussed.
It is anticipated that the Revised PAR will be submitted to NESCom for approval at their Feb 2021 meeting.
The WG will plan to meet at the May 2021 PSRC meetings to start work on the revision. Prior to this meeting an I-Meet site is requested as well as a WORD version of the present standard.

IEC TC 57 IEC 61850 update
Ch. Brunner

Recently, the following parts have been published:
- Ed 2.1 of parts 4 and 7-1
- Part 90-11 on logic modelling
- Part 61850-1-2 providing guidelines for extension of IEC 61850

IEC 61850-1-2 is of relevance for IEEE PSRC, SC H, as several WGs of SC H are working on extensions to IEC 61850. Those guidelines provide the information on how such extensions shall be made in general and in particular with regard to the code components

IEC TC57 / WG10 will meet virtually last week of February. WG10 has currently the following projects:

1. Preparation of an Edition 2.2 of IEC 61850 parts 7-2, 7-3 and 7-4 to address a requirement from the modelling of DERs (Part 7-420). The modification is an extension that will be backwards compatible.

2. Technical reports that are under preparation
- Several TRs are being worked on. First drafts for Traveling Wave based fault location and alarm handling have been circulated.

3. Work on technical specifications for mappings between IEC 61850 and Modbus data (TS IEC 61850-80-5) still ongoing. A second CD has been circulated in 2020; the next draft is in preparation.

4. Significant work ongoing on enhancing the engineering process to include as well the specification process and to include configuration of the communication network.

IEC TC57 / WG17 will meet virtually the third week of February and is working on the following topics:

1. Revision of IEC 61850-7-420 to include modelling of grid codes.

2. 61850 modelling for microgrids

3. 61850 modelling for systems with thermal storage

IEC TC57 / WG18 is working on the following topics;

1. Update of IEC 61850-7-410 and IEC 61850-7-510.

I: Relaying Practices Subcommittee

Chair: Jim Niemera
Vice Chair: Robert Frye

Relaying Practices Subcommittee Scope

Develop, recommend and establish standards on protective relaying practices which are compatible with the electrical environment, including but not limited to; relay withstand capabilities to electromagnetic interference, characteristics and performance of instrument transformers, testing procedures, applications performance criteria, and definitions of relay and relay systems. Evaluate and report on pertinent aspects of protective relaying not addressed by other PSRCC Subcommittees. Maintain applicable protective relaying standards.

1. Call to order: 8:01 AM CST
2. Welcome and Webex guidelines for meeting
3. Thank guests for attending
4. Many thanks to former members of the I-SC:
a. Demetrios Tziouvaras (December 2020)
5. Welcome to new members of the I-SC:
a. (no new members)
6. Determine a Quorum (**34 members** total in I SC)
    a. Attendance: 22 members, 57 guests. Only 18 members required for quorum therefore we had quorum.
7. Approval of Minutes of the September 24, 2020 meeting APPROVED
    a. Motion entered by: Jeff Pond
8. Motion seconded by: Mike Meisinger
9. Coordination & Advisory Committee Meetings Items of Interest
    a. Subcommittee Members' status and incoming Officers for January 2021
    b. Attendees information
    432 Registered including 64 newcomers

Future Meetings:

a. May 2021 – On-Line Meeting
b. Sept 2021 – TBD
c. Jan 2022 – JTCM – Garden Grove, CA
d. May 2022 – trying for Reno, NV

Policies and Procedures for: Power System Relaying and Control Committee Working Group – see PSRC

Knowledge Base

Three officers: Chair, Vice-Chair, Secretary
All WG Officers must be members of SA!!!

Working Group sign-in sheets – use 123SignUp procedure!!!

a. 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 in 123signup when they register for our meetings.
   i. https://www.123signup.com/ also there is a navigation link on the PSRC website
b. 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 2018 slides available and are at http://standards.ieee.org/about/sasb/patcom/materials.html.
c. Looking for Webinars to publicize our PSRC work products as part of Global Outreach
   i. 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 one of the PSRC Officers, Murty Yalla, Michael Thompson, or Gene Henneberg.
d. Looking for presentations for future Main Committee meetings – please contact Jim Niemira.

10. Administrative Items
a. From IEEE-SA: WG/TF Agendas and Minutes: "***The 14-calendar-day rule" – the Standards Association requirement in P&P Section 6.0:***
A meeting notice to all members at least 30 days in advance of a face-to-face meeting (15 days notice for an electronic or teleconference meeting)
A meeting agenda (including participation information) shall be distributed to all members at least 14 days in advance of a face-to-face meeting (5 days for electronic meeting).
   a. 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
      i. 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

      ii.
      iii. Create new PAR for new standard – MC
      iv. Create new PAR for existing standard without major changes to scope – SC; with changes to scope – MC
      v. Approval to proceed to IEEE-SA for creation of a balloting body or to proceed to sponsor ballot – SC
      vi. Minor changes to statements of PAR title, scope and/or purpose without change of scope – SC; Changes to PAR scope - MC
      vii. 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.
      viii. 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.
      ix. 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.

x. 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).

xi. PSRC Committee is the Sponsor

xii. myProject™ Volunteer User Guide – good stuff https://mentor.ieee.org/etools_documentation/dcn/11/etools_documentation-11-0014-MYPR-myproject-user-guide.pdf

b. 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 Robert Frye and Jim Niemira for your requested changes – we will consolidate them and forward to Michael Thompson.

c. Make sure that on the Meeting Room Request (MRR) form for the *May 2021* meeting that you include "do not conflict with I50, D87, …"

b. As Chair or Vice-Chair of WG or TF, please contact Jim Niemira and Robert Frye ***if you cannot attend your session***.

c. 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.

d. All PAR related document (IEEE related) drafts cannot 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.

e. 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!

f. Email WG or TF Minutes to Robert Frye at: rmfrye@tva.gov

g. ***iMeet Central*** (formerly Central Desktop) is to be used for IEEE Guide/Recommended Practice/Standard documents with a PAR.

h. **PSRC has a File Share facility for non-PAR documents. Contact Jim Niemira (I_SC Chair) if your group has need or interest. Need a list of participants with email addresses to allow upload access; view/download access can be granted to others**. See link in PSRC Knowledge Base.

i. Standards WG Awards - The IEEE Standards Association Working Group Awards has a new Procedure to request certificates of appreciation for completed (Approved Standard) work.

   a. 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.

   b. 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.

j. 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.

k. Links to PES:

a. PES Technical Resource Center: http://resourcecenter.ieee-pes.org/
   i. PES - Technical Report Template: https://www.ieee-pes.org/images/files/doc/tech-council/PES-Technical-Report-Template_Jan_2016.docx
   ii. PES - Technical Paper Template: https://www.ieee-pes.org/templates-and-sample-of-pes-technical-papers
   iii. 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

l. Working Group Reports

WG/TF #	Name	Report Given By:
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	Revision of C37.110 Guide for the Application of Current Transformers for Protective Relaying Purposes	Michael Higginson
I30	Revision of C37.235 Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes	Robert Frye
I31	P1613 – Standard for Environmental and Testing Requirements for Devices with Communications Functions in Electric Transmission and Distribution Facilities	Brian Mugalian
I32	A Survey of Protective System Test Practices	Will Knapek
I33	Review of Relay Testing Terms	No Report
I35	PC37.2 – Standard for Electrical Power System Device Function Numbers, Acronyms, and Contact Designations	Mike Dood
I36	Revision of C37.90.2 – Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers	Chase Lockhart
I37	Revision of C37.90 – Standard for Relays and Relay Systems Associated with Electric Power Apparatus	Marilyn Ramirez
I38	Revision of C37.92 – Standard for Analog Inputs to Protective Relays from Electronic Voltage and Current Transducers	Ritwick Chowdhury
I40	Revision of IEEE C37.90.1 – Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus	Todd Martin
I41	Revision of IEEE C37.90.3 – IEEE Standard Electrostatic Discharge Tests for Protective Relays	Steve Turner
I43	Investigate response to USA executive order regarding EMP protection	Angelo Tempone

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	Will Knapek
I45	Investigation of Grounding and Bonding Issues Associated with Substation Wiring Practices and Instrumentation.	Adrian Zvarych

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 virtual WebEx meeting was called to order by Mal Swanson, Chair at 4:40 pm (Central Time) on January 13, 2021 with Fred Friend, Vice-Chair recording minutes with 14 in attendance. Quorum was achieved with 6 of 11 members present. The minutes from September 2020 were reviewed with no corrections provided, Tony Seeger motioned for approval and was seconded by Matt Black, and unanimous approval was given.

Updates were given on of each of the assignments.

The working group discussed the definitions for the terms: autoreclosing, delayed autoreclosing, and high-speed autoreclosing from C37.104.

The working group chair is to send the approved working group draft to Erin Spiewak e.spiewak@ieee.org, IEEE SA, to begin the editorial review process in order to expedite the review process.

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.

The meeting was adjourned at 5:40 pm (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 virtual meeting to order at 8 AM CST on January 11, 2021 using PSRC WebEx platform. A quorum of 10 out of 15 members plus 23 guests attended, including an impressive international contingent who joined based on Murty Yalla's circulation of the PSRC agenda to IEC TC 95. Murty is Chair of TC 95 internationally; TC 95 Secretary Thierry Bardou also joined from France. Eric presented the previously circulated agenda and called for approval of the presented and previously circulated minutes from September 21, 2020, with no objections.

The Chair presented IEC TC 95 standards development events since September that had been circulated via e-correspondence – including review of two new standard Committee Drafts and the proceedings of the TC 95 Virtual Plenary Meeting on November 5-6, 2020.

From the plenary meeting, the Chair presented the TC 95 Program of Work – currently scheduled standards projects and dates, as confirmed at the meeting - some listed further below.

The attendees were shown the final revised TC 95 scope statement to which the US had made important contributions. Notable additions beyond relays and protection systems are control, monitoring, and process interface related functions and equipment used with protection systems (such as automatic reclosing, fault location, teleprotection or process data interfaces, and fault recording); as well as protection and protection related functions of distributed energy resources (DER) or inverter-based resources (IBR).

The Chair presented selected meeting decisions, including:

- Plans to participate in a JWG for standard for traveling wave protection systems and for fault location with another IEC TC.
- Plans to participate in a JWG for standard for certain HVDC system protection functions with another IEC TC.
- TC 95 will join with IEEE PSRC in a JWG for revision of the IEEE C37.111/IEC 60255-24 COMTRADE standard, leading to a new dual-logo standard like the recently completed Synchrophasor standard 60255-118-1. The leaders need to obtain the process for coordinated but different IEC versus IEEE voting and document advancement processes as was used for JWG 1 that developed dual-logo 60255-118-1 Ed 1 Synchrophasor standard, now approved and published.
- TC 95 WG 2, developing 60255-216-1 requirements for protection systems with digital I/O including merging units, has opened the door for JWG relationship with PSRC WG H47 on the same topic.

The Chair summarized recent standards document reviews and voting:

- 95/453/CD 60255-1Ed2 Common Requirements – the USNC submitted comments on the latest draft in December.
- 95/452/CD 60255-27Ed3 Safety Requirements – the USNC submitted comments on the latest draft in December.
- 95/457/CC comments on 60255-26 Ed4 EMC requirements reviewed from last cycle; the USNC awaits a new CD or CDV (voting draft).
- 95/410/RVC 60255-187-1 on functional requirements for motor, generator, and transformer differential Relays moves from CDV to FDIS.
- Part 187-3 on functional requirements for line differential relays continues in development. Part 187-2 with functional requirements for bus differential relays is in early development stages.

TC 95 WG 2 developing 60255-216-1, Guidelines for requirements and tests for protection functions with digital inputs and outputs [e.g. merging unit I/O tied to relay], had circulated its first CD in September and the USNC submitted comments, including those collected from the Chair of PSRC H47 working on the same topic. At its plenary meeting in November, TC 95 WG 2 offered a JWG relationship with H47 – the working arrangements are to be developed. In this meeting, the attendees discussed the impacts of connecting CTs and VTs to relays versus that of connecting those same devices to MUs and having the relays receive data streams whose creation and transmission idiosyncrasies can affect relay performance or even lead to misoperations.

USNC TAG member Allen Goldstein is contributing as the key subject matter expert on frequency measurement methods in JWG 12 between TC 95 and TC 8 (System aspects of electrical energy supply) on the new project IEC TS 62786-41 Ed1, Distributed energy resources connection with the grid – Part 41 - Requirements for frequency measurement used to control DER and loads. As penetration of IBR increases, this methodology will be critical to grid reliability; we have already witnessed major generation loss events such as the 2017 California Blue Cut fire event in which inverters designed with this standardization could have avoided the loss and grid disruption. The leader of that work is Phillipe Alibert of France. WG I4 will add reporting on this topic and status in future meetings.

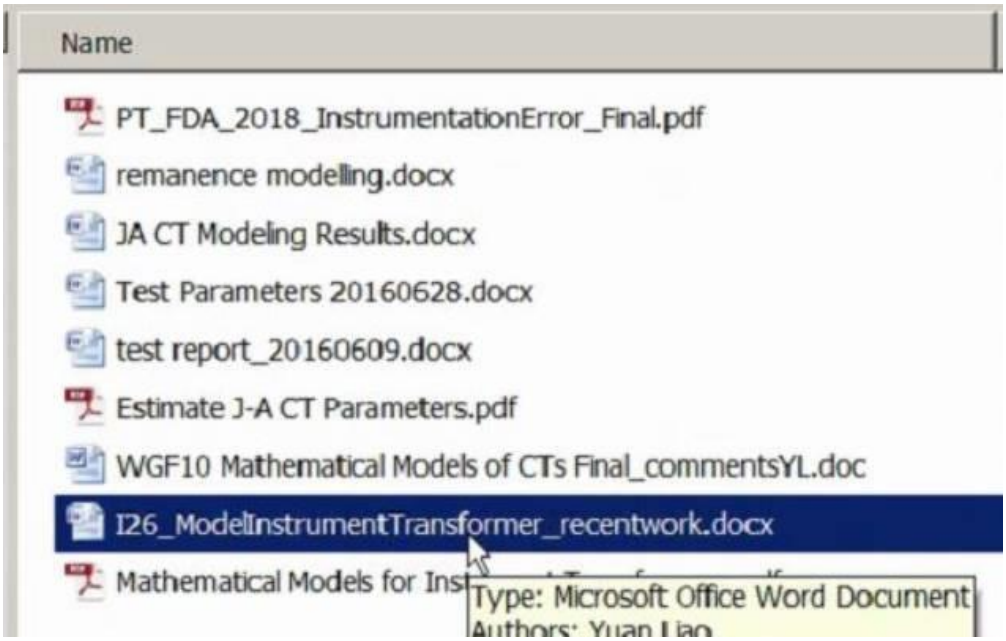
I-26: Mathematical Models of Current, Voltage, and Coupling Capacitive Voltage Transformers

Chair: Mike Meisinger
Vice Chair: Steve Turner
Secretary: Amir Makki
Output: Report
Established Date: 2012
Expected Completion Date: 2021
Draft: 2
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.

a) Officer presiding – Mike Meisinger
b) Officer recording minutes – Steve Turner
c) Call to order – Mike Meisinger

d) Chair's remarks – Begin the report.
e) Results of call for quorum – Not applicable
f) Approval of Agenda (motion and seconded)
g) Approval of Minutes of previous meeting (motion and seconded)
h) Begin drafting the report.
i) Action Items:

Amir will post the documents for the group with help from SC Chair.



We are still working on establishing a site to store the documents listed above. SC Chair informed us that there have been various requests to have NON-PAR related WGs to share draft documents using and ftp site.

- imeet central is being used by PAR related WGs
- PSRC committee will be setting up a new file sharing site: https://psrc.sharefile.com
- to be used by NON-PAR related WGs
- This site is for sharing files between working group members
- Can also share files externally (via links) to anyone
- Please do not ask how to login yet – if a working group has a need, the WG chair will contact PSRC leadership requesting to have a sharefile folder setup.
- If it is only for WG use then a list of WG members names and email addresses is required.
- Files can be shared via link to people that do not have a login account on https://psrc.sharefile.com
- More information (and "how-to" videos) will be forthcoming to clarify

So, file sharing site should be available. SC Chair will ask again if there have been developments or further information.
It may just require for the WG Chair to ask and provide list (with email addresses) for participants.

Some writing assignments have been tasked:

- JA CT Modeling Results – Jim Van De Ligt

- Recent Work - Federico Lopez
- Remanence Modeling & Mathematical Models – Steve Turner
- JA Model Parameter Estimation- Athula Dayanart Rajapaske
- Test Report – Amir Makki

Still to be assigned:
- Annexes
- Instrumentation Error
- Test Parameters
- Mathematical Models of CTs Final Comments

I-29: IEEE PC37.110 - IEEE Draft Guide for the Application of Current Transformers Used for Protective Relaying Purposes

Chair: Joseph Valenzuela
Vice Chair: Michael Higginson
Output: IEEE Guide
Established Date: January 2015
Expected Completion Date: July 2021
Draft: 20200702
Assignment: Revise IEEE C37.110-2007 - IEEE Guide for the Application of Current Transformers Used for Protective Relaying Purposes

Working Group did not meet.

I-30: IEEE PC37.235 - IEEE Draft Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes

Chair: Robert Frye
Vice Chair: Chase Lockhart
Secretary: Chase Lockhart
Output: Guide
Established Date: 2014
Expected Completion Date: 2021
Draft: 10_Incorp Bal Comments Final
Assignment: Review and revise IEEE C37.235-2007 - IEEE Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes

The Working Group did not meet

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)
Expected Completion Date: 31-Dec-2022 (PAR extension approved October 2020)
Draft: 1.17
Assignment: Revise 1613

a) Officer presiding: Brian Mugalian
b) Officer recording minutes: Craig Preuss
c) Call to order, approximately 8 am central time
d) Chair's remarks, general welcome
e) Results of call for quorum: 7 of 14 members in attendance, quorum not announced but after meeting check shows 8 of 14 members were present
f) Approval of Agenda: N/A
g) Approval of Minutes of previous meetings: Two were on the agenda, but since there was no quorum announced, the chair did not seek a motion to approve them
h) Patent slides were shown, no claims were made. Copyright slides were shown.
i) Draft 1.16 was reviewed and updated to draft 1.17.
j) No items reported out of executive session
k) Recesses and time of final adjournment, approximately 9 am central time.
l) Next meeting date and location, conference calls Feb 9, March 9, and April 6 from 3-4:30 pm.

Meeting Participants:

Name	Affiliation	Voting Status (voting member, non-voting member, guest)
Dave McGuire	Hubbell Power Systems	Guest
Jim Niemira	S&C Electric	Voting Member
Brian Mugalian	S&C Electric	Voting Member
Robert Frye	TVA	Guest
Jerry Ramie	ARC Technical Resources, Inc.	Voting Member
Craig Preuss	Black & Veatch	Voting Member
Jeffrey Pond	National Grid	Guest
Michael Dood	Schweitzer Engineering Labs	Voting Member
Zitao Wang	S&C Electric Co.	Guest
Michael Meisinger	S&C Electric Co.	Voting Member
Louis Garavaglia	G&W Electric Co.	Guest
Xicai Zhao	NR Electric	NEW GUEST
Thomas Rudolph	Schneider Electric GmbH	Guest
Malcolm Swanson	Iniven	Voting Member
Hani Al-Yousef	Eaton	Guest
Jay Herman	EPRI	Guest

Name	Affiliation	Voting Status (voting member, non-voting member, guest)
Mariyn Ramirez	Power Grid Engineering	Guest
Jay Anderson	ComEd - Exelon Corp.	Voting Member
Eric Udren	Quanta Technology, LLC	Guest
Lalitha Devarakonda	Eversource	Guest
Roger Ray	PowerComm Solutions	NEW GUEST

I-32: A Survey of Protective System Test Practices

Chair: Andre Uribe
Vice Chair: Don Ware
Output: Report
Established Date: May 12th, 2015
Expected Completion Date: May 2019
Draft: 3.2
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.*

1. The Working Group virtually meet on Tuesday, January 12, 2021.
2. WG discussed various methods of acquiring/soliciting survey participants
    a. Solicit by announcing during sub-committee meeting
    b. Solicit by announcing during main-committee meeting
    c. Send out a second PSRC email request to help identify survey participants
    d. Ask IEEE PES to send out mass email to request for survey participants
    e. I-32 members to submit contacts they know
    f. I-32 member that are vendors to help solicit their clients
3. WG discussed Next Steps once a database of survey participants have been developed:
    a. Vetting out survey participants database
        i. Need on representative for each utility
        ii. Need to ensure we have representation from:
            1. IOU
            2. Government
            3. Coop/Muni
            4. Generation
        iii. Our target of participants is 146
        iv. May encounter some discrepancy of double representation
            1. Utilities have multiple sections
                a. Construction or maintenance
                b. Regional (respond to your region only)
            2. Solution: add a set of instructions at the beginning of the survey
        v. Ask IEEE PES to
            1. Pre-message their database that we want to survey
            2. Vet out contacts before surveying

b. Work with IEEE PES to send out survey once we have a database
c. Gather data from survey and write report and review during May's meeting

4. 2:10 Meeting Adjournment

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: 5/20
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-Scott Cooper
b) Officer recording minutes-Hugo Monterrubio
c) Call to order
d) Chair's remarks
e) Results of call for quorum-NA
f) Approval of Agenda (motion and second)-NA
g) Approval of Minutes of previous meetings (motion and second)-NA
h) Brief summary of discussions and conclusions including any motions
   a. Plan for finalizing the report
   b. Submission procedure
i) Action items
   a. Submit report draft to members for comments and approval
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)

I35: IEEE Std C37.2 - Standard for 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 2021
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 met virtually on January 13th, 2021.

a) Mike Dood presided
b) Marc Lacroix recording minutes
c) The patent and copyright slides were shown and there were no objections from the participants
d) Since 5 members out of 8 participated in the meeting, we had quorum.
e) Minutes of November 09 and 24 meetings were approved (motioned by Will Knapek and seconded by Éric Thibodeau)
f) The WG is ready to form a SA ballot poll
    a. Latest version of the draft was approved, by email, by 100% of the WG members
    b. A motion will be proposed during the I meeting to form the ballot poll.
g) Action items
    a. No action recorded

Name	Affiliation	Voting Status (voting member, non-voting member, guest)
Mike Dood	SEL	Voting Member
Marc Lacroix	EMCREY	Voting Member
Eric Thibodeau	Hydro Quebec	Voting Member
Will Knapek	Omicron	Voting Member
Craig Preuss	Black & Veatch	Voting Member
Kevin Donahoe	GE	Guest
Laurel Brandt	TVA	Guest
Michael Thompson	SEL	Guest

I36: C37.90.2 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/Secretary: Mat Garver
Output: Standard
Established (month/year): September 2017
Expected completion date (month/year): December 2021
Draft: 2.1
Date and Location of Meeting: January 13, 2021, WebEx, The World Wide Web

Meeting Participants:

Name	Affiliation	Voting Status (voting member, non-voting member, guest)
Chase Lockhart	Leidos	Chair
Mat Garver	Beckwith Electric	Vice-Chair
Jeffrey Pond	National Grid	Voting Member
Gerald (Jerry) Ramie	ARC Technical Resources Inc.	Voting Member
Craig Palmer	PowerComm Solutions	Voting Member
Hani Al-Yousef	Eaton	Guest
Suresh Channarasappa	Westinghouse	Guest
Tony Bell	Ametek	Voting Member
Samir Darbali		Guest
Zitao Wang		Guest
Dan Reckerd		Guest
Mason Griffin	CMY Solutions	Guest
Jackie Wilson		Guest
Malia Zaman	IEEE SA	Guest
Mark Adamiak	Adamiak Consulting LLC	Guest
David McGuire	Hubbell Power Systems	Guest
Brian Mugalian	S&C Electric Company	Guest
James Niemira	S&C Electric Company	Guest
Louis Garavaglia	G&W Electric Co.	Guest
Robert Frye	TVA	Guest
Roger Whittaker	None	Guest

Time called to Order and Chair's remarks: The meeting was called to order at 11:30 Central Time and introductions were made.

IEEE Policy Reminders (patents and copyrights): Copyright and Patent slides were reviewed.

Confirm that call for Patent issues was made and record any responses: The chair asked for any objections and no responses were made.

With 5 members in attendance, quorum was achieved.

Approve minutes of previous meeting: September 2020 minutes. **Motion by** Jerry Ramie **Second by:** Jeff Pond. Approved by all, motion carried

Topics discussed:

- PAR Extension needed
- Copyright form from IEC for figure 2
- Photo credit and a thank you for Ed Hairer to be added to annex
- No Closing Remarks

Action items:

- Chase work with Erin S. to get IEC copyright form
- Chase to modify document to get the best readability/resolution from the use case photos in Annex B.

Times of any recesses and time of final adjournment: Motion to adjourn at 12:20 first by Jerry Ramie, 2nd by Jeff Pond. Approved by all, meeting adjourned.

Date, time, and location of next meeting: May, 2021 Virtual

I-37: C37.90, Standard for Relays, Relay System Associated with Electric Power Apparatus

Chair: Marilyn Ramirez
Vice Chair: TBD
Output: Standard
Established Date: 2018
Expected Completion Date: 2021
Draft: 2.0
Assignment: Revision of C37.90 Standard for withdrawn in 2021. PAR Expiration 31-Dec-2022

Meeting Participants:

Name	Affiliation	Voting Status
Marilyn Ramirez	Qualus Power Services	Chair
Laurel Brandt	TVA	Guest
Jeff Pond	National Grid	Guest
Jorge Cintron	NRC	Guest
Todd Martin	Basler	Voting Member
Rashed Fakhruddin	NES	Guest
Angelo Tempone	Duke Energy	Voting Member
Craig Palmer	Power Comm Solutions	Guest
Joe Xavier	ABB	New Member
Dolly Villasmil	Power Grid Engineering	Guest
Hani Al-Yousef	Eaton	Guest
René Lord	Gentec	Guest
Zitao Wang	S&C Electric	Guest
Gavin Oconnell	Xcel Energy	Guest

Brian Mugalian	S&C Electric	Guest
Dave McGuire	Hubbell Power	Voting Member
Tony Bell	Ametek	Voting Member
Jim Niemira	S&C Electric	Guest
Robert Frye	TVA	Voting Member and Host
Vijay Goel	NRC	Guest
Craig Preus	B&V	Guest
Dan Reckerd	Duke Energy	Guest
Xavier Manel-la	Siemens	Guest
Jörg Blumschein	Siemens	Guest

- Officer presiding: Marilyn Ramirez
- Officer recording minutes: Marilyn Ramirez
- Call to order, approximately 9:10 am Central Time
- Chair's remarks, general welcome
- The meeting had 6 members and 18 guests in attendance. Quorum was met. However, September minutes were not reviewed/approved as just 4 members were recorded at the beginning of the meeting during the Introductions Section (Chair reviewed Webex attendee list when it was provided).
    - September 2020 Meeting Minutes will be sent via email for approval.
- Patent slides were shown, no claims were made. Copyright slides were shown.
- Approval of Agenda: N/A
- Sections of the Standard were reviewed, including 3 sections that 1613 requested to Harmonize with C37.90 including: Environmental/climatic, Ingress and Mechanical.
- Final adjournment, approximately 10:10 am Central Time.
  Motion by: Angelo Tempone; Second by: Joe Xavier
- Next meeting date and location, tentative virtual meetings before May PSRC Meeting.

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: September 2022
Draft: 3
Assignment: To revise and update C37.92

The working group meeting was called to order on January 13, 2021 at 8 AM CST via PSRC WebEx with 8 members and 19 guests. With 11 listed members, this comprised a quorum. The agenda was approved. Minutes from September were presented and approved – Eric Udren moved; Veselin Skendzic seconded.

The title and the scope of the standard were substantially updated in meeting discussion to reflect changes in technical focus since the original standard as well as specific focus of the application of the

interface.

The new title is “Standard for Low-Energy Analog Interfaces between Protective Relays and Power System Signal Sources”. The new scope is “This standard defines the performance of the interface between voltage or current measurement systems with low-energy analog outputs, and compliant inputs of protective relays or other substation measuring equipment. These measurement systems reproduce the power system waveforms as corresponding scaled analog waveforms.”

For both the title and the scope, the WG members present voted unanimously in favor of the modifications. The chair will bring up the modification of the title, scope and a PAR extension all together as may be required, first to a future I-SC meeting and then to the IEEE-SA PAR modification process.

Modifications to the Purpose section were accepted; the figure will be updated by Ritwik and Hugo Monterrubio.

Eric Udren proposed modifications to signal level requirements in Section 5.1 to handle two different application classes in accordance with different analog electronic technology types. After meeting discussion, Eric will further revise these requirements for compatibility with sensors and relays that already comply with IEC TC 38 standards as presented by Veselin Skendzic.

Hani Al-Yousef, Eric and Ritwik will collaborate to revise Clause 4 (General requirements) and Annex A (Informative background). Eric is revising Clause 5 (Electrical Requirements). Rich Hunt volunteered to review Clause 7 (Interconnection wiring practices). Clause 6 on intermediate devices is no longer of practical use – to be deleted. Veselin will update Section 5.9 (Physical Length) and 5.10 (Connectors). Contributors are to deliver revisions by April 26.

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
Established: September 2018
Output: Review for revision IEEE C37.90.1
Expected Completion date: Dec 31, 2022
Assignment: Review and revise IEEE C37.90.1 – Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus.

Working Group I40 met on Wednesday, January 13th at 11:10 am in a single session. A quorum was achieved with 9 of 10 voting members present. Additionally 21 non-voting members and guests were in attendance.

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

Minutes from the September 2020 meeting were reviewed and approved. The motion was made by Mike Meisinger and seconded by Jerry Ramie.

Standards IEEE C37.90.1 and IEEE1613 have acquired and have been added to iMeet Central. The standard text for C37.90.1 can be used as a basis for review for each clause and appendix as needed by each reviewer.

Volunteers chosen to review each clause are as follows:

Clauses1,2,3 and definitions…Roger Whittaker (Jerry Ramie to contribute to definitions)
Clauses 4 and 5, plus related annexes test wave shapes, generator characteristics....Todd Martin
Clause 6 , annex E examples, Equipment to be tested…..Jim Niemira
Clause 7 Application of test wave……David Maguire
Clause 8,9,10 test procedures, acceptance criteria, test records…Travis Mooney, Hani Al Yousef

Annex F: IEC standards comparison table…Jerry Ramie will mark this up as a part of EMC presentation.
Annex G Roger Whittaker
Annex A Bibliography…Roger Whittaker

Roger will set up a separate web-EX meeting where Jerry Ramie will present the EMC Society position and information. This is a workgroup presentation that shall occur on Tuesday, **Jan 26 at 4pm eastern time** and also at Tuesday Feb 16 4pm eastern. (special webex meeting for workgroup participants) a SYNOPSIS OF THIS PRESENTATION WILL BE AVAILABLE TO MEMBERS AT Imeetcentral workspace.
(A SPECIAL WEBEX MEETING FOR I40 WORKGROUP MEMBERS AND PARTICIPANTS.!

Meeting minutes by Roger Whittaker. 1/13/2021

I41: <u>Draft Standard for Electrostatic Discharge Tests for Protective Relays</u>

Chair: Steve Turner
Vice Chair: Dan Ransom, PE
Secretary: (open)
Output: Standard
Established Date: September 22, 2020
Expected Completion Date: January, 2022
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 10:20 a.m., Central Daylight Time, on January 12, 2021.
4. *Chair's remarks*

Chair Turner welcomed all to the online meeting, hosted by Mr. Frye. Chair Turner reiterated that we are working on a very old standard that needs changing.

5. *Results of call for quorum*

   The quorum check established that a quorum was present.

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

   Jerry Ramie moved, and Dan Ransom seconded a motion to approve the agenda. This motion passed on a voice vote.

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

   Tony Bell moved, and Louis Garavaglia seconded a motion to approve the previous minutes. This motion passed on a voice vote.

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

   Jerry Ramie gave a presentation on the draft that he created for improvements needed in the standard, compared to the IEC standard.

   Hani Al Yousef, Eaton; Malcolm Swanson, MJ Swanson Assoc.; and Travis Mooney, Schweitzer Engineering Laboratories; asked for membership status.

9. *Action items*

   AI1: Mr. Ramie to update the present standard with input from the IEC standard—resolved

   AI2: Mr. Frye and Mr. Ramie to send a note to meeting attendees to enquire about group membership—completed

   AI3: Mr. Ramie to provide a document with all changes for group review

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 at 11:23 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 May, online.

The group discussed group membership. Secretary Ramie and Mr. Frye agreed to send a note to each attendee asking if they want to belong to this working group.

1. *Action items*

   AI1: Mr. Ramie to update the present standard with input from the IEC standard
   AI2: Mr. Frye and Mr. Ramie to send a note to meeting attendees to enquire about group membership.

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

   There was no executive session.

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

   Chair Turner adjourned the meeting at 11:23 a.m. Central Daylight Time

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

   The next meeting will be in January, probably online, during the week of the 2021 IEEE PES JTCM (Joint Technical Committee Meeting).

I-43: 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: 2023
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 14:20 CST on Tuesday, January 12, 2021

The chair called the roll and asked the attendees to introduce themselves.

The meeting had 17 members and 34 guests

A quorum was obtained since all members, 17, were in attendance to the meeting.

The minutes of the previous meeting were approved. (Taylor Raffield & Bill Radasky)

The Chair discussed asked for volunteers to contribute to the development of the report. The following assignments were given:

- On section 1 “Introductions”: Taylor Raffield, Jim Campbell, Dr. Tapan Manna and Angelo Tempone.
- On section 3 “Background”: Qun Qiu will work along the previous volunteers.
- On section 3c “History of HEMP effects on electronic equipment”: Dr. Tapan Manna
- On section 4 “Assessment: Modeling & Testing HEMP”: Tim Minteer & Josh Butterfield.
- On section 6: Art Buanno will work along with the previous volunteers.

Discussion of additional meetings between the two main committee meetings took place (no meetings were scheduled). Volunteers to work individually until the May meeting when we will reconvene.

The meeting was adjourned at 15:00 CST (Bill Radasky & Rey Ramos).

Our next meeting will be VIRTUAL in May of 2021 (time TBD).

I-44: Skills Required to Program, Commission, Test, and Maintain Ethernet Based PAC Systems

Chair: Will Knapek
Vice Chair: Andre Uribe
Secretary:
Output: Report
Established: 01/2020
Expected Completion Date: 01/2023
Assignment: Create report on Skills Required to Program, Commission, Test, and Maintain Ethernet Based PAC Systems
Draft: Ver 1.0
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: Will Knapek, Chair
b) Officer recording minutes: Will Knapek, Chair
c) Call to order
d) Chair's remarks
e) Action items: Discussed Outline of report. See below.
f) Recesses and time of final adjournment: 1:30pm Central
g) Next meeting date and location: TBD Planning a March Webinar

OUTLINE

1. Intro
    a. Should mention not one person but team.
    b. Why the report
2. What are the pieces of a Digital Substation?
3. Comm systems covered David Dolezilek, SEL.

Time protocols

4. Tools needed.
    a. Documentation
    b. Cyber Security
5. System Integrator skills. May be contractor.
6. Protection Engineer skills
    a. Cyber Security
7. Network/Communications Engineer skills
    a. Cyber Security
8. Commissioning Engineer skills
    a. System design understanding
    b. Proper transfer of documentation.
9. Maintenance Engineer/Tech Skills.
10. How to get these skills, Training.
11.
12. Conclusion.

I-45 Working Group: Grounding and Bonding Issues Associated with Substation Wiring Practices & Instrumentation

Chair: Adrian Zvarych
Vice Chair:
Secretary: Adrian Zvarych (recording of minutes)
Virtual Meeting/WebEx 13 January 2021, 10:20 – 11:20 AM CST
Output: Report
Established Date: May 2020
Expected Completion Date:
Draft:
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.

a) IEEE Housekeeping & Moderator: Robert Frye
b) Call to order – Adrian Zvarych 10:21 CST
c) Chair's greeting & remarks – "Assignment" verbiage corrected to align with IEEE records.
d) Brief summary of discussions & topics to be initially included in the Report:
   a. EMP resilience. Grounding systems traditionally have been considered as 60Hz reference and safety grounds. High Frequency Grounding is different than IEEE 80/367 grounding and bonding.
   b. How do we keep a change in grounding – bonding practices intact for the life of a substation.
   c. Communication towers are collocated with substation yards, another point of transient injection which needs to be managed.
   d. Isolated grounds in substations – they occasionally do exist
   e. H45 Centralized protection and control; no copper from equipment to house (Merging Units). Grounding at equipment needs to be 'sufficient' vs grounding reference at CEE.
   f. Some training needs to be added; safety aspects vs transient education.
   g. Ground conductor theft – how does this play into safety at the substation?
   h. Clarify the definition between Grounding and Bonding (NEC as a source) – add to the Report.
   i. Might this Report end up as a Guide or Recommended Practice? Some good support for that end based on discussions.
   j. Off Shore wind locations – can these be included in the Report? Other guides or standards might have information (oil derricks, boats at docks, etc). Off shore wind turbines mature in Europe – perhaps European standards might address. Perhaps turbine manufacturers? More research to be done.
   k. Control switches mounted on panels – about 50% of panel mounted control switches were discovered to be 'floating' and not properly bonded to the panel. Accidental bonding to the panel vs intentional. Potential safety hazard.
   l. What does a 'good bond' look like? Dissimilar metals, scrape, anti-ox grease, what's an acceptable ohmic value for bonding?
   m. Grounding and bonding within inverter based resources (wind farm, energy storage, solar, et al). Keep this topic from a P&C point of view not actual inverter operation.

n. Number of grounds in secondary circuits. CT summation on a differential scheme, voltage schemes could have multiple grounds in those circuits. Add a section to clarify this requirement of a single point of ground. Good support within the group for this.
o. Older substation designs called for yard grounding, new designs call for CEE grounding. Which is best? Safety, operations, should be discussed, and why.
p. .
q. Safety of people 'vs' equipment operation. Bonding shields both ends may affect signal levels and the accuracy of signals within the conductors.
r. Compromised or degrading ground grid topics
    i. Stolen grounds, examples of where compromised or degraded ground grids present additional burden on the interconnected cable grounding-bonding system. Idea – share examples within this report.
    ii. Make it a practice to perform routine ground grid testing. Had some safety issues rise up. Others also shared some related experiences that point to monitoring station grid degradation.
    iii. "As Found and "As Left" station ground grid integrity measurements should be documented.
    iv. Corrosive soil conditions – should avoid building a station on certain reclaimed or repurposed lands.
    v. Ground resistivity testing – process, acceptable ohmic values. Other discussions around how this topic might influence content in this report. An experience was shared where a degraded ground field led to increased current flow on circuit and instrumentation cable grounds. Other examples also shared – good topic to include, perhaps real examples to be included.

e) Action items
a. Z to contact Jim N to have a Document Management System/Cloud based storage site for development documents assigned.
b. Z to develop a Report outline with above topics
c. Remove specific name references within the minutes for official IEEE recording purposes.
d. One z receives e-attendee list
    i. These minutes will be shared
    ii. Set up a polling to confirm best and most available meeting date and time (Wednesday mid-morning or afternoon). Every other week.
    iii. Will share IEEE shared file storage information.

f) Next meeting date and location Tuesday – Thursday; Wednesday mid-morning 9:30 Eastern, every other week; potentially afternoons

g) Motion to Adjourn – Don Ware, seconded by several. 11:24 CST Adjournment Time.

Liaison Reports

a. Transformers Committee – Will Knapek

HERE FOLLOW EXCERPTS FROM THE INSTRUMENT TRANSFORMERS SUBCOMMITTEE MEETING. FULL MEETING MINUTES OF THE TRANSFORMER COMMITTEE ARE AVAILABLE ON LINE ON THE TRANSFORMER COMMITTEE WEBSITE https://grouper.ieee.org/groups/transformers/meetings/F2020-VirtualMtg/Minutes/F20-MainMeetingMinutes.pdf

Chair: Thomas Sizemore

Vice Chair: David Wallace
Secretary: Nigel MacDonald

F.7.1 JWG on Station Service Voltage Transformers, IEC-IEEE 63253-5713-8 – David Wallace & Ross McTaggart

David Wallace presented the status of the latest draft revision. The draft has been submitted for distribution to the committee for comment. The committee will have 16 weeks to review and comment on the draft. This will place comment resolution taking place beginning around the mid of January 2021 and having a revised draft ready by the Spring meeting.

In new business, discussions were held on the various methods of performing heat runs on the SSVT. Huan Dinh gave a presentation on a study made by ABB / Hitachi. There was a good round of discussions made by various members of the committee.
Zolton Roman gave his presentation on the Heat Run study made by GE followed by a round of discussions.
Igor Ziger presented the heat run findings obtained at Koncar. Unfortunately, time expired before he could finish his presentation.
It was decided to hold a later conference meeting to finish the heat run discussion. David Wallace will send out tentative dated for the meeting to be held on.
Next Meeting: The WG will meet to continue work at the Spring 2020 meeting in Toronto, Canada.

IX. Working Group for PLC Capacitors and CCVT's C57.13.9 – Zoltan Roman

Meeting started by presenting the status of the standard. The standard is 95%+ ready, comments received in the last 3 web meetings will be included in draft 9, which is intended for balloting.

Intend to have 2 more virtual meetings to finish standard.

1. Old business:

a. PAR extension – expected date was 05/2020, if not needed we will not extend. Two more meetings to be scheduled to finish by January 2021.
b. Review of Table 5 (dielectric levels) and
c. Table 8 (PD levels)

a. Dielectric table 5
   - Survey question 1 results were presented.
   - Dielectric levels from IEEE 1427-2006 were presented. These levels match the proposal of Draft 8.
   - Questioned if the values presented on draft 8 are acceptable, open discussion
   - Ross we don't have the history of why those levels were specified, the concern is too relax the test requirements.
   - Pierre agrees with the table and the values which are in line with the levels of the other instrument transformers.
   - Steve Snyder supports proposal.
   - Sylvain Plante don't see any issue. (user)
   - Motion to accept the levels as they are shown in the table: Deepak Kumaria, second Rob Gosh

Vote for motion 1, only members to vote.

Results: For: 13, Against: 2, Abstain: 0. Motion accepted.

b. Table 8 (PD levels)

- Survey question 2 results were presented.
- Motion from Stephen Ashcraft to have further discussion on the PD levels. How were those levels determined?
- Response by Zoltan: 10pc is used in CT/VT standard. Other values are arbitrary. Higher capacitance higher is the noise during the testing.
- Pierre Riffon capacitance increase the sensitivity of the measurement equipment is decreased.
- Andre can achieve 5pc up to 25nF depending of the shielding.
- Suggestion to invite PD experts to present reasoning behind the testing settings.
- Feras Fattal they test up to 60nF, values are ok. Send invitation to meeting (ffattal@hydro.mb.ca).
- Members to invite their teams to the meeting and email names to Zoltan.

These levels are for test single units. PD can be improved by testing 2 units in parallel.

2. New business

a. Review of Randy Brannen's suggestions to add an Appendix about the capacitance ranges of CCVTs Presented

proposed capacitance ranges to be added in an informative annex.
Proposed to have 3 ranges of capacitance, include an extra high capacitance and guidance on when to use the different ranges. Include the intention of when to use the different capacitance, TRV, PLC. Include text in draft 9 and to be reviewed in the following meetings.

Survey to vote on the table to be proposed, including 3 ranges.

b. RIV testing – Pierre Riffon

Include 2 levels of acceptance for the 2 test methods for the RIV table. The impedance will be specified as 150 ohms for NEMA and 300 ohms for IEC. The RIV test is no necessary for devices rated below 245kV.

Dieter Wagner is OK with proposal.
Ivan Konta agreed too.

X. TF for Instrument Transformers Accuracy – Igor Ziger

XI. Review of the action items for this task force:

- Presentation was done by I. Žiger on "Influence of burden on accuracy of VTs", which took up most of the time. IT showcased the work done in previous meeting as well as dana collected by T. Sizemore and I. Ziger. It also included some ideas on how to proceed forward. There were discussion points throughout the presentation. More notable comments are given below:
- Hossein suggested to have a survey on performing all measurements at 1.0 PF, as then the customers can easily recalculate the accuracy for any burden and power factor.
- R. Ogajanov suggested to include the impact of the new RCF/PF to the TCF in regards to proposed square accuracy limits
- I. Ziger and D. Kumaria to send out the survey to the main standard group and to the AEIC meter and service committee on the new burdens with unity PF and the application requirement for 400 VA and 0 VA burdens.
- I. Ziger and D. Kumaria will reach out and search for volunteers to work on a new informative annexure (Currently I. Ziger, T. Sizemore, D. Kumaria and R. Trifunoski)
- Web meetings to be scheduled to discuss further sections of the presentation

- I. Ziger to upload all previous materials to the IEEE server

Next Meeting: This WG will meet to continue work at the Toronto, Canada Spring 2020 meeting.

New Business

Zoltan Roman questioned C57.13 – 2016 table 10 which in deviates from the method used in earlier versions of the standard regarding burdens at ratings other than 5 amperes. Considerable discussion took place without reaching a group consensus. Ross McTaggart took the action to contact ITSC members not in attendance that might be able to explain the reasons behind the change.

Diego Robalino raised a question regarding the uncertainty limits as presented in C57.13 – 2016 8.1.1. The requirements presented and the example do not seem to match. Thomas Sizemore is to reach out to Vladimir Khalin and Diego Robalino to discuss this topic.

The next meeting is to be held in Toronto, Canada, in Spring 2021.

13. Old Business

a. Three Email ballots passed since the September 24, 2020 meeting – reporting results of the ballots for the record; no additional action required.

Motion 1 (Motion by Mugalian, Second by Preuss): Working Group I31 moves to revise the PAR for IEEE Standard 1613, Standard for Environmental and Testing Requirements for Intelligent Electronic Devices (IEDs) Installed in Electric Power Transmission or Distribution Facilities, with the following revisions to the Title, Scope, and Purpose:
WG Assignment: Revise IEEE Std 1613-2009, IEEE Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Electric Power Substations.
Output: IEEE Standard**, Project Number:** P1613
Old Title: Standard for Environmental and Testing Requirements for Intelligent Electronic Devices (IEDs) Installed in Transmission and Distribution Facilities
New Title: Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus
Old Scope: This document specifies standard service conditions, standard ratings, environmental performance requirements, and testing requirements for IEDs installed in transmission and distribution facilities. These devices and/or systems may or may not include communication ports and may or may not be port powered.
New Scope: This standard specifies ratings and service conditions, environmental performance and testing requirements for devices with communication functions used with electric power apparatus. Environmental and electromagnetic compatibility (EMC) immunity levels and type-tests simulating environments associated with electric apparatus are described. Acceptance criteria for evaluating device functionality are provided.
For devices with communication ports, where the device does not perform protection or control functions, testing of the communication functions is covered by IEEE Std 1613. Where the device performs protection or control functions and has communication ports, tests for all communication functions are covered by the IEEE C37.90 family of standards.
Old Purpose: The purpose of this standard is to define the environmental conditions present in transmission and distribution facilities and to establish a common reproducible basis for designing and evaluating IEDs to be installed in those locations.

New Purpose: The purpose of this standard is to define the environmental and EMC conditions required to establish a common and reproducible basis for designing and evaluating devices with communications functions used with electric power apparatus.
Motion 1 APPROVED: 25 responses (35 voting members, 18 required for quorum); 25 approve, 0 disapprove, 0 abstain

Motion 2 (Motion by Ramirez, second by Mugalian): Working Group I37 motions to revise PAR for IEEE Standard C37.90, Standard for Relays and Relay Systems Associated with Electric Power Apparatus with the following revisions to the Title, Scope, and Purpose.
New Title: Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – General Requirements and Tests
WG Assignment: Review of C37.90 Standard due for withdrawn in 2021.
Output: IEEE Standard**, Project Number:** PC37.90
Chair: Marilyn Ramirez
New Scope: This standard establishes the service conditions, ratings (electrical, thermal, and mechanical), and testing requirements for relays, relay systems, and control devices used for the protection and control of electric power apparatus.
For devices with communication ports, where the device does not perform protection or control functions, testing of the communication functions is covered by IEEE Std. 1613. Where the device performs protection or control functions and has communication ports, tests for all communication functions are covered by the IEEE C37.90 family of standards.
New Purpose: This standard establishes a common reproducible basis for validating designs and testing for the service conditions, electrical ratings, thermal ratings, and testing requirements for relays, relay systems, and control devices used for the protection and control of electric power apparatus.
Motion 2 APPROVED: 25 responses (35 voting members, 18 required for quorum); 25 approve, 0 disapprove, 0 abstain

Motion 3 (Motion by Lockhart, second by Mugalian): Working Group I36 motions to revise PAR for IEEE Standard C37.90.2, Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers with the following revisions to the Title, Scope, and Purpose.
WG Assignment: Revision C37.90.2 Standard.
Output: IEEE Standard**,**
Project Number: PC37.90.2
Chair: Chase Lockhart (formerly Jeff Pond)
Existing Title: Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers
New Title: 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
Existing Scope: The scope of this project is to establish a test method for evaluating the susceptibility of protective relays to single-frequency electromagnetic fields in the radio frequency domain, such as those generated by portable or mobile radio transceivers.
New Scope: This standard specifies design tests for relays, relay systems, and control devices used for protection and control of electric power apparatus that relate to the immunity of this equipment to radiated electromagnetic fields.
For devices with communication ports, where the device does not perform protection or control functions, testing of the communication functions is covered by IEEE Std. 1613. Where the device

performs protection or control functions and has communication ports, tests for all communication functions are covered by the IEEE C37.90 family of standards.
Existing Purpose: The purpose of this standard is to provide a common reference and test procedure that industry can use for evaluating the performance of protective and control relays used in electric power facilities.
New Purpose: This standard establishes a common and reproducible basis for evaluating the performance of relays, relay systems, and control devices used for protection and control of electric power apparatus, when subjected to radiated electromagnetic fields. This standard requires that an evaluation is performed during both quiescent and operate states.
Motion 3 APPROVED: 25 responses (35 voting members, 18 required for quorum); 25 approve, 0 disapprove, 0 abstain

PSRC should form a WG to Co-Sponsor IEEE P1854. WG is being formed in H-SC. Participate in that WG if you are interested.

14. New Business

a) Motion to form Balloting Body for PC37.2 (Dood)
Motion 1, Motion by Dood: Working Group I35 moves to proceed with IEEE SA Ballot for IEEE Standard PC37.2, Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations

WG Assignment: Revise IEEE C37.2-2008
Output: IEEE Standard**, Project Number:** PC37.2
Title: Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations
Scope: This standard applies to the definition and application of function numbers and acronyms for devices and functions used in electrical substations, generating plants, and in installations of power utilization and conversion apparatus. Historically, device function numbers have typically represented individual or component devices. These numbers and acronyms may also be used to represent individual functions within multi-function devices or software programs, and that may contain both protection- and non-protection-oriented functions.
Purpose: A device function number, with an appropriate prefix and appended suffix (or an acronym), is used to identify the function(s) of each device installed in electrical equipment. These numbers and acronyms are to be used in drawings, elementary and connection diagrams, instruction books, publications, and specifications. The device number or acronym may be physically placed on, or adjacent to, each device on the assembled equipment.
Motion by Dood, Second by Preuss

Motion passed by unanimous acclamation

b) Motion to form a Task Force

Motion 2: Motion by Mugalian: Form Task Force to review IEEE C57.13.3-2014 - IEEE Guide for Grounding of Instrument Transformer Secondary Circuits and Cases.
The Guide will be expiring soon (2024) so the I-SC should form a Task Force to review and determine whether a PAR should be opened for revision or reaffirmation of the Guide.
Motion by Mugalian, Second by Jeff Pond

Proposed Chair: Brian Mugalian, Task Force 46 (ITF-46)

Motion passed by unanimous acclamation

c) Motion to form a Task Force

Motion 3, Motion by Makki: Form Task Force to review IEEE C37.231-2006 - IEEE Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control.
The Guide will be expiring soon (2022) so the I-SC should form a Task Force to review and determine whether a PAR should be opened for revision or reaffirmation of the Guide.
Motion by Makki, Second by Roger Whitaker

Proposed Chair: Amir Makki, Task Force 47 (ITF-47)
Motion passed by unanimous acclimation

15. Motion to Adjourn, by Jeff Pond, second by Mike Meisinger

Meeting Adjourned at 8:59 AM CST

See you on WebEx in May 2021!

Reference Material:
WG and TF Minute Format Template: **Please use the template provided by PSRC (then) Secretary Mike Thompson to simplify compilation of the Minutes from all the groups! Refer to PSRC P&P for Working Groups, Section 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:

J Rotating Machinery Protection Subcommittee Meeting Minutes, January 14, 2021, 10:20 – 11:20 CST – Webex

Chair: Gary Kobet
Vice Chair: Will English
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.

J SC met with 24 out of 32 members and 43 guests, reaching quorum.
A motion to approve the September 2020 J SC meeting minutes was made by Steve Conrad and seconded by Phil Tatro. The minutes were approved.

Liaison Reports:

Electric Machinery Committee – M. Yalla – At their 8/17/2020 meeting, the C50.12 Working Group is discussing the underexcited region of generator capability curves, in particular the definitions of "practical stability limit", "theoretical stability limit", and "steady state stability limit". Minutes of that meeting are available upon request.

Industry Applications Society (IAS) / Industrial & Commercial Power Systems (I&CPS) - M Donolo - No Report

Nuclear 1E WG - Prem Kumar - IEEE 741 (IEEE Standard for criteria for Protection for Class 1E system, have got a PAR to make a small change - are for now going to revise only to add criteria-level words, in alignment with IEEE-308, that protection must be provided to ensure any "power quality" issues (magnitude, balance, harmonics, etc.) do not affect the ability of the Class 1E system to do its job. They will later add new standard (possibly IEEE 742) or Annex to discuss detailed guidance on addressing the open-phase issue specifically – likely similar to the IAEA guide on open-phase protection.

Old Business

PSRC Sharefile information – PSRC Sharefile sites have been created for J18, J20, and JTF2 (see https://www.pes-psrc.org/psrcsharefile.html).

All WG/TF Chairs are requested to review the following information including the links and share with their membership:

- PSRC attendees can watch the video at this link to see what PSRC Sharefile is for and about: https://www.pes-psrc.org/psrcsharefile.html
- Also at that link it describes **who needs** access. The **majority** of the time only a WG chair would need access to upload files.
- WG chairs can share files with anyone by creating links as described here: https://pes-psrc.org/sharefile/sharing_read_only_via_link.mp4
- NOTE: PSRC Sharefile is **ONLY FOR** non-PAR related materials. Any standards-related goes through https://ieee-sa.imeetcentral.com

123Signup – All WG/TF chairs are requested to update their membership roles in 123signup. The J-SC Chair will be glad to assist if needed to walk them through how to do this.

New Business

Jason Espinosa suggested a task force to investigate the need for a project on protection of synchronous condensers. Murty Yalla and Gary Kobet agreed this might be beneficial. Jason will write up a proposal for an assignment to present at the May 2021 J-SC meeting.

Tom Beckwith requested that when PAR-related communications are conducted that the C37 number be included with the J-SC TF or WG. For example, J17 is the revision of C37.102, J16 is C37.101, J19 is C37.106, J22 is C37.96.

Motion to adjourn was made by Steve Conrad and seconded by Jason Espinosa. Meeting was adjourned.

The following J SC WGs met

J12: <u>Improved Generator Ground Fault Protection Schemes</u>

Chair: Dale Finney
Vice Chair: Manish Das
Established: Jan 2013
Output: Report to subcommittee
Status: 23rd Meeting

Assignment: To review new methods related to generator ground fault protection

WG Report
J12 met with 11 members and 17 guests.

Chair Dale Finney opened the meeting. September 2020 meeting minutes were approved

The Chair reminded that the output material is intended to be a feeder into C37.101 (J16) and C37.102 (J17).

The report is complete and posted in IEEE PES Resource Center as PES-TR82 dated September 2020 https://resourcecenter.ieee-pes.org/technical-publications/technical-reports/PES_TP_TR82_PSRC_WGJ12_090129.html

Chair shared that the report has so far been submitted to the Georgia Tech relay conference. Chair will follow up with Luis Polanco regarding a conference in Central or South America.

Chair shared the conference presentation and walked through the slides, which included all the improved methods (accelerated tripping using negative sequence current and voltage, improved timer schemes, adaptive third harmonic scheme) of ground fault protection discussed in the report.

A slide that was not included in the report was included and discussed. It shows intermittent fault model simulated in Matlab showing the results from the various timers for 1000 cases. The results show all timers detect the intermittent fault. The WG agreed they are useful to keep those slides.

Nader Safari-Shad suggested adding a slide showing the fault case in the adaptive scheme. He also mentioned a potential scenario for intermittent timer logic behavior that may not be covered in this report. Chair suggested this could be a topic for further discussion/future work in the subcommittee.

Chair thanked the WG members for their valuable contribution on this report.

A motion was made in the J Subcommittee by Dale Finney to disband the WG. The motion was seconded by Russ Patterson, and the motion carried. J12 is disbanded, so no additional meetings are needed or requested. A presentation to the MC is planned for May 2021.

J13: <u>Modeling of Generator Controls for Coordinating Generator Relays</u>

Chair: Juan Gers
Vice Chair: Phil Tatro
Assignment: Work jointly with the Excitation Systems and Controls Subcommittee (ESCS) of the Energy Development and Power Generation Committee (EDPG) and the Power Systems Dynamic Performance Committee (PSDP) to improve cross discipline understanding. Create guidelines that can be used by planning and protection engineers to perform coordination checks of the timing and sensitivity of protective elements with generator control characteristics and settings while maintaining adequate protection of the generating system equipment. Improve the modeling of the dynamic response of generators and the characteristics of generator excitation control systems to disturbances and stressed system conditions. Improve the modeling of protective relays in power dynamic stability modeling software. Define cases and parameters that may be used for the purpose of ensuring coordination of controls with generator protective relays especially under dynamic conditions. Write a report to the J-Subcommittee summarizing guidelines.

WG Report

The working group met in one session with 15 members and 24 guests present. A quorum was achieved.

The working group approved minutes of the September 22, 2020 meeting.

Juan Gers reported that the report has been approved by the J Subcommittee and has been forwarded for approval by the Main Committee officers. Juan also reported that comments have been received since the

previous meeting. Comments were discussed by the working group and a decision was to make limited revisions to the report.

The working group reviewed comments on Section 4.2. This section will be supplemented with a short paragraph referring to the OEL and UEL functions to emphasize that in addition to coordination with generator protective relays, the limiters also must be coordinated with the protection functions with the exciter controls. Hasnain Ashrafi, Phil Tatro, and Juan Gers will work on the corresponding paragraph.

The working group also considered comments on Figure 67 and agreed to add text to better explain the figure and, in particular, to validate why the out-of-step (78) relay should trip when the impedance trajectory crosses the second blinder even if it already has exited the mho characteristic. The text will note that a trip decision is associated with the setting logic and timers and may vary among relays from different manufacturers. Gustavo Brunello volunteered to write a brief discussion on this subject.

Juan Gers indicated these changes will be incorporated within the next week and circulated to the working group prior to resubmitting the report to the Main Committee officers.

Gary Kobet requested that the working group prepare a PowerPoint presentation for the Main Committee meeting in September 2021. This assignment will be the focus of the May meeting.

Next Meeting:
The requirements for the next meeting are a single session and, if held in-person, a meeting room for 40 people and a computer projector.

J14: <u>Plant Protection Issues Associated with Black Starting of Generators</u>

Chair: Chris Ruckman
V Chair: Zeeky Bukhala
Established: May 2014
Output: Report to Subcommittee
Expected Completion: January 2017
Status: 17th Meeting

Assignment*:* Investigate and report to the J Subcommittee on plant protection issues associated with black start.

WG Report

WG J14 did not meet.

JSC chair note:
The report has been successfully balloted in the SC and the WG. The final report has been reformatted and once a final comment has been resolved the report will be forwarded to PSRC MC officers for review/approval. The Chair requested J14 continue to meet to create a presentation for a future MC meeting.

J15: <u>Investigation of the Criteria for the Transfer of Motor Buses</u>

Chair: Wayne Hartmann
Secretary / Vice Chair: Joseph Valenzuela
Established 2015 (1/15)
Output: Report (Draft 5B)

Status: 18th Meeting (1-12-21)

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 Jan 12, 2021, with 15 members and 16 guests.
2. Doug Weisz performed Vice Chair duty for this meeting.
3. The WG assignment was reviewed as well as a brief history of WG activities.
4. The WG reviewed Draft Report 5B starting on page 32, section 6 "Motor Bus Transfer System Test Protocol" to resolve and accept comments from Jason Espinosa. All comments, edits, and additions were discussed and resolved by the WG. Here are some **action items** from the discussion:
   - Jason had recommended that the title of this section "6] Motor Bus Transfer System Test Protocol" align with the Table of Contents.
   - There was a recommendation to add a figure on page 33 of a sync scope showing the pickup and dropout. Tom Beckwith will send to Chair for inclusion.
   - There was also some discussion on if a Table of Inertias from the 2012 report should be added here as well; however the consensus was to not include this table and instead add some clarification text on page 32 about the 2012 report and C37.96.
   - There was some discussion on Figure 1 on the top of page 35 concerning if the GSU high side breaker is needed if the ring bus already had 2 breakers and there are no other taps off of this section of the ring bus. The final conclusions were to just keep the figure as is.

***WG Assignments*:**
Note for comments use "Review," "track changes" and comment bubbles as needed

- **Modeling B**
  a. Reference for Simulink Standard Model (Kraus,Maughan)
  b. Dale F., Investigate and verify parameters used in model are realistic
  c. Derrick H., Author a note for certain data points at 120 and 140 degrees shown in figures 6, 7, 8 and 10 exhibit lower torque that rest of same motor power curve
  d. Add any salient conclusions after each figure and its discussion as appropriate.

- **MBT Field Data from MV Buses**
- MBT Field Data from MV Buses
  a. Dale Finney to review

- "Modeling A
  a. JC Theron to review

- "NEMA MG-1, IEEE 666 and ANSI C50.41", compare and contrast
  a. After the meeting, Tom Beckwith volunteered to author this section. Wayne Hartmann and Chris Ruckman will review.

1. Chair to issue next Draft with incorporated comments and edits from today's meetings to be issued to Members and Guests by Feb. 15, 2021.
2. Chair mentioned the WG may have some interim meetings prior to the next May 2021 PSRC meeting to accelerate resolution of all comments and edits that have been submitted.
3. All remaining assignments (not for Section 6) are due to Chair by March 31, 2021.

Adjournment

Next Meeting:
- In Person: Double session, projector, room for 30 people for in-person meeting
- Virtual: WebEx or similar from PSRC

J16: PC37.101, Guide for Generator Ground Protection

Chair: Ryan Carlson
Vice Chair: Doug Weisz
Established: 2016
Output: Guide
Status: 10th Meeting

WG Report

The WG met with 12 out of the 19 voting members present. A total of 54 participants joined the Webex meeting. As quorum was achieved, **Ryan** asked if someone would like to make a motion to accept the Sept meeting minutes. **Will** made a motion to accept Sept meeting minutes and **Ritwik** seconded so previous meeting minutes were accepted.

Ryan reviewed the patent slides required for IEEE PAR WGs. The C37.101 format change was reviewed and the working group decided to have three primary sections for the guide:
1) Grounding Methods
2) High Impedance / Resonant / Ungrounded Generators
3) Low Impedance / Solidly / Hybrid Grounded Generators

Next, assignments were reviewed:

- Low impedance grounding – This section was assigned to **Ryan & Kelvin**. **Ryan** requested help with this section and **Omar Marte** agreed to assist.

- Hybrid Grounding – **Derrick Haas** previously volunteered for this section. **Ryan** will follow up with Derrick.
- Resonant Grounding –**JC Theron** is in the process of reviewing this section. Ryan will follow up with additional reference material to allow him to complete the review.
- High Impedance Grounding – The WG discussed the copy of the high impedance grounding section that was reviewed in 2018. The WG agreed that a summary of the material from the J12 improved grounding protection schemes report should be incorporated into the guide.
- Legacy Schemes – **Kelvin** and **Onur** previously volunteered for this section. **Ryan** to follow up with Kelvin on this.
- System Provides 3Io – **Ryan** will contact **Vinod** to see if he is still willing to help with this section.
- Grounding Methods – **Sudarshan Byreddy** previously volunteered for this section. **Ryan** to follow up with Sudarshan.
- Annex A, example calculations – A preliminary review of Annex A is complete. This Annex may need to be reviewed further once the new guide format takes shape.
- Figures Team – **Ratan** posted the Visio files used in the 2006 guide on imeetcentral.
- **Dale** volunteered to review 3Vo section vs latest draft of C37.234, J12 report, etc.
- **Ritwik** and **Jason** volunteered to develop a section on accelerated tripping, intermittent arcing, etc which could be a summary of material in J12 report.

Nadere Safari-Shad mentioned that he had previously completed the injection schemes section. **Nadere** will send the section to **Ryan** for incorporation into the guide.

Ryan stated that the PAR for this working group is set to expire at the end of 2021. An extension request will be filed. The goal is to have all assignments completed in 1st have of 2021 and then start to pull the guide together in the 2nd half.

Ryan asked for a motion to adjourn meeting: **Dale** provided motion and **Ritwik** seconded.

The WG requests a single WebEx session for 60 people the May 2021 meeting. The WG also request no conflict with other J meetings, especially J17 (C37.102) & J19 (C37.106).

As a result of this session, we have updated the voting member list to include 2 new voting members and they have been added to the J16 working group. They are as follows:

- Hasnain Ashrafi
- Omar Marte

In addition to the new members added above, the J16 working group consists of the following voting members:

1) Kelvin Barner
2) Zeeky Bukhala
3) Ryan Carlson
4) Manish Das
5) Jason Espinosa
6) Dale Finney
7) Gary Kobet
8) Prem Kumar

9) Sudhir Thakur
10) Steve Turner
11) Doug Weisz
12) Matchyaraju Alla
13) Sudarshan Byreddy
14) Will English
15) Onur Usmen
16) Vinod Yedidi
17) Ritwick Chowdhury
18) Jacobus Theron
19) Nader Safari-Shad

J17 - Revision of C37.102 Guide for AC Generator Protection

Chair: Manish Das
Vice Chair: Gary Kobet
Output: IEEE Guide
Draft: 1.9
Established: May 2017
Status: 12th meeting, Jan 2021 (virtual)
Expected completion date: December 2021 (initial sponsor ballot by January 2021)
Assignment: Revise C37.102 Guide for AC Generator Protection

WG Report
WG met on January 11, 2021 virtually via Webex in a single session with attendance recorded from 22 members and 33 guests. Quorum was achieved. The Sep 2020 minutes were approved.

The Chair presented the patent slides, no claims were made.

The Chair shared updates in the latest draft:

- Annex is now complete and has been merged into the latest draft (1.9). GSU nameplate pic in Annex fig A.2 will be replaced or improved.

- Relevant feeder material from J13 report has been incorporated in subclauses 4.2.1.2.3, 4.5.1.1, 4.5.1.3, 4.5.3 and 4.6.1.1 with statements clarifying that performing transient studies isn't required, but is beneficial, to set loss of excitation and loss of synchronism relays. Emphasis on this will also be added in the Annex A 78 settings per Juan's comment. Pointers were added to the J13 report. Dale offered to write a short section on transient study process and Juan offered to help. This will be added to subclause 4.5.3 Loss of Synchronism. It was noted C29 and D29 are WG on Out of Step protection.

- A new subclause 5.8 Protection during Black Start has been added and a pointer added to the J14 report.

- Will coordinate with J16 on potential overlapping content on subclause 4.3.3 Ground fault protection.

- Deepak Maragal suggested adding some verbiage to help users understand different modes of generator operation and differentiate between control related trips and protection trips. He offered to provide a write up.

- Chair will review J5 report and provide feeder material for subclause 4.5.3 and Loss of Synchronism settings in Annex A.

- Blocking input criteria was added to table 7.2.1. A brief explanation in each device subclauses for any blocking criteria will be added by Doug.

Alla Deronja suggested following the IEEE 2020 Style Manual; avoid using “should”, “shall” etc.

Chair shared a tentative timeline (below) to complete remaining assignments, WG ballot, and sponsor ballot. Some formatting and editorial issues may be left to be addressed after WG ballot.

Malia Zaman from IEEE-SA shared that final draft should be submitted to RevCom by October 2021 or submit a PAR extension request by that deadline. Generally easier to get the PAR extended when sponsor ballot is underway.

The request WG members to complete any remaining assignments by January 29.

Next Meeting:
Request a single session for May 2021 with space for 40 people and a computer projector. The WG also requests no conflict with other J meetings, especially J16 (C37.101) and J19 (C37.106).

J18 Investigate the effects of sub-synchronous oscillations due to inverter based resources (IBR) on rotating machinery protection and control

CHAIR: **Normann Fischer**
VICE CHAIR: **Jared Mraz**
Output: Report
Established: September 2017
Status: WG

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
The working group discussed progress on the writing assignments. Ali Hooshyar has begun drafting the DFIG modelling section of the report. The report outline and writing assignments will be stored on the PSRC “sharefile” site to improve visibility to the WG.

The chair suggested that the WG obtain a detailed model of the CREZ system (or a portion of the system) as the example system for this report. Realistic machine models will be needed for this model. “Black box” models that accurately reflect the control system models for the DFIG’s will be sufficient. The simulations used for this report will be performed either in PSCAD or EMTP-RV.

The working group reviewed the report outline and writing assignments. Dale Finney, Derrick Hass, Aboutaleb Haddadi, Nuwan Perera, and Deepak Maragal volunteered to take on writing assignments in addition to the other WG members who have already volunteered. No substantial changes were made to the report outline.

The working group discussed the need to obtain more background information about the SSCI events that have occurred in Texas, Minnesota, and China. Engineers from China, where the majority of SSCI events have occurred, with first-hand experience with the SSCI events that have occurred there may be invited to speak at future J18 WG meetings. Xicia Zhao will contact engineers in China with respect to sharing their experience wrt SSCI events.

The chair discussed uploading additional reference papers as well as a working copy of the WG report to the PSRC "sharefile" site to improve the ability of the WG to collaborate.

Next meeting:
For the next meeting, if it is not held virtually, J18 will need a room for 60 and an overhead projector.

J19 PC37.106 Guide for Abnormal Frequency Protection for Power Generating Units

Chair: Ritwik Chowdhury
Vice Chair: Jason Espinosa
Output: Guide
Draft: 7.1
Established: January 2019
Status: 9th WG meeting, Virtual – January 12, 2021
Expected Completion Date: September 2021
PAR Expiration Date: December 2022

Assignment: To revise and update C37.106, IEEE Guide for Abnormal Frequency Protection for Power Generating Plants

WG Report

- 14 voting members, 1 non-voting member and 13 guests in attendance, quorum was met.
- Meeting minutes for previous two virtual meetings were approved – Dale motioned for both meetings, Daniel seconded for one and Vinod seconded for the other.
- We added definitions from IEEE 421.1-2007 for excitation system terms
- C37.102 recommends definite time V/Hz alarm and trip at 6 seconds, C37.106 uses 60 seconds
  - Mike Thompson believes V/Hz step scheme is obsolete and compromised. Believes Inverse timing is the preferred method.
  - A single step scheme is inadequate to protect the machine
  - WG modified the time delay to 6 seconds
- WG approved the addition of the User Defined V/Hz scheme section and various other sections
- We will continue meeting virtually between the regular PSRCC meetings until we go to WG ballot

Existing action items **due on February 22nd**, 2021.

- **Jason:** Consider what to do with Relay A in Figure 5. Also improve language in dual-definite time section.
- **Jean and Daniel:** Add a note to Section 5.5 on abnormal frequency capability for Francis vs Caplan vs Pelton Turbines.

- **Dale, Normann, Steve, Doug:** Discuss language in Section 4.4.2.1, come up with a conclusion and merge into guide. Also consider supervision of healthy frequency measurement in addition to healthy voltage measurement. Please also propose relevant changes to Annex A example.

New action items **due on March 8**, 2021.

- **Zeeky, Ritwik and Raju:** We added definition for "self-excitation"; we need to revise the definition to add more clarity.
- **Doug:** Follow up on 4.4.2.7 V/Hz tripping practice for online conditions. Please refer to the latest draft of C37.102 and tutorial.
- **Derrick:** Prior to the meeting, Derrick volunteered for any assignments the WG needed help with. The chair will email him and the figures team to update certain figures.

Next meeting:
Double session. If virtual, capacity for 40. If physical, a room for 25 and a projector.
Request no conflict with I38 and J20.

J20 Practices for Generator Synchronizing Systems

CHAIR: Jason Espinosa
VICE-CHAIR: Luis Polanco
Output: Report
Established: January 2019
Status: 5th WG Meeting, Virtual January 13, 2021

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

- 14 members present with 22 guests, quorum was not met
  - Action Item: Jason Espinosa to send an email to the WG to approve the WebEx meeting minutes
- The WG was updated on the location to store documents
  - The Sharefile site has been setup and WG members have been given access.
  - Reference documents have also been sent to WG members via Sharefile link
- Joe Rostron of Southern States provided a presentation on generator breakers. The following topics were discussed:
  - Most utilities in US will place their generator breaker on the high-side of the GSU while in Europe they tend to place their generator breakers at the generator terminal
  - Current Chopping
  - Missing (Delayed) Current Zeros and how this phenomena delays tripping of a generator
  - Voltage rise associated with out-of-phase Transient Recovery Voltage and system faults
  - Tradeoff between high voltage and high current capabilities of circuit breakers
  - Discussed newly discovered issues from IBR facilities that may impact circuit breakers
  - Gang vs IPO breaker types
  - Slow breaker closing time or one phase not closing when required
  - Breaker closing time may get slower randomly due to mechanics; they can be test operated a few times prior to synchronization to help this

- Close command blocked by breaker control circuit (e.g. low mechanism energy, etc.)
- Breaker auxiliary contacts tend to be very reliable
- There tends not to be much difference between a generator breaker connected to the high-side of a GSU and an adjacent breaker connected on the next bay for a transmission line. Ryan Carlson pointed out that some manufacturers may make special request for synchronizing breakers so this is on a case-by-case scenario

- The chair thanked the presenter on behalf of the PSRC for an excellent presentation
- Action Item: Dale F will send the Canay paper on delayed current zeros to chair
- Action Item: Jason Espinosa will send paper to Joe Rostron and upload to Sharefile

J21 - Motor Protection Tutorial

CHAIR: Kelvin Barner
VICE-CHAIR: Derrick Haas
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: Report
Established: September 2019
Status: WG (2nd meeting 20210113)

WG report
- 8 members and 24 guests attended.
- Vice-chair revisited review assignments from previous meeting.
  - Several WG members assignments still pending:
  - Will English – Section 4: Equipment description
  - Jason Espinosa – Section 5: Motor protection requirements
  - Prem Kumar – Section 5.2 & 5.4 Stator Protection, Section 5.9 Nuclear 1E
  - Marcos Donolo – Sections related to stator, rotor & thermal elements
  - Raju – Section 5.7 Abnormal Supply conditions
  - Kelvin, JC Theron, Subhash Patel – Section 6.3 Adjustable Speed Drive
  - Sungsoo Kim – Section 7: Setting and Adjustment of Protective Devices
  - Ritwik Chowdury – reviewed surge protection section. May not need to be included as a full section in the tutorial. Suggested addressing parts of this section elsewhere in the tutorial, such as in "other considerations" section.
  - Tom Beckwith, Dale Finney, Marcos Donolo - agreed section was valuable, but needed revision to add updates from J15 and other more recent publications
  - Dale Finney did provide Kelvin with the word document version of C37.96 from 2012
- Tom Beckwith brought need to set up file sharing.
  - **ACTION ITEM** – Derrick to discuss with Kelvin and potentially setup file share site
- J subcommittee chair reminded all of us that this working group needs to work closely with JTF3, task force investigating the need to revise C37.96. The chair of JTF3, Zeeky Bukhala was present, and agreed to meet with J21 chair/vice-chair to ensure coordination
- Suggestion to setup an interim meeting via Webex before May meeting to revisit review assignments and work on outline

Next meeting:

JTF1: Investigate the Need for a Generator Condition Monitoring

Chair: Steve Turner
Vice Chair: Open
Secretary: Open
Output: Report
Established Date: 09-22-2020
Expected Completion Date: Open
Draft:
Assignment:

WG report

- Officer presiding – Steve Turner
- Officer recording minutes – Steve Turner
- Call to order- Check
- Must develop scope first (might include motors as well)
- Purpose - condition monitoring can help to find a problem before a fault develops and schedule maintenance
- Schedule vendor presentation for next meeting
- Dale Finney gave a presentation on existing technical papers regarding condition monitoring
- Steve Turner gave a presentation how to use a multi-function numerical relay to data log field insulation resistance and how to detect a change

- Results of call for quorum – Not applicable
- Approval of Agenda (motion and second) - Check
- Action items:
  Invite industry experts to join the working group
  Gather and review pertinent industry technical papers

JTF2: Investigate the Need for a Disturbance Recording

Chair: Dennis Tierney
Vice Chair: open
Secretary: open
Output: Report
Established Date: 9-22-2020
Expected Completion Date: September 2023
Draft:
Assignment:

WG Report

The task force met on 01/12/2021@2:20pm CDT with 27 people in attendance

Special thanks to Shane Haveron for volunteering to be Vice Chair.

The Chair opened the discussion on item four of the agenda, Develop a list of topics. He started by reviewing the content and layout of PSRC C5 report "Considerations for Use of Disturbance Recorders". He pointed out that the contents of the report are still relevant. The report is just in need of updating, because the report was completed in 2006, 14 years ago.

The Vice Chair mentioned that the integration of IBR has increased the need for better disturbance recording and that grid oscillation with DG is becoming a greater concern.

The Chair pointed out that the Guidelines and Technical Basis Section of PRC-002-2 states " PRC-002-2 addresses "what" data is recorded, not "how" it is recorded."

Dale Finney, J-SC Chair, mentioned adding a section on tools and methods used for analyzing data from Fault Recording and Disturbance Recording devices.

The Vice Chair commented on the need to understand how the each data file was produced when comparing data from different files.

Gopal Gajjar commented on including methods of correcting time stamps to help synchronize fault data from different device with incorrect time stamps. He also talked about adding a section on recognizing CT saturation and VT transients.

The Chair mentioned that PRC-002-2 contains sections on data file type and data file naming. He suggested including a section to cover these topics.

The J-SC Chair suggested all members of JTF2 read PSRC C5 report "Considerations for Use of Disturbance Recorders". The Vice Chair asked members where to acquire a copy of the report, has IEEE charges for copies. The J-SC Chair and Gary Kobet will help setup a folder for JTF2 on the PSRC Sharefile site.

The Chair opened the discussion on item five of the agenda; What will be our final product? Guide, tutorial, paper? After a discussion the consensus was reached to see if could use the PSRC C5 report and update it. Gary Kobet said he would see if we could use the report or not.

The Chair opened the discussion on item six of the agenda; Updating the assignment wording for submittal. After a discussion, the consensus was reached to wait on the outcome of our request to use the PSRC C5 report. The Chair and Vice Chair will arrange for an on-line meeting, or meetings, to work on the outline and assignment wording prior the May 2021 meeting.

Next meeting:
Single session with accommodations for 30 people is requested

JTF3: Investigate revision of C37.96 Guide for AC Motor Protection

Chair: Zeeky Bukhala
Vice Chair: --
Secretary: --
Output: Recommendation to Subcommittee
Established Date: September 2020
Expected Completion Date: January 2021
Draft: --
Assignment: Investigate whether a working group should be formed to open a PAR and revise C37.96 Guide for AC Motor Protection

WG Report
The task force held its first meeting on Wednesday, January 13th with 30 attendees.

I. Chair kicked off the meeting at 8:05am CST, welcomed attendees and introduced himself and the purpose of the task force.
II. Reviewed pre-Par IEEE-SA Guidelines slide.
III. Reviewed outline of current C37.96-2012
IV. Discussion on potential topics to review
    a. Motor Bus Transfer. Review papers published (Tom Beckwith has some references) since last revision of the guide and include material being developed by J15.
    b. Motor Protection Tutorial. J21 is just getting started. Chair will continue engagement.
    c. Motor performance monitoring. Expand to include application of multifunction, microprocessor-based protection device monitoring capabilities, including data recording (faults and disturbance). Coordinate with JTF2 that is investigation the need for a document on disturbance recorders. This includes remote monitoring through communication systems (Nabil El Halabi Fares/Derrick Haas).
    d. Motor thermal models. Previous discussions in the PSRC have identified manufacturer discrepancies in thermal models. Re-visit discussion considering the current state of the art.Multifunction, microprocessor-based protection device. Review Section 8 and applicability of dedicated clause to these devices. Review use of electro-mechanical relays. Integration of Section 8 into main body, like what was done for C37.102.
    e. Industry Application Society. Tom Beckwith suggested liaising IAS working groups involved in related work. He will provide contacts.
    f. Other non-IEEE standards. Review API, IEC, CIGRE, etc. for relevant material. Dale Finney stated that IEC has a standard dedicated to motor thermal models
    g. Redundancy requirements. Nabil El Halabi Fares suggested that the guide discuss any redundancy requirements.
    h. Grid Code/Regulatory Requirements. Review impact of increasingly stringent requirements on motor protection, e.g., motor low voltage ride through capability (Nabil El Halabi Fares).
    i. Adjustable Speed Drives. Consider advances in ASD technology and capability and motor/ASD protection and operation (Dale Finney).
    j. Equipment description. Review synchronous motor content for completeness (Bob Pettigrew).
    k. Pump Storage Generator Protection. Protection of the hydro-generator during pump operations (motor operation) (Dale Finney).
    l. Protection Tables (Section 6.4). Add in cross-references like C37.102.
    m. Literature survey
V. Discussion on PAR
    a. Discussion on Scope.

i. There was some discussion about the applicability of the word "requirement" in the Scope. It was pointed out that some current PSRC guides (approved by IEEE-SA) still include "requirement" in the scope.
ii. Consider expanding to include monitoring

b. 17 attendees volunteered to work with the Chair to draft the PAR.

VI. Next Steps

a. Chair will draft PAR and work with volunteers to finalize the PAR prior to the May 2021 meeting

VII. Meeting adjourned at 8:53am, CST.

A motion was made by Zeeky Bukhala at the SC meeting to disband the TF and form a working group. The motion was seconded by Dale Finney, and the motion carried. The new WG is J22.

Next meeting:
Single session with accommodations for 30 people is requested (for WG J22).

K Substation Protection Subcommittee Meeting Minutes, January 14, 2021, 11:30 – 12:30 CST - Webex

Chair: Jeff Barsch
Vice-Chair: 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.

- **Introductions**
- **Call for Quorum** – Quorum Met (Need information from daily 123 report). Jeff welcomed Sebastien Billaut and Steve Klecker as new members of the K Subcommittee.
- **Approval of previous meeting minutes;** Webex Virtual PSRC - September, 2020) – motion by Don Lukach, second by Adi Mulawarman, unanimous approval.
- **Approval of agenda** – motion by Steve Klecker second by Sebastien Billaut, unanimous approval.
- **Advisory Committee items of interest**
  - Please have working group meeting minutes to K SC chair by Jan 22 2021, using the recently provided template.
  - Please send working group minutes to members for their review ASAP.
  - Please send agendas one month in advance of meetings, including online meetings.
  - There were 432 PSRCC Attendees for this meeting, including 64 first time attendees.
  - PSRC Sharefile site for non-PAR related Working Groups will be available.
  - O&P and P&P manual updates will be available in early 2021.
- **Working Group Reports:**

K10SCC21 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 Monday from 11:30am to 12:30pm by web meeting. There were 15 Voting Members, 4 non-voting members, and 75 non-members present. Benjamin Kazimier chaired, presided over the meeting. Wayne Stec served his role as vice-chair and Mat Garver and recorded the minutes.

Wayne Stec presented updates on 1547.2 which is currently on draft 4.0. It is expected that draft 5.0 will be out very soon ahead of the Feb 24-26 virtual working group meetings. The goal of the next meeting is to approve a ballot ready draft for publication in 2021.

Tony Johnson provided an update on 1547.3/PSCC S13. The next meeting of 1547.3 is concurrent with 1547.2 and will take place on Feb 23-24.

Mark Siira noted that 1547.9 hopes to enter the ballot process in late 2021. The group will meet by web on Feb 22nd.

The registration link for the 1547 activities mentioned above is: https://web.cvent.com/event/1a735667-35d8-4ce4-96ba-798f2a715b0a/summary

Mark Siira returned the previously requested information raised by Dean Miller regarding the status and plan for revision of IEEE 1547.7. SCC21 studied the need and has determined that downloads and sales of the standard to not indicate an urgency to update it given the bulk of other work currently taking place.

Mark also mentioned that SCC21 has developed a new grid-forming inverter subgroup. They are currently writing an application white paper.

Dr. Jens Boemer discussed P2800 indicating the latest draft has passed the working group approval to move into the sponsor ballot phase. Approximately 150 working group members voted with close to 99% in favor. The ballot pool is set to open Feb 1st and will close near the end of Mar.

Additional notes:
Meeting Room Requirement (MRR): For the next meeting we request a single session in a room that can accommodate 20 persons. Please avoid scheduling conflicts with C36, C38, and S13.

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.

The K12 WG did not meet at these PSRC meetings.

K16: Revision of C37.91 Guide for Protecting Power Transformers

Chair: Will English
Vice Chair: Steve Conrad
Secretary: Steve Conrad
Output: Guide
Established Date: May 2014
Expected Completion Date: January 2021
Draft: 17
Assignment: To revise and update C37.91, IEEE Guide for Protecting Power Transformers to correct errors and address additional protection related topics.

The WG did not meet in January 2021.

The PAR has been extended through the end of December, 2021.

The ballot recirculation generated just one comment which was editorial in nature.

An email was sent to the WG requesting approval of a proposed comment resolution, September 2020 meeting minutes and submission of the final version of the Guide to RevCOM. 14 of 26 members have responded and given approval. The revised document will be submitted to RevCOM shortly.

K18: C37.108, Workgroup K18: Secondary Network Systems Protection

Chair: Adi Mulawarman
Vice Chair: Roger Whittaker
Secretary: Roger Whittaker
Output: Guide for the Protection of Secondary Network Systems
Established Date: May 2015
Expected Completion Date: February 2021
Draft: D2.23
Assignment: Revise the Guide for the Protection of Secondary Network Systems

The WG did not meet in January. The chair provided the following update.

Currently in Rev-Com agenda. The WG is filing for PAR extension. In discussion with SA on what the next course of action whether need to go on ballot again or can we proceed to SA Editorial and publish. The WG has not decided if we need a meeting in May or not.

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
Draft: 9
Assignment: Revise and ballot IEEE Standard C37.234 prior to its expiration in 2019

Call to order

The IEEE patent and policy slides were presented. There were no responses or questions regarding the slides.

Quorum was achieved. The meeting was attended by 20 voting members, 4 non-voting members and 41 guests.

A motion was made by Sebastien Billaut to approve the minutes from the September 21 PSRC and WebEx meetings (September 21 PSRC, Oct 6 WebEx #19, Oct 22 WebEx #20, Nov 11 WebEx #21, Nov 24 WebEx #22, and Dec 9 WebEx #23 meeting minutes). The motion was seconded by Steve Conrad. The minutes were unanimously approved.

The meeting agenda was reviewed, and no revisions were made to it. A motion was made to approve the agenda by Jeff Barsch and seconded by Don Lukach.

The guide draft 9.0 is currently in the IEEE-SA MEC review, and the formation of the balloting body is underway (it closes Jan. 16, 2021). When the MEC comments are received and resolved, we plan to ballot the guide revision.

A series of webex meetings is planned to be set up after the WG receives the IEEE-SA ballot comments depending on the amount and nature of the comments. We plan to have a meeting at the PSRC in May, 2021. Please avoid conflicts with C31 and DTF47.

K24: Summary paper for PC37.245, Guide for the Application of Protective Relaying for Phase Shifting Transformers

Chair: Brandon Davies (filled-in by Hillmon Ladner)
Vice Chair: Hillmon Ladner
Established: January 2019
Output: Summary Paper for PC37.245 PST Guide
Expected Completion: May 2021

Assignment: Write a summary paper for the recently completed PC37.245 Guide for the Application of Protective Relaying for Phase Shifting Transformers (PST) for presentation at regional conferences.

Motion to disband working group by Brandon Davies, second by Mike Thompson, unanimous approval.

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: 1.3
Assignment: Revise and Update C37.99, IEEE Guide for the Protection of Shunt Capacitors

Formalities:

- The WG met via Webex Meetings on 01/13/2021 from 2:20 to 3:20 PM CST.
- Officer presiding – Meyer Kao
- Officer recording minutes – Rick Gamble
- The meeting was called to order by the Chair, who then showed the patent/copyright slides.
- The Webex Meeting was attended by 14 members and several guests. Quorum was met.
- Approval of Agenda (motion and second) – N/A
- Approval of Minutes of previous meetings (motion and second) – Paul Elkin and Pratap Mysore

Meeting Summary:

- Chair invited Juan Piñeros to present on 46 negative sequence protection elements
  - Issue encountered include lack of guidance on 46 element tripping speed requirements versus need to coordinate the element with downstream devices. Other issues around calculating the pickup were discussed: as a percentage of rated bank current versus based on fault location.
  - The recommendation is to add more setting guidance for the 46 element to the guide. Discuss pickup setting (by rated bank current or by fault location). Discuss timing considerations and coordination with downstream elements. Discuss supervision options (directional, supervisor). Discuss bank construction (fused/fuseless, phase over phase configuration, etc.)
  - Rick Gamble, Eric Thibodeau, and Juan Pinero to review section 7 in this matter.
- The Chair invited Bogdan Kasztenny to present his findings on the table-based calculations in the guide. He recommends simplifying the approach and cleaning up those tables. Bogdan wrote a paper with recommendations that will be distributed to the WG.
- The WG ran low on time to get through the full agenda, and the chair adjourned the meeting.

Next Meeting:

- The next meeting will be in May via WebEx

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 1.3, Sep 22 2020

Date: Tuesday, Jan 12, 2021
Time: 3.30 – 4.30 PM (CST)
Venue: WEB Meeting

1. Introduction and agenda (48 participants and 14 members). Reached Quorum. (Total WG members 20).
2. Approval of the previous meetings-approved Sep 22, 2020.
3. Patent slides were presented.
4. Kamal gave progress update.
5. Normann asked the question on naming Dry type and replace with Air core. Some other discussion also proposed to change the reactors main types to air and iron core. Further discussion in working is required in next meeting
6. BF for line and bus reactor presented by Jason and Josh. Further discussion in the next working group meeting.
7. Ilia presented on Turn-to-Turn faults for line and bus reactors. Good discussion on the methods. Charlie had question on using impedance method for turn to turn. Normann has question on the sensitivity of numbers of turn and design difference for air and iron core. Further discussion required in the next working group meeting.
8. Pratap presented Excel Energy field events on parallel resonance and oscillations for the two cases. Excellent discussion. Normann had question of zero crossing. This event will be further discussed in the WG.
9. Mukesh presented an BC Hydro event on air core reactor failure and series resonance. Excellent discussion and further discussion in next WG meeting. Good discussion on resonance frequencies and failures.
10. Kamal discussed that 4-th reactor protection and bypass-was updated by Charlie. Will be discussed in the next WG meeting.
11. Discussion on split phase reactors are CT locations for the line and bus reactors. Further discussion in the next WG. Pratap is working with reactor manufacturers to get more details.
12. Two WG meetings are planned- One in Feb and another in April before the PSRC WG meeting in May. Look for the proposed dates and invite.
13. New volunteers agreed to review the sections are Steve Mueller, Josh Warner, Normann and Binaya Joshi. Ilia and Kamal will work to distribute the review material.

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: TBD
Draft: 0
Assignment: Review and update C37.95 IEEE Guide for Protective Relaying of Utility-Consumer Interconnections

1. Welcome
2. Patent Slides - https://mentor.ieee.org/myproject/Public/mytools/mob/slideset.pdf
3. Call for Membership (Quorum met with 12/15 members) - Thanks for the support Jeff!
    - 5 New Voting Members Joining During the Meeting
        - Wayne Stec
        - Lalitha Devarakonda
        - Gopal Gajjar
        - Lubomir Sevov
        - Abu Zahid
4. Approval of Agenda
    - Motion to Approve: Jeff Barsch
    - Second: Steve Conrad
    - Opposed: no
5. Approve September 2020 Virtual Meeting Minutes
    - Motion to Approve: Jeff Barsch
    - Second: Ted Warren
    - Opposed: no
6. PAR Update
    - SA Approved
    - Setting up iMeet Central, working to upload documents.
7. Assignment Updates
8. Schedule Next Meeting
9. Adjourn
    - Motion to Approve: Sebastien Billaut
    - Second: Steve Conrad

K28 WG: Transaction Paper on GMD Impacts on Protection Systems
Chair: Qun Qiu
Vice Chair: Steve Klecker
Secretary: Steve Klecker
Established: 2019
Output: Transaction Paper
Expected Completion Date: 2020

Assignment: This paper provides background and historical events of Geomagnetic Disturbances (GMD), and reviews GMD impacts on power systems equipment, and associated protection and control systems, mitigating measures, and Geomagnetic Induced Current (GIC) monitoring methods. This paper is a summary of the IEEE

PES-TR72 report, titled, GMD Impacts on Protection Systems, which is prepared by the Working Group "GMD Impacts on Protection Systems", the Substation Committee of the Power System Relaying Control committee.

WG did not meet in January 2021.

KTF29 Review the need to revise: K3 report (2009), "Reducing outage durations through improved protection and autorestoration in distribution substations".

Chair: Sebastien Billaut
Vice Chair: NA
Secretary: NA
Established: 2019
Output: Recommendation to K SC
Expected Completion Date: 2020
Assignment: Review the need to revise: K3 report (2009), "Reducing outage durations through improved protection and auto-restoration in distribution substations".
KTF29 met Wednesday at 15:30CT with 58 attendees**,** via the virtual online Webex.

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, Adi Mulawarman recorded the minutes. The host moderated the Chat window.

The group discuss the 12 following additions to the guide:
1. Self-healing Loops
2. High penetration of IBR/DER/microgrid
3. Use of fault indicators (wireless or not)
4. Distribution PMU
5. Fusing / Relay philosophy (Fuse save/Blow)
6. Distribution protection standard references
7. Fault location, isolation and service restoration
8. Implement 61850
9. Automate the transmission source restoration (auto-sectionalizing, throw-over)
10. Sensitive High impedance fault
11. 87L
12. Auto-reclosing on bus fault

The Group successfully proceeded to vote on the recommendation:
KTF29 recommends to the Subcommittee K to form a working group to revise the K3 report.
Proposed Assignment: to revise to include the newer technologies and distribution configuration.
Title: Reducing outage durations through improved protection and auto-restoration in distribution substations.

Volunteers for the working group leadership are:
Chair: Sebastien Billaut, **Vice Chair:** Mohamed Zadeh, **Secretary:** Lalitha Devarakonda

9 attendees volunteered to become Voting member: Steve Klecker, Nirmal Nair, Xicaih Zhao, Massoud Davoudi, Pieman Dadkah, Yan Liao, Xicai ZHAO, Peiman Dadkhah, Brian Boysen.

Next Meeting single session room for 30.

Liaison Reports:

T&D Committee, Capacitor Subcommittee, **Pratap Mysore,**

http://grouper.ieee.org/groups/td/cap/

Nothing to report

Transformers Committee, **Will Knapek**

http://www.transformerscommittee.org/

Meeting Minutes of the Fall 2020 Virtual Meeting

https://grouper.ieee.org/groups/transformers/meetings/F2020-VirtualMtg/Minutes/F20-MainMeetingMinutes.pdf

Old Business

None

New Business

K Subcommittee voted to approve formation of the K29 WG. Assignment is as follows: Create a PES technical report based on the K3 report entitled 'Reducing outage durations through improved protection and autorestoration in distribution substations'. Chair will be Sebastien Billaut. Vice chair will be Mohamed Zadeh. Secretary will be Lalitha Devarakonda.

The H47 WG is requesting input from protection experts for Section 3 of their report entitled "Impacts of IEC 61850 sampled values, GOOSE and PTP time synchronization on protection and control applications using process bus." If anyone is interested in contributing, they should contact Mital Kanabar.

Items of General Interest

Adjourn motion by Stephen Conrad. Second by Brandon Davies. Unanimously approve.