POWER SYSTEM RELAYING AND CONTROL COMMITTEE
of the IEEE POWER AND ENERGY SOCIETY at the
JOINT TECHNICAL COMMITTEE MEETING (JTCM)
MINUTES of the MEETING
January 10-13, 2022, Hybrid In-Person and Virtual Meeting

I. Call to order / Introductions: Murty Yalla

Chair Murty Yalla, called the meeting to order at 7:30 am (PST) on Thursday, January 13, 2022.

In-person attendees followed the tradition of introducing themselves, but the introduction of the virtual attendees via Teams was skipped. Similarly, the tradition of having all first time attendees reintroduce themselves was also skipped. A quorum check was conducted and verified (70 of 134 Main Committee voting members). Attendance was recorded via Teams report and in-person check list. Attending this Main Committee meeting were also 129 guests for a total attendance of 199.

The meeting agenda was approved (motion by Jim Niemira, second by Jeff Barsch).

Meeting registration statistics for both PSCCC and PSRC:

Committee	In-Person	Virtual	Total
PSCC	10	10	20
PSRC	64	210	274
Total	74 (0)*	220 (456)*	294 (456)*

* September 2021 Attendance

II. Approval of Minutes / Financial Report: Gene Henneberg

A motion to approve the minutes of the September 2021 virtual meeting of the PSRC Committee was made and seconded (Jim Niemira and Jeff Barsch). The motion was approved unanimously.

The PSRC committee financial status is healthy. Registration was lower than for the all-virtual meetings of May and September, but somewhat higher than for the traditional in-person meetings, and expenses have been low. However, expenses for the future in-person / hybrid

meetings are more difficult to predict due primarily to the uncertainty of in-person attendance numbers.

III. Reports of Interest

A. Technical Paper Coordinator's Report: Michael Thompson

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

- T&D Conference and Exposition 2022 (New Orleans, LA, April 25 to 28)
  - 4 papers accepted
  - 1 Tutorial proposed:
    Modeling of converter-interfaced renewable sources for short circuit studies
- GM 2022 (In Person Meeting, July 17 to 21, Denver, CO)
  - 1 Panel session

Opportunity

- ½ Day Tutorial Accepted, Dr. Vasudev Gharpure and Dr. Mital Kanabar
  - PSRC WG C40, Applying PDC standard (C37.247-2019) for a large-scale WAMS
- 33 Papers Submitted,
  - Reviews due this week
  - PSRC quota is 16 can be accepted
- 77 Paper Reviewer Volunteers

Abu Bapary	Brandon Davies	Gene Henneberg
Adrian Zvarych	Bruce Mackie	Gustavo Brunello
Ali Hooshyar	Damir Novosel	Heather Malson
Alla Deronja	Dan Sabin	James Mearns
Allen Goldstein	Dean Miller,	Jean Raymond
Amin Zamani	Dean Ouellette	Jeffrey Barsch
Amir Makki	Dennis Holstein	Jim O'Brien
Athula Rajapakse	Edgar Perez Flores	Juergen Holbach
Benton Vandiver	Eric Allen	Kamal Garg
Bonian Shi	Evangelos Farantatos	Kevin Donahoe

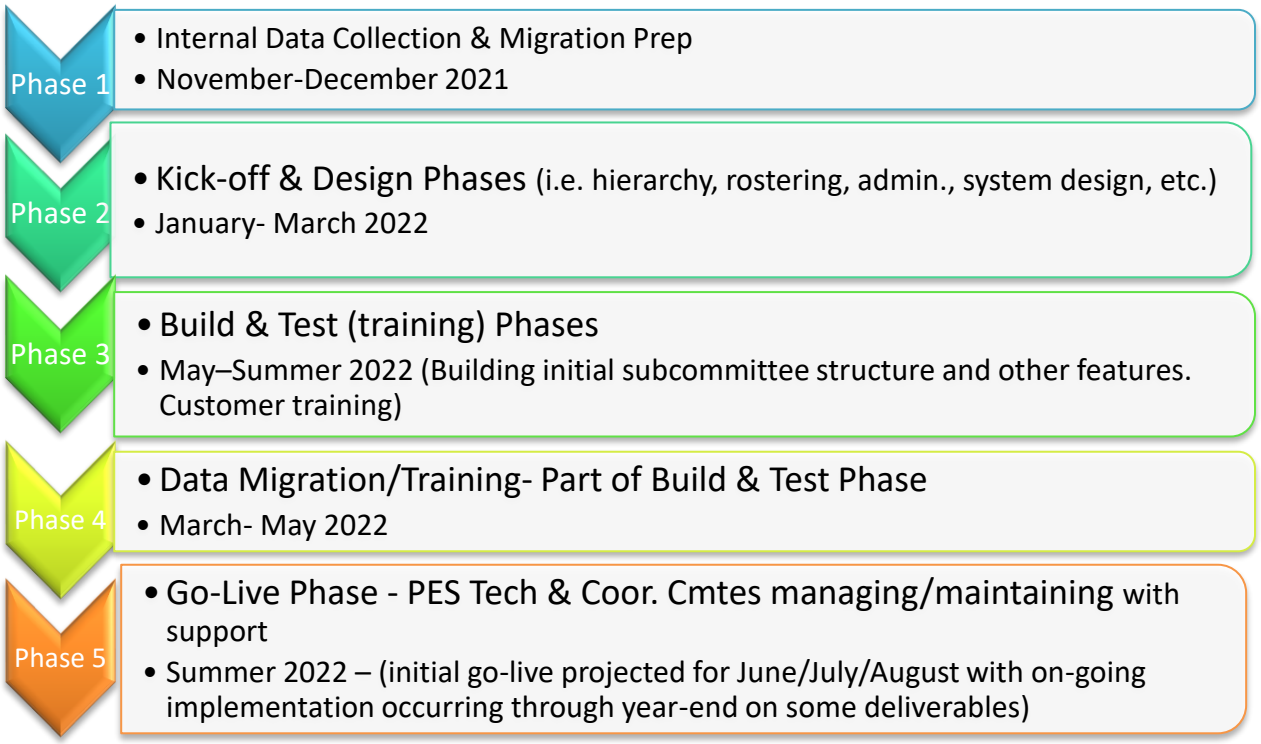
61 Paper Reviewers – Assigned

Kevin Jones	Paul Myrda	Shuhui Li
Manish Patel	Pratap Mysore	Taylor Raffield
Marc Lacroix	Rafael Garcia	Tony Bell
Mark Adamiak	Ramakrishna Gokaraju	Veselin Skendzic
Matchyaraju Alla	Randy Cunico	Vinod Yedidi
Mike Dood	Rene Midence	Wayne Hartmann
Mohammad Zadeh	Rich Hunt	Yi Hu
Mukesh Nagpal	Roger Whittaker	Yu Liu
Nathan Gulczynski	Rui Fan	Zhiying Zhang
Neil Shepard	Sakis Meliopoulos	
Paul Elkin	Sebastien Billaut	

PSRC / PSCCC Membership Management System – Gene Henneberg

- 123Signup Extension
  - The portal was open as late as New Year's Day, but it is now done
  - Many PES committees used it until the end

- Ongoing needs of all PES Committees
  - GDPR compliant listserv function
  - GDPR compliant roster management
  - Attendance and participation records
  - Mandatory to import 123Signup records
  - PES AdHoc Committee evaluations
  - New system supplied by MemberPlanet
  - Anticipate implementation in time to support the Sept 2022 PSRC meeting



* This plan was drafted by S. Pepin and not necessarily the final implementation plan from memberplanet team. Modifications to the plan may occur after Jan. 2022

B. Future Meetings: Murty Yalla

- May 2022 Meeting, Reno, NV; May 9-12, 2022.
- Sept 2022, Orlando, Florida is under consideration (not firm)

- January 2023, JTCM, Jacksonville, FL
- May 2023, Las Vegas, Nevada is under consideration (not firm)

Details for the May 2022 meeting will be posted on the PSRC website.

- We are striving to eventually move back to mainly face-toface meetings
- JTCM 2022 has been a scramble to sort out how to execute a hybrid (simultaneous F2F and Remote) meeting
- We will continue to refine our hybrid meeting execution
- Hybrid meetings entail great financial risk so plans will evolve

How Meetings are Paid For

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

C. CIGRE B5 Activities Report: Rich Hunt

Rich Hunt's term as US Regular Member to CIGRE B5 is ending in August 2022. Mladen Kezunovic is taking over as US Regular Member at the August meeting. The U.S. also qualifies for an additional B5 member. If you're interested, please contact Rich Hunt.

- International Body
- Membership in Study Committees, Working Groups is by Country
- Publishes Technical Brochures, webinars, hosts conferences

New Working Groups

There are no new Working Groups since the last PSRCC meeting. New Working Groups have been proposed for consideration by the CIGRE Technical Council (TC). These are:

- PACS design for reliability
- Requirements for IT and OT managed PACS
- Protection Roadmap for Low Inertia and Low Fault Current Networks
- New requirements of network protection & control for renewable energy integration

The TORs (Terms of Reference) have to be completed and submitted to the TC. Once these are approved, the Working Groups will form. Watch for the announcements as these Working Groups form.

New Publications

Technical Brochures

- There have been no new Technical Brochures published since the September PSRCC meeting.

Webinars

- There have been no new webinars published since the September PSRCC meeting.
- Available on e-cigre. Free download for all.

2021 CIGRE Grid of the Future Conference, Providence, RI.
The 2021 CIGRE Grid of the Future Conference was held in Providence, RI, October 17-20, 2021 as a hybrid in-person/online event. The GOTF presents papers over 6 CIGRE Study Committees (A2, A3, B1, B4, B5, C1), 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-2021/.

2022 CIGRE General Session
The 2022 CIGRE General Session will be held in Paris, France, from August 28 to September 2, 2022. Authors have already been notified of paper acceptance. Full papers are due by 7 January 2022.

The B5 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

2023 B5 Colloquium
The 2023 CIGRE B5 Colloquium will be held as part of the CIGRE Symposium to be held in Cairns, Australia, September 4-7, 2023.
The B5 Preferential Subjects for the Symposium will be:

- Interoperability for IEDs of different manufacturers integrated in one PAC
- IEC 61850 engineering & test tools & settings
- Improvement in fault detection

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.

rich.hunt@ieee.org
RHunt@quanta-technology.com

D. IEEE PES Report: Shana Pepin, IEEE PES Program Manager (presented by Murty Yalla)

- Technical Council Officers
  - Hong Chen, Chair
  - Diane Watkins, Vice Chair
  - Jim McBride, Secretary
  - Vijay Vittal, Past Chair
- PES Program Manager:
  - Shana Pepin

The report is very long and will be posted along with the minutes.

One important point for PSRC committee is discussed and Technical Council has agreed to keep PSRC reports on our website (without the PES cover page) along with posting on PES Resource center.

E. IEC Report for January 2022: Eric Udren

IEC Technical Committee 95, Measuring relays and protection systems

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

US Technical Advisory Group to USNC for TC 95

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

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

- *US DOE - Pacific Northwest National Laboratories (PNNL)*
- *Jeff Dagle, PNNL, TAG Administrator*

PNNL covers ANSI fees and keeps US engaged in IEC TC 95 standards.

Standards Projects

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* – Committee Draft for Vote (CDV) (technically stable state) under review for Feb. 25 vote and comments.
- 60255-26 Ed 4 - *EMC requirements* – CDV - same.
- 60255-27 Ed 3 - *Safety requirements* – CDV - same.
- These standards are highly impactful to designers and manufacturers.
- We have engaged PSRC WGs for IEEE equivalents to align with IEC.
- We seek more reviewers – how we get IEC to align with us - contact Eric.
- Principles of IEEE – IEC alignment initiatives since 2000:

- Align requirements – avoid conflicts
- Common type tests need to have the same test setups and procedures.
- Align test levels and values if possible – differences only as clearly justified.
- Either standard can have unique requirements as really justified.
- Result – vendors and labs can set up and run one set of tests showing compliance with both IEC and IEEE standards – *huge efficiency, cost, and product reliability benefits.*

Functional and product performance standards:

- 60255-187-1 – *Functional standard for motor, generator, xfmr percentage differential relays* – completed and just published.
- 60255-187-3 – *Functional standard for line differential relays* – CD later in 2022
    - Will restart PSRC D34 to review and comment.
    - Splitting out channel issues for a separate project below.
- 60255-187-2 – *Functional standard for busbar differential relays* – starts after 187-3 gets CD out.
- 60255-132 – Functional standard for directional power relays – *new project*, CD in 2022.
- 60255-167 - Functional standard for directional overcurrent relays – *new project*, CD in 2022.
- 60255-216-1 – *Digital Interface - Requirements for relays with digital I/O* (e.g., merging units) – Revision of prior CD is coming.
    - TC 95 has liaison relationship with PSRC H47 on similar topic - Jeorg Blumschein .
- 60255-216-3: *Digital Interface - Requirements for protection data exchange interfaces* [for data-based teleprotection - intended to categorize performance of data communications for line differential relay terminals] – New project accepted, but scope statement needs fixing – US and Canada are to propose revision and supply WG participants.
    - Need volunteers with expertise in data channels for teleprotection.
    - Shared interest with PSCC.
- New TC 95 AHWG for HVDC protection – 4 US participants.
- New TC 95 AHWG for traveling wave protection & fault location – 4 US participants.
- TC 95 to start JWG for 60255-24/C37.111 dual logo COMTRADE revision – now can proceed with PSRC H35 report input.

TC 95-PSRC Standards Collaboration

- US TAG commenting in depth on TC 95 standards drafts
- US participants in TC 95 working groups and maintenance teams
- PSRC WGs are specifically established to evaluate complex standards and contribute to IEC content or modify it.
- Compliance with aligned international standards improve robustness, safety, and performance of products.

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

F. Standards Coordinators Report: Don Lukach

- This report summarizes the status of PAR related projects as of the January, 2022 meeting.

- All PARs that needed actions were individually addressed before and during the PSRC meeting week.
- New Participant Slides required from SA. See IEEE-SA Website Participant-Behavior-Individual-Method.pdf (ieee.org)
- New mandatory SA training for all PSRC Officers, Subcommittee Officers, and Working Group Officers.
- IEEE SA Standards Group Chair Fundamentals Training
- Understanding IEEE SA's Antitrust, Competition, and Commercial Terms Policies
- Implementation June 1, 2022
- Due December 31, 2022
- There may be updates prior to June!
- https://standards.ieee.org/content/ieee-standards/en/about/policies/index.html

- ***Main Committee PAR Submissions:***
- Please refer to the Main Committee minutes for specific Subcommittee PAR motions.
- ***Completed PAR projects in 2021:***

C37.91	IEEE Guide for Protecting Power Transformers
C37.235	IEEE Approved Draft Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes
C37.242	IEEE Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control
C37.108	IEEE Guide for Protection of Secondary Network Systems
C37.234	IEEE Approved Draft Guide for Protective Relay Applications to Power System Buses
C37.120	IEEE Approved Draft Guide for Protection System Redundancy for Power System Reliability

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

P2800	Standard for Interconnection and Interoperability of Inverter Based Resources Interconnecting with Associated Transmission Electric Power Systems
P2800.2	Recommended Practice for Test and Verification Procedures for Inverter-based Resources (IBRs) Interconnecting with Bulk Power Systems
P1854	Guide for Smart Distribution Applications
P0018	Standard for Resilient Positioning, Navigation and Timing (PNT) End-User Equipment
PC37.431.20	Guide for Modern Protection System for Static Var Compensators

- **PAR Expiration dates and their Status:**

Project Number	Project Title	Expiration PAR Date	Project Status

PC37.1.2	Guide for Databases Used in Utility Automation Systems	31 Dec 2022	Draft Development
P1613	Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus	31 Dec 2022	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
PC37.249	Guide for Categorizing Security Needs for Protection, Automation, and Control Related Data Files	31 Dec 2022	SA Ballot: Ballot
PC37.2	Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations	31 Dec 2022	SA Ballot: Comment Resolution
PC37.233	Guide for Power System Protection Testing	31 Dec 2022	SA Ballot: Comment Resolution
PC37.251	Standard for Common Protection and Control Settings or Configuration Data Format (COMSET)	31 Dec 2022	Draft Development
PC37.102	Guide for AC Generator Protection	31 Dec 2022	Draft Development
PC37.300	Guide for Centralized Protection and Control (CPC) Systems within a Substation	31 Dec 2022	Draft Development
P2030.100.1	Monitoring and Diagnostics of IEC 61850 Generic Object Oriented Status Event (GOOSE) and Sampled Values Based Systems	31 Dec 2022	Draft Development
PC37.104	Guide for Automatic Reclosing on AC Distribution and Transmission Lines	31 Dec 2022	RevCom Agenda(25 Jan 2022)
PC37.106	Guide for Abnormal Frequency Protection for Power Generating Plants	31 Dec 2022	SA Ballot: Comment Resolution
P2030.12	Guide for the Design of Microgrid Protection Systems	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
PC37.90.2	Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – Radiated Electromagnetic Interference Withstand Capability Requirements and Tests	31 Dec 2023	SA Ballot: Pre-Ballot

PC37.110	Guide for the Application of Current Transformers Used for Protective Relaying Purposes	31 Dec 2023	SA Ballot: Comment Resolution
P1646	Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation	31 Dec 2023	Draft Development
PC37.252	Guide for Testing Automatic Voltage Control Systems in Regional Power Grids	31 Dec 2023	Draft Development
PC37.1.3	Recommended Practice for Human Machine Interfaces (HMIs) used with Electric Utility Automation Systems	31 Dec 2023	Draft Development
PC37.109	Guide for the Protection of Shunt Reactors	31 Dec 2023	Draft Development
PC37.99	Guide for the Protection of Shunt Capacitor Banks	31 Dec 2023	Draft Development
PC37.90.3	Standard Electrostatic Discharge Tests for Protective Relays	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
PC37.113	Guide for Protective Relay Applications to Transmission Lines	31 Dec 2024	Draft Development
PC37.95	Guide for Protective Relaying of Utility-Consumer Interconnections	31 Dec 2024	Draft Development
PC37.101	Guide for Generator Ground Protection	31 Dec 2024	Draft Development
PC37.96	Guide for AC Motor Protection	31 Dec 2025	Draft Development
PC37.243	Guide for Application of Line Current Differential Protection Using Digital Communications	31 Dec 2025	Draft Development
PC37.239	Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems	31 Dec 2025	Draft Development
PC37.232	Standard for Common Format for Naming Time Sequence Data Files (COMNAME)	31 Dec 2025	Draft Development

- **All PSRC Lead Committee PAR Projects:**

Project Number	Project Title	Project Status

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
PC37.1.2	Guide for Databases Used in Utility Automation Systems	Draft Development
P1613	Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus	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
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	SA Ballot: Pre-Ballot
PC37.96	Guide for AC Motor Protection	Draft Development
PC37.243	Guide for Application of Line Current Differential Protection Using Digital Communications	Draft Development
PC37.239	Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems	Draft Development
PC37.249	Guide for Categorizing Security Needs for Protection, Automation, and Control Related Data Files	SA Ballot: Ballot
PC37.232	Standard for Common Format for Naming Time Sequence Data Files (COMNAME)	Draft Development
PC37.92	Standard for Low-Energy Analog Interfaces between Protective Relays and Power System Signal Sources	NesCom Agenda (24 Jan 2022)
C37.90.3	Standard for Electrostatic Discharge Tests for Protective Relays	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	Standard for Relays and Relay Systems Associated with Electric Power Apparatus	Completed
C37.231	Recommended Practice for Microprocessor-based Protection Equipment Firmware Control	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
C37.99	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
C37.90.1	Standard Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus	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
C37.243	Guide for Application of Digital Line Current Differential Relays Using Digital Communication	Completed
C37.114	Guide for Determining Fault Location on AC Transmission and Distribution Lines	Completed
C37.232	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
C37.91	Guide for Protecting Power Transformers	Completed
C37.250	Guide for Engineering, Implementation, and Management of System Integrity Protection Schemes	Completed
PC37.2	Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations	SA Ballot: Comment Resolution
C37.235	Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes	Completed
PC37.110	Guide for the Application of Current Transformers Used for Protective Relaying Purposes	SA Ballot: Comment Resolution
C37.248	Guide for Common Format for Naming Intelligent Electronic Devices (COMDEV)	Completed
C37.242	Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control	Completed
C37.108	Guide for the Protection of Secondary Network Systems	Completed
PC37.233	Guide for Power System Protection Testing	SA Ballot: Comment Resolution
PC37.251	Standard for Common Protection and Control Settings or Configuration Data Format (COMSET)	Draft Development
C37.112	Standard Inverse-Time Characteristic Equations for Overcurrent Relays	Completed
C37.234	Guide for Protective Relay Applications to Power System Buses	Completed
PC37.102	Guide for AC Generator Protection	Draft Development

P1646	Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation	Draft Development
C37.120	Protection System Redundancy for Power System Reliability	Completed
PC37.101	Guide for Generator Ground Protection	Draft Development
PC37.300	Guide for Centralized Protection and Control (CPC) Systems within a Substation	Draft Development
P2030.100.1	Monitoring and Diagnostics of IEC 61850 Generic Object Oriented Status Event (GOOSE) and Sampled Values Based Systems	Draft Development
PC37.104	Guide for Automatic Reclosing on AC Distribution and Transmission Lines	RevCom Agenda(25 Jan 2022)
PC37.106	Guide for Abnormal Frequency Protection for Power Generating Plants	SA Ballot: Comment Resolution
P2030.12	Guide for the Design of Microgrid Protection Systems	Draft Development
PC37.92	Standard for Analog Inputs to Protective Relays From Electronic Voltage and Current Transducers	SA Ballot: Comment Resolution
PC37.252	Guide for Testing Automatic Voltage Control Systems in Regional Power Grids	Draft Development
PC37.1.3	Recommended Practice for Human Machine Interfaces (HMIs) used with Electric Utility Automation Systems	Draft Development
PC37.109	Guide for the Protection of Shunt Reactors	Draft Development
PC37.99	Guide for the Protection of Shunt Capacitor Banks	Draft Development

G. PSCC Committee Report: Mark Benou, Secretary PSCCC (Marc Benou)

- PSCCC held 29 meetings this week including sub-group meetings of the P, S, and C subcommittees, a newcomers meeting on Monday, and 3 subcommittee meetings. At 11AM today, we will have our main committee meeting.
- C0 –Power Line Carrier Subcommittee
    - Will make a motion at our MC meeting to extend par P643 – IEEE Guide for Power Line Carrier Applications
    - Will make a motion to the MC to form a working group with the proposed Title: C2WG – Working Group for Revision of C93.4-2012 – IEEE Standard for Power Line Carrier Line-Tuning Equipment (30 kHz to 500 kHz) Associated with Power Transmission Lines, to update C93.4
- S0 – Cybersecurity Subcommittee
    - Approved updating the Scope for P2808 - Standard for Function Designations used in Electrical Power Systems for Cyber Services and Cybersecurity to clearly include drawings in the scope of the standard

    - S1, 1686, IEEE Standard for Intelligent Electronic Devices Cyber Security Capabilities is resolving comments and expects to have a revised draft approved for recirculation ballot before or at the May meeting.
- P0 – Protocols and Communication Architecture Subcommittee
    - Will make a motion on behalf of study group P19 to Develop an IEEE Standard for Universal Utility Data Exchange (UUDEX)
    - There was a presentation of SCC21 - P1547 revision PAR and a new PAR for P1547.10 (DER Gateway) given at the P SC meeting. There is enough interest in this work that the P SC voted to recommend to the MC to appoint a liaison to the SCC21 for these two PAR activities.
- There are two PSCC subcommittees that do not meet with us during the January, May and September meetings. They are E0, Wireline Subcommittee and F0, Optical Fiber Subcommittee.
- F0 would like to share several recent accomplishments
- F0 – Optical Fiber Subcommittee
    - IEEE 1138-2021 - IEEE Standard for Testing and Performance of Optical Ground Wire (OPGW) for use on Electric Utility Power Lines was published in November
    - IEEE P1595 - IEEE Draft Standard for Testing and Performance for Optical Phase Conductor (OPPC) for Use on Electrical Utility Power Lines, has balloted and the recirculation is nearly complete. They expect to publish in the first quarter of 2022

H. IEEE P2800 - Standard for Interconnection & Interoperability of Inverter-Based Resources Interconnecting with Associated Transmission Electric Power System: Manish Patel

- The P2800 (Standard for Interconnection and Interoperability of Inverter-Based Resources Interconnecting with Associated Transmission System) has been submitted to RevCom in December of 2021 and is assigned to a RevCom meeting agenda on 25th January 2022. The latest ballot was successful with 90% response rate and 94% approval rate.
- With publication of the P2800 in sight, the drafting of P2800.2 (Recommended Practice for Test and Verification Procedures for Inverter-Based Resources Interconnecting with Bulk Power Systems) is expected to begin soon. The kick-off web meeting is scheduled for January 18, 2022. The PSRC is a co-sponsor for P2800.2 as well. Individuals interested in joining the P2800.2 WG, please send a note to chair Andy Hoke @andy.hoke@nrel.gov. Manish Patel has volunteered to serve as a secretary of the P2800.2 WG.

I. NERC Report: Rich Bauer

- There is no update from NERC at this meeting

J. Advisory Subcommittee Reports - Murty Yalla

- PES Fellows: If you are a Nominator planning to nominate some one to IEEE Fellow grade and are looking for references you can contact the IEEE Fellows committee chair, (B2/PSCC, A2TF/PSCC), T.W. Cease, who can help connect with IEEE Fellows in the PSRC committee. The list of IEEE Fellows who are associated with PSRC committee are published on PSRC website: https://www.pes-psrc.org/kb/history/fellows.html

- If you are looking for an endorsement from PSRC committee, please contact the officers of PSRC.
- PSRC committee will be adding a remembrance link on the website remembering past members who passed away.
-

K. Administrative Working Groups

B1: <u>Awards and Technical Paper Recognition Working Group</u>

Chair: Hugo Monterrubio
Vice Chair: Mal Swanson

- *The Awards and Recognition working group continues to keep track of completed work and of individual awards.*
- *Our plan continues to be to resume delivery of all these awards during our first PSRC Awards Ceremony.*
- *We plan to schedule this during a PSRC face-to-face meeting, currently targeted for May 2022.*

<u>REMINDER</u> Standards WG Awards/Certificates

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

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

PSRC Young Professional Award

- We are actively looking for nominees for the 2021 PSRC Young Professional Award
- This PSRC award recognizes the technical contributions of young members of the PSRC that are 35yrs or younger (as of July 1 of the year of the award) and within 10 years of graduation
- If you are or know of someone that meets this criteria and would like to be nominated, please reach out to any PSRC officer.

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

Chair: Mal Swanson

Vice-Chair: Cathy Dalton

Assignment: Assist in searching for new attendees.

Requesting support from attendees' employers.

Attendance during the January JTCM hybrid meeting was 274, of which three quarters was remote attendees.

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

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

B4: Long Range Planning Working Group

Chair: Pratap Mysore

No report.

B5: Publicity Working Group

Chair: Cathy Dalton
Vice Chair: Mal Swanson

Assignment:

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

B8: O&P Manual Revision and Working Group Chair Training Working Group

Chair: Don Lukach

No formal report. See discussion above on revision of section 7.2.1.2

B9: Web Site Working Group

Chair: Rick Gamble

No report.

In Memory Of
Roger Hedding

Muskego, WI

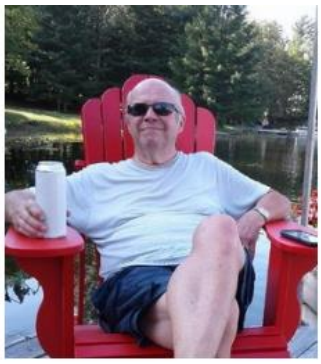
It is with deep sadness that we share with you the news of the passing of Roger Hedding on September 21, 2021. Roger was chair of the IEEE PES PSRC committee from 2013 to 2014. He was a great leader who contributed to the growth of the PSRC committee. As a member of the advisory committee of the PSRC he was instrumental in providing guidance and mentoring to the PSRC committee officers. He was always willing to help with a smile, and he will be greatly missed by all of us. Roger retired as a senior consultant in 2016 after working at ABB for 45 years.

Family organized a remembrance mass on Dec 21, 2021, in Muskego, WI. Our thoughts and prayers are with his family and friends.

PSRC committee was represented at the remembrance mass by Michael Thompson (Vice Chair) and Miriam Sanders (Past Chair).

In Memory Of

Raimo Juhani Marttila
November 22nd, 2021
Toronto, Ontario, Canada



It is with deep sadness that we share with you the news of the passing of Raimo Juhani Marttila on November 22nd, 2021. Raimo a principal research engineer with RJM Power Technologies 2001 – 2009, Principal Research Engineer with Ontario Power Generation, 1972-2000. He worked in the area of power system protection and testing protection relays. He received MA.SC in Electrical Engineering from University of Waterloo in 1972.

He was very active in Rotating machinery protection subcommittee of RSRC committee during 1990's.

L. Subcommittee Items of Interest from the Main Committee Meeting:

<u>System Protection "C" Subcommittee Report on WG progress of note</u> – Fred Friend
Published
C28: C37.242 Guide to the Synchronization, Calibration, Installation and Testing of PMUs for Power System Protection and Control
Congratulations to
Allen Goldstein, Chair
Harold Kirkham, Vice Chair
and working group members

Approved, awaiting publication
C31: C37.120 Protection System Redundancy for Power System Reliability
Congratulations to
Solveig Ward, Chair
Alla Deronja, Vice Chair
and working group members

Ballot in 2022:
C33: C37.233 Guide for Power System Protection Testing
C39: C37.252 Guide for Testing Automatic Voltage Control Systems in Regional Power Grids
C38: 2030.12 Protection System Redundancy for Power System Reliability

Presentations
C36: Role of Protective Relays in the Smart Grid
Main Committee PAC World
Georgia Tech WPRC
Thanks to Ben Kazimier, Steve Klecker, working group

C40: Tutorial development from C37.247 Standard for Phasor Data Concentrators (PDC) for Power Systems
2022 GM (4 hour)
Thanks to Vasudev Gharpure, Mital Kanabar, working group

New Task Force
CTF48: Summary paper from C37.120
Assignment: Write a summary paper for
C37.120 IEEE Guide for Protection System Redundancy for Power System Reliability, present it at relay conferences, and develop Power Point presentation for PSRC Main Committee.
Chair: Alla Deronja

New Request
C33: P2004 Recommended Practice for Hardware-in-the-Loop (HIL) Simulation Based Testing of Electric Power Apparatus and Controls **Needs assistance with HVDC protection**
Contact WG officers:
PSRC Chair: Dean Ouellette
PSRC Vice Chair: Sakis Meliopoulos
PSRC Secretary: Aaron Findley

IV. Meeting Minutes

The System Protection Subcommittee of the PSRC met on January 12, 2022 at 2:30 PM Pacific Time via Microsoft Teams.
The participants were displayed by the teleconferencing software tool. Participants introduced themselves and indicated their affiliations. A quorum was achieved (38 of 59 members and 50 guests).

Farnoosh Rahmatian made a motion to approve the agenda, Abu Bapary seconded, and the agenda was approved with no opposition.
The September 2021 minutes were reviewed. Richard Hunt made a motion to approve the minutes, Jonathan Sykes seconded, and the minutes were approved with no opposition.

V. Advisory Committee Items of Interest

- Working group agendas are required to be posted at least two weeks prior to the meeting.
- Working group meeting minutes due to Mike and Fred by Friday, January 21. Please use the provided Word template and include your assignment.
- A custom web page is available for each WG, if the WG Chair wishes to use it. Contact Rick Gamble, webmaster@pes-psrc.org
- Working groups that complete their work are encouraged to present it to the IEEE community through WEBEX. Contact PSRC officers or Cathy Dalton (Publicity Chair) for further information.
- Working group chairpersons are required to have IEEE PES and IEEE SA memberships.
- Registration for this meeting was about 261, including about 75% virtual attendees.
- There will be a new member management system implemented in May 2022, expected to be used starting in our September 2022 meeting. Before this new system is implemented, please be sure to follow required confidentiality practices. Ensure the BCC is used so that email addresses of members are not shared.
- The IEEE SA style manual was revised in 2021. Working group reports should follow word usage and other requirements described in this manual.
- Working groups with a PAR must show Copyright and Patent Policy slides at each meeting.
- New templates for the O&P and P&P were approved in 2020 and are coming soon. These policies recommend a Chair, Vice Chair, and Secretary for each Working Group. Additional information is expected to follow.
- A file share application (Sharefield) for non-PAR working groups is available. If you are interested in using this please request from Subcommittee Chair.
- There is an opportunity to present at a panel session at the upcoming 2022 PES General Meeting. If you are interested, please contact Mike Thompson by January 21, 2022.
- The Awards Ceremony will take place during the Monday night reception for the May and September meetings when we can resume in-person meetings.
- WG officers should request certificates for their members upon completion of their work. Hugo Monterrubio can address any open questions.
- All are reminded and encouraged to apply for Senior Membership in the IEEE if you are eligible.
- Emails with some attachments are blocked by some participants' firewalls. Please be aware of this when sending files via email.

VI. Working Group Reports

The minutes of the Working Groups are attached.

VII. Old Business

Open ideas for new projects include:

- Impact on the power system for a successful cyber-attack at a substation
- Impact of Electro Magnetic Pulses (EMP) on System Protection

VIII. New Business

C28 has completed their work as their standard (C37.242) has been completed and published. The working group moved to disband, with a second from Farnoosh Rahmatian. There was no opposition, and the WG is now disbanded. A summary paper for this new standard will be written in C46.

C33 requested support of anyone with expertise on HVDC protection. If you have this expertise, please reach out to Dean Ouellette.

Alla Deronja made a motion to Write a Summary Paper for C37.120. Gene Henneberg seconded this motion. There was no opposition in the subcommittee. This new task force will be CTF48.

IX. General Discussion

Fred Friend noted that he will be retiring in February. Going forward, he can be reached at fafriend@ieee.org.

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

D39: Revise C37.104 IEEE Guide for Automatic Reclosing for AC Distribution and Transmission Lines - Ballot Comments have been resolved

DTF50: Determine if Summary Paper should be created for C37.104
Manish Patel – Chair

D46: Summary Paper on C37.230 Guide for Protective Relay Applications to Distribution Lines – revising after initial Subcommittee Ballot
Brian Boysen – Chair

D: LINE PROTECTION SUBCOMMITTEE

- The Subcommittee meeting met in person (Orange Grove, CA) and virtually (via MS Teams) on Wednesday, January 12th, 2022, from 1:00 to 2:10 PM PST.
- Officer presiding – Bruce Mackie
- Officer recording minutes – Meyer Kao
- The Subcommittee meeting was called to order by the Chair
- Introduction from in person (13) and virtual attendees (84)
- The meeting was attended by 31 voting members and 66 guests. Quorum was met.
- Minutes from the September 2021 meeting held virtually were approved - motion made by Brian Boysen and seconded by Chris Walker/Jonathan Sykes.
- Agenda for the D Subcommittee January 2022 meeting was approved - motion made by Sebastien Billaut and seconded by Gregory Ryan.

The Chair reviewed items of interest from the Advisory Committee.

- WG Chairs: please send up to date minutes to Chair and VC by January 21st
- Reminders:
  - Please use template
  - 123 Signup no longer available – WG officers to keep records
  - New registration/membership system expected by September meeting
- 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: e.g. XXXX(Standard number)- XXXX (Year)
  - http://standards.ieee.org/develop/awards/wgchair/wgawards.html
  - The process is very simple and will require to list the names of the WG officers and members
  - The awards can be shipped to the person who is filling out the form OR can all be sent to an event. If you want these awards to be handed at our next PSRC Awards Ceremony then choose to have them be sent to an event and enter your name or the name of the awards Chair (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.
- PSRC web page www.pes-psrc.org
  - Rick Gamble is contact for D SC (Webmaster)
  - A custom web page is available for each WG, if the WG Chair wishes to use it. Contact Rick Gamble, webmaster@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.pes-psrc.org/psrcsharefile.html
- WGs that complete their work are encouraged to present it to the IEEE community through WEBEX. Contact PSRC officers or Cathy Dalton (Publicity Chair) for further information
- WG Chair requires PES and IEEE SA membership
- Reminder to apply for Senior Membership in IEEE
- P&P Manual is being Reviewed and Updated. O&P Manual will be Reviewed Next Year
- For each project development (PAR related) meeting show: Copyright & Patent Policies
- New Procedures may require additional management – For standards based WG, consider 3 officers
- PSRC Knowledge Base
- Attendance approximately 270+ people with 60+ in person
- Future Meetings (Subject to Change)
  - May 2022 – Reno, NV

- September 2022 – Orlando, FL (considered)
- January 2023 – JTCM – Jacksonville, FL
- May 2023 – Las Vegas, NV

- PES General Meeting Panel Sessions
  - Week of July 17th in Denver
  - Need response by end of week
  - Contact Michael Thompson

IEEE Standards Documents currently involved with WGs in D Subcommittee

No.	Approval Date	Name
C37.113	2015	Guide for Protective Relay Applications to Transmission Lines
C37.114	2014	Guide for Determining Fault Location on AC Transmission and Distribution Lines
C37.243	2015	Guide for Application of Digital Line Current Differential Relays Using Digital Communication
C37.104	2012	Guide for Automatic Reclosing on AC Distribution and Transmission Lines
C37.230	2020	Guide for Protective Relay Application to Distribution Lines

Working groups gave reports on their activity.

Reports from the WG Chairs:

Reminder of Working Group Reports:
- WG meeting minutes
  - Assignment
  - Draft number
  - Writing assignments
  - Motions (with name)
  - Attendance records (name/affiliation)
- Meeting requests
  - Next meeting room requirements
  - Number sessions
  - Number participants
  - A/V requirements

H: RELAYING COMMUNICATIONS SUBCOMMITTEE

Chair: Aaron Martin

Vice Chair: Hugo Monterrubio

- SC H met on Wednesday January 12, 2022, on a hybrid mode with 27 members and 50 guests.
- Quorum was confirmed
- A vote was also taken virtually with the polling functions to approve the September minutes.

Announcements:

1. New items from September 2020 AdCom Meeting
    a. Plans for a May 2022 in-person meeting in Reno Nevada continue to move forward.
    b. 123Signup is getting a reprieve. It's under new ownership and is popular with the PES. PSRC officers are asking that WG maintain meeting attendance for the September meeting. New guests in September meeting will not be available to add but will be available from Webex attendance sheets. New guest are being asked to register in 123Signup.
    c. IEEE Digital Privacy Workshop is being offered October 7-8, 2021.
2. Digital Privacy Workshop – IEEE Future Directions https://cmte.ieee.org/futuredirections/events/digital-privacy-workshop/
3. New items from Awards and Recognition Meeting:
    a. Look for large Monday night award dinner/reception at first face-to-face meeting currently scheduled for May in Reno.
4. New from Standards Coordination Meeting: No meeting
5. New items from SC and reminders carried from prior meetings:
    a. WG officers to attend Standards Coordination meeting
    b. SC Members are required to Vote on Reports
    c. iMeet space available for Non-PAR WGs.
    d. PSRC Officers have organized documents depository for non-PAR WGs
    e. WG presentations to be reviewed by SC Officers
    f. Upon work completion, prepare a presentation to the MC

WG business:

- H22 PC37.249 IEEE Guide for Categorizing Security Needs for Protection, Automation and Control (PAC) Related Data Files is moving forward with forming a balloting committee. If you are interested in joining the balloting committee, please sign up to join the balloting group.

- The below 2 motions were carried electronically. Both motions were approved electronically with a few .

Motion 1: HTF54 motions to Revise: IEEE Std C37.111-2013/IEC 60255-24:2013 Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems. HTF54 has already received approval from IEC to submit PAR. This motion was made by Jun Verzosa and second by Ken Fodero. The motion passed with 21 electronic approval votes, 3 email approval votes. We received one not approved vote with comments. These comments will be reviewed and addressed.

Proposed Title: Revision to IEEE Std C37.111-2013/IEC 60255-24:2013 Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems

Output: IEEE Standard, Project Number: PC37.111

WG Assignment: Revise IEEE Std C37.111-2013/IEC 60255-24:2013 Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems
Proposed Scope: This standard defines a format for files containing transient waveform and event data collected from power systems or power system models. The format is intended to

provide an easily interpretable form for use in exchanging data. An XML-based format is defined while maintaining backward compatibility with the existing formats. Changes have been made in COMTRADE to keep pace with changing technology. The standard is for time-sequenced data files stored on physical media and cloud storage. It is not a standard for transferring data files over communication networks.

Proposed Purpose: This standard defines a common format for the data files needed for the interchange of various types of transient, event, fault, test, and simulation data. The rapid evolution and implementation of digital devices for fault and transient data recording, power quality, and testing in the electric utility industry have generated the need for changes to the 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 triggered or periodic 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: M. Adamiak

Motion 2: Motion to form a Task Force to investigate "Distributed Cyber Physical Assessment for Grid Resilience". Motion made by Aaron Martin (H SC Chair) and was second by Deepak Maragal. The motion pass with 26 votes to approve with no comments and three votes to approve with comments. There were three votes to not approve with comments. The H-SC will hold a virtual meeting to address these comments.

Background

- Extensive functionality of protection and control devices is achieved through networked
- capability and re-programmability of settings and firmware.
    - However, the networked capability of the devices opens a cyber-attack vector from any connected assailant and the reprogrammability of the devices facilitates potential profound damage and lingering consequences.
    - A sophisticated cyber-attack that incorrectly operates protection and control devices or changes relay settings could cause significant physical damage or result in cascading power losses.
    - In addition, as the complexity of these systems has increased, concerns over mis-operations from unintended settings or human action can lead to similar issues even with a benign actor.
- As the grid evolves to include a larger penetration of inverter-based distributed energy
- resources, the decrease in system inertia coupled with changes in how reserves are met will lead to a shift in dynamics and yield shorter response times
- Cybersecurity technologies have started to evolve, but further advancements are needed to correlate the threat to the physical context necessary to enable an appropriate response.
- When considering mis-operations, the ability to characterize expected configuration and
- response requires technologies to evaluate system operation against current condition.

Alignment with Power System Relaying and Control Subcommittee

- Subcommittee Charter

    - Evaluate and report on the characteristics and performance of protective relaying communications and control systems. Recommend communication requirements, operating and test procedures which assure reliable performance of the overall protection and control system.
    - Report on new relaying equipment designs tailored to specific communication requirements. Included are matters necessary to the function of such systems employed in the generation, transmission, distribution, and utilization of electrical energy, and their effects on system operation.
- Proposed Task Force Scope
    - Assess the current state of the art and challenges that in the development and implementation of distributed analytics to assess the resiliency of practical control/power systems including mis-operation due to human error and cybersecurity components.
    - Consider the application of advanced sensing such as synchrophasors and cyber event logging for potential event correlation and to inform the cyber and physical analytics
    - Consider the current methods of presenting control system information and methods to provide the cyber, physical and impact analysis that can be easily adapted for current human machine interfaces for quick response of dispatchers/operators
    - Suggest promising directions available from emerging practice.
        - From a cybersecurity perspective, the awareness of specific information on the type of attack on a control system, is a necessity that will yield, along with the state estimation, a comprehensive approach that delineates between malicious and benign behaviors.
        - In some cases, a portion of the response includes operator awareness through human machine interface decision support, but also additional recommended notification, automated response, contingencies or courses of action.
        - Considering that damaging storms or cyber attacks can impact centralized control system operation, these technologies must be distributed to allow for bottom up (as compared to top down) evaluations that allow for continuing the characterization of threats and mis-operations without dependency on a centralized hub for all communications.

Tasks

1. Review distributed cyber analytical to real time response challenges
    - Ascertain the state of the art on the cybersecurity and cyber resilience techniques, that can be leveraged to inform the operator/dispatcher of context specific application, or specificity of alerts to equipment impacted.
2. Review distributed power system analytical techniques for mis-operation challenges

Ascertain the state of the art on synchrophasor-informed multi-level or distributed state estimation, adjacency analysis and application to provide characterizations of potential mis-operations or cyber attacks.

3. Emerging visualization designs and methods to integrate cyber-physical root cause
    - Ascertain the state of the art on visualizations that present cyber-physical root cause for appropriate response and teaming of the cyber defender and power system dispatcher/engineer.
1. Response mitigations and challenges to advancement to automated cyber-physical response

- Ascertain the state of the art in tactical techniques and orchestrated response that consider cyber security attacks, as well as misoperations. Initial consideration of the trade-off space analysis would be included in understanding the challenges to advance from human to more automated, fast time scale mitigation and ultimately resilience.

2. Architecture and Scalability of Response Capability
   - Develop a conceptual architecture for real time cyber-physical response capability. Considerations include the communications required to implement the capability, the hardware and software design for substation and generation environments, and the ability to implement and scale the cyber-physical response capability related to cybersecurity.

Outcomes and Deliverables

- A final report will be drafted for review and published that summarizes the outcomes of each task area and recommendations on the analytical and response architectures.

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

I SC met Wednesday, January 12, 2022, in a Hybrid meeting. More than 20 members were present – quorum was met. Actual attendance will be in reported in the minutes.

- New VC Ritwik Chowdhury

Many thanks to former VC Robert Frye for his service!

- Added 5 new members of I-SC

Total 39 Voting Members

- Approved I SC Minutes from September 2021
- 19 Active WG and 1 TF

WG updates of note:

- I30 - *IEEE C37.235-2021 - IEEE Approved Draft Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes*
  - RevCom Approved!
  - Congratulations Robert Frye, Chase Lockhart, and the entire WG!
- I38 - PC37.92 – *Standard for Low-Energy Analog Interfaces between Protective Relays and Power System Signal Sources*
  - Making progress, expect to reballot this year.
- I31, I36, I37, I40, I41 - C37.90.x and 1613
  - C37.90.2 is in ballot. Ballot body has formed. Reconciling editorial comments from IEEE SA prior to initial ballot.
  - 1613 Draft 2.8 & C37.90.3 Draft 5 passed WG ballots and approved by SC to proceed to SA ballot.
  - C37.90 is close to final draft for WG ballot.
  - Work proceeding on C37.90.1
- I33 – Report on Review of Relay Testing Terms
  - Comments received in SC ballot are being addressed. Revised report will be resubmitted for SC ballot.
- ITF48 – Review and revise C37.103-2015 - *IEEE Guide for Differential and Polarizing Relay Circuit Testing*.
  - Requesting participation from people with commissioning and testing experience.
- I29 – C37.110 - CT application guide
  - Resolving comments. Reballot should proceed directly.
- I32 – Survey relay test practices

        - Andre Uribe working with IEEE PES Marketing to distribute survey and sort responses
        - Expect survey distribution in February with first summary of responses for WG review by May PSRC.
    - I47 Review and revise: *IEEE C37.231-2006 - IEEE Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control.*
        - Developing PAR for approval by SC
        - Considering Joint Sponsor with PSCCC for Cyber Security Issues
    - I35 *IEEE PC37.2-202x - IEEE Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations.*
        - In ballot; reconciling comments for reballot
    - I26 Report on Mathematical Models of Instrument Transformers
        - Nearing completion for WG Ballot

OTHER TOPICS

- New TF on revised Scope for I-SC.
    - Chair Brian Mugalian will lead a group to discuss scope of the I Subcommittee and recommend a revised scope statement for consideration by the I-SC and PSRC MC.
    - The I-SC scope needs revision to align with revised PSRC Scope from PES Reorganization several years ago. Efforts towards revision stalled with leadership changes and changes of priority and focus due to COVID
    - Request Transformer Liaison. If someone attends Transformer Committee meetings, please consider serving as PSRC liaison.

1. Welcome and hybrid meeting guidelines for meeting
2. Thank guests for attending
3. Thanks to out-going I-SC VC Robert Frye for his faithful service!
   Welcome incoming I-SC VC Ritwik Chowdhury!
4. Many thanks to former members of the I-SC:
   a. (no new retirements)
5. Welcome to new members of the I-SC:
   a. Hani Al-Yousef
   b. Art Buanno
   c. Lou Garavaglia
   d. Dan Ransom
   e. Don Ware
6. Determine a Quorum (**39 members** total in I SC)
   a. Attendance: __31_____ (min 20 for quorum; YES_X__ or NO ___)
7. Approval of Minutes of the September 23, 2021 on-line meeting
   a. Motion entered by: __Dood_____
   b. Motion seconded by: __Meisinger_____
   c. Motion carried unanimously.
8. Coordination & Advisory Committee Meetings Items of Interest
   a. Subcommittee Members' status and incoming Officers for September 2021
   b. Attendees information
      - 263 Registered for PSRC and PSCCC including ~50 newcomers
      - Roughly 3/4 on-line, 1/4 in person
   c. *Future Meetings - all plans subject to change:*
      - *Trying to get back to In Person meetings.*

- *May 2022 – Reno, NV – in person, possibly Hybrid, still negotiation*
- *Sept 2022 – Orlando, FL – still in negotiation*
- *Jan 2023 – JTCM Jacksonville, FL*
- *May 2023 – Las Vegas, NV – hotel contract executed*

d. 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!!!**

e. ***Working Group sign-in sheets – use confidential procedure!!!***
   - See instructions on PSRC website for how to create your Working Group roster and attendance list for handout at your meeting. Email addresses are no longer permitted to be placed on your sign-in sheet. Attendees must add their email address when they register for PSRC meetings.
   - 123Signup IS NO LONGER AVAILABLE. Use a spreadsheet to maintain records. Use BCC on email correspondence to maintain confidentiality of user contact information. Attendance roster should contain name and affiliation, but not email addresses, phone numbers, or other contact information.

f. For PAR related work, please present the new patent slides and *record in your minutes* whether essential patent claims exist. If there are none, please write this into the minutes. ***Do this at every working group meeting***. New JUNE 2021 slides available and are at http://standards.ieee.org/about/sasb/patcom/materials.html.

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

h. Looking for presentations for future Main Committee meetings – please contact Jim Niemira.

i. The PSRC Committee is international and open to anyone who cares to attend. A protective relaying group has formed in China – 800+ membership – and may in future have a liaison with PSRC. This group had contemplated becoming a regional affiliate of PSRC.

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

        PAR Committee motion_2020-6-18.p
      -
      - Create new PAR for new standard – MC

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

c. Review Draft 1 of the PSRC meeting agenda as soon as the meeting notice arrives in your inbox – to avoid meeting conflicts and multiple agenda revisions. Contact Ritwik Chowdhury and Jim Niemira for your requested changes – we will consolidate them and forward to Michael Thompson.

d. **Make sure that on the Meeting Room Request (MRR) form for the *May 2022* meeting that you include scheduling conflicts to avoid, e.g. "do not conflict with I50, D87, …" etc.**

e. As Chair or Vice-Chair of WG or TF, please contact Jim Niemira and Ritwik Chowdhury ***if you cannot attend your session***.

f. Non-PAR related document drafts can be shared with anyone who is interested. Please add a note that this is a draft version subject to change. Once this document is complete and approved it will be posted on PSRC website which is open to all and/or published on the PES Resource page.

g. All PAR related document (IEEE related) drafts **may not** be forwarded by the WG member to anyone else – there is a public review period for all IEEE documents where anyone can submit their comments.

h. When submitting "comments resolution" CSV file back to IEEE-SA in myProject, make sure that your draft is updated to reflect all the changes made – must match up to the CSV file!

i. Email WG or TF Minutes to Ritwik Chowdhury at: ritwik_chowdhury@selinc.com **– PLEASE HAVE THIS IN WITHIN 1 WEEK – USE THE MINUTES TEMPLATE FORMAT PROVIDED ON p. 8 OF THIS AGENDA** – confirm WG information is all correct and do not use special formatting or extra indents.

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

k. ***PSRC has File Share facility for non-PAR documents. Contact Jim Niemira (I-SC Chair) if your group has need or interest. Need list of participants with email addresses to allow write access - typically only a few people***

(WG Chair, VC, and/or Secretary); view access can be granted to others. See instructional videos on PSRC Website.

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

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

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

m. Reports/Paper Final Output – To be considered for PES level award the output of all Working Groups with a Technical Output including Technical Reports, Transactions / Journal and conference papers must be completed in PES Format and submitted and posted in the PES Resource Center. Final Draft of PSRC Reports, without PES Resource publication number or cover will also be posted to PSRC Website.

n. Links to PES:

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

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

WG/TF #	Name	Spokesperson
I2	Terminology Review	Mal Swanson
I4	International Standards Development	Eric Udren

I26	Review and Expand Transaction Paper on Mathematical Models of Current, Voltage, and Coupling Capacitive Voltage Transformers	Mike Meisinger
I29	PC37.110 - IEEE Draft Guide for the Application of Current Transformers Used for Protective Relaying Purposes -- Revision of C37.110-2007	Michael Higginson – No meeting held
I30	PC37.235 - IEEE Draft Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes -- Revision of C37.235-2007	Robert Frye – No meeting held
I31	P1613 - Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus -- Revision of 1613-2009	Brian Mugalian
I32	A Survey of Protective System Test Practices	Don Ware – No meeting held
I33	Review of Relay Testing Terms	Hugo Monterrubio
I35	PC37.2 - Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations -- Revision of C37.2-2008	Mike Dood
I36	PC37.90.2 - Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – Radiated Electromagnetic Interference Withstand Capability Requirements and Tests -- Revision of C37.90.2-2004	Chase Lockhart
I37	PC37.90 - Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – General Requirements and Tests -- Revision of C37.90-2005	Marilyn Ramirez
I38	PC37.92 - IEEE Draft Standard for Analog Inputs to Protective Relays From Electronic Voltage and Current Transducers -- Revision of C37.92-2005	Ritwik Chowdhury
I40	PC37.90.1 - Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus-Surge Withstand Capability (SWC) and Electrical Fast Transient (EFT) Requirements and Tests -- Revision of IEEE C37.90.1-2012	Roger Whittaker
I41	PC37.90.3 - Standard Electrostatic Discharge Tests for Protective Relays -- Revision of IEEE C37.90.3-2001	Steve Turner
I43	Investigate response to USA executive order regarding EMP protection	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	Andre Uribe
I45	Investigation of Grounding and Bonding Issues Associated with Substation Wiring Practices and Instrumentation.	Adrian Zvarych
I46	Review and revise: IEEE C57.13.3-2014 - IEEE Guide for Grounding of Instrument Transformer Secondary Circuits and Cases.	Bruce Magruder

I47	Review and revise: IEEE C37.231-2006 - IEEE Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control.	Amir Makki
ITF48	Review and determine need of revision for: C37.103-2015 - IEEE Guide for Differential and Polarizing Relay Circuit Testing.	Mohit Sharma

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

J SC met Wednesday with 20 members present – quorum was met.

- J13 Modeling generator controls (report) – ready for MC presentation May 2022

J26 WG Summary Paper starts May 2022

- J21 Motor protection tutorial – in process, will be working closely with J22 (C37.96 revision)
- Four PAR activities:
  - J16 Revise C37.101 Generator ground protection: PAR extension (3yr) granted
  - J17 Revise C37.102 AC generator protection: WG ballot comments being worked through, PAR extension (1yr) granted
  - J19 Revise C37.106 Abnormal Frequency: Sponsor ballot completed late 2021, comments being worked through, recirculation early 2022
  - J22 Revise C37.96 Motor protection: PAR approved, documents requested from IEEE-SA

J SC met Wednesday January 12, 2022 at 1:00 PM PST with 21 out of 33 members and 16 guests, reaching quorum.
A motion to approve the September 2021 J SC meeting minutes was made by Jason Eruneo and seconded by Steve Conrad. The minutes were approved unanimously.

Liaison Reports:

Electric Machinery Committee – M. Yalla – No report

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

Nuclear 1E WG - Prem Kumar - P741, is in the ballot process, resolving initial ballot comments. Expect to issue 741 by end of the year.

Old Business:

Status of J6 Report "Protection Issues Related to Pumped Storage Hydro (PSH) Units" – Dale Finney has a copy of the latest version. He will put the report in the proper format.

New Business:

None.

Adjournment:
Motion to adjourn was made by Jason Eruneo and seconded by Zeeky Bukhala. Meeting was adjourned at 2:16 PM PST.

K Substation Protection Subcommittee Meeting Notes – Adi Mulawarman

- Introductions
- Check for quorum (25 out of 35 members, need 18 for quorum)
- Approval of agenda (Mike Thompson motioned, Don Lukach seconded, approved unanimously)
- Approval of previous meeting minutes (Vahid Madani motioned, Jeff Barsch seconded, approved unanimously)
- Advisory Committee items of interest
    - 294 registrants
    - Future meetings May 2022 in Reno, NV and Virtual.
- Working Group Reports:

Published guide!

- C37.91-2021, Guide for Protecting Power Transformers
  - Thank you to K16 WG and officers:
    - Chair: Will English
    - Vice-chair: Steve Conrad

Completed summary paper for report on Geomagnetic Disturbance (GMD) Impacts on Protective Systems

- Thank you to K28 WG and officers:
    - Chair: Qun Qiu
    - Vice-chair: Steve Klecker

WG near completion:

- K22 – PC37.234, Guide for Protective Relay Applications to Power System Buses
    - Completed recirculation
    - Submitted to IEEE-SA RevCom

Established WG's continuing work:

- K10 – SCC21 DER standard coordination
- K12 – Static Shunt Compensators
- K25 – Shunt Capacitors
- K26 – Shunt Reactors
- K27 – Utility-Consumer Interconnections
- K29 – Reducing outage durations

New K31 WG

- C37.119, Guide for Breaker Failure Protection of Power Circuit Breakers
    - Chair: Vahid Madani
    - Vice Chair: Brandon Davies
    - During K Subcommittee Meeting Vahid Madani made a motion to the subcommittee to approve K31 scope, Ratan Das seconded the motion, there was no discussion and none opposed, motion carried. The sub committee felt that there were not substantial changes to the scope and therefore the submission PAR is approved by the K Subcommittee without further approval needed from the main committee.

Liaison Reports:

T&D Committee, Capacitor Subcommittee, **Pratap Mysore,**

http://grouper.ieee.org/groups/td/cap/

- NEMA CP1- Now merged with IEEE 18 -NEMA still provides input to IEEE 18

- IEEE 1036, Shunt capacitor Application guide – New PAR will be submitted this month to start revision
- IEEE std.1531-Guide for application & Specification of Harmonic Filter – Already published
- IEEE Std. 824 – Standard for series capacitors – Under ballot stage ready for recirculation after addressing negative ballots
- IEEE Std. 18- shunt Capacitor Standard – under preparation- invitation to ballot – deadline-Next week
- WG on Low voltage shunt capacitor application and DC capacitor application – still collecting information
- Two Taskforce groups: T.F. on Capacitor GMD Mitigation and T.F. on Capacitor Discharge Limitation Application
- IEC – HVDC green book is under preparation

Transformers Committee,
http://www.transformerscommittee.org/

Old Business

None

New Business

Checking interest with previous WG member of C37.245-2018 (Guide for Protection of Phase Shifting TR) for providing inputs to IEEE TC-C57.135 (Phase Shifting TR) PAR Study Group. Comments from K1 group provided previously to the transformer committee and are being considered as part of the new PAR. The transformers committee are now forming a working group and Mike suggests that once they start developing a draft K subcommittee form a future task force to review and comment on the revised guide. Mike Thompson offers to compile our inputs and present them to the associated working group.

Items of General Interest

Mike Thompson asked for parties interested in providing a panel session for the IEEE General meeting in July 2022. Panel sessions can be 2 or 4 hours and involve several people who each prepare a 15-minute presentation on a panel topic. Mike Thompson asked that anyone with ideas on topics for panel sessions and interest in developing a session to reach out to Mike directly. Needs an answer by next week.

Adjourn

Mike Thompson motion to adjourn; Sabastian Billaut seconded.

WORKING GROUP REPORTS FOR ALL SUBCOMMITTEES

C23: Coordination of Synchrophasor Related Activities
Chair: Allen Goldstein
Vice Chair: Gustavo Brunello
Secretary: N/A
Output: Discussion Forum
PAR and PAR expiration: N/A
Established Date: September 2013

Expected Completion Date: On Going
Draft: N/A
Assignment: The ongoing task force will provide three main functions: -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: Hybrid meeting, On Jan 11, 2022 at 5:00 pm PDT

Attendance: 7 members out 15 attended. 5 guests also attended.
Call to order

Officer presiding: Allen Goldstein
Officer recording minutes: Allen Goldstein

Quorum was not reached,

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

Summary of Activities and Discussions

Announcement that Harold Kirkham has voluntarily left the working group.

- Overview of PMU related standards work was shown.
- IEEE PSRC ongoing PMU related activities were discussed and updated
- IEEE PSCC ongoing PMU related activities were discussed and updated
- NASPI past work and publications were discussed and updated
    - NASPI 2020 Survey of Industry Best Practices for Archiving Synchronized Measurements has been published
    - Phasors or Waveforms: Considerations for Choosing Measurements to Match Your Application (PNNL) has been published
    - Distribution Synchronized Measurements Roadmap Final Report has been published
- NASPI current work was discussed and updated
- NASPI upcoming webinars and next work group meeting datewere announced.
- Old Business:
    - Some ongoing discussions pertaining concluded with the NASPI publication of recent NASPI publications and the formation of WG C43 on the use of AI and Machine Learning
    - Ongoing discussions were reviewed with no new additions to the discussion.
- New Business: None.

Adjourn at 6:10 PDT

Next Meeting:

NASPI Work Group Meeting, April 12-14, 2022
Next C23 meeting will be during PSRC meetings May 9-12

C25: Summary Paper and Presentation on Protection of Wind Electric Plants
Chair: Martin Best
Vice Chair: Amin Zamani
Secretary:
Output: Summary Paper
Established Date: May 2021
Expected Completion Date: 2022
Draft: 0
Assignment: Prepare a summary paper and presentation on the PES Technical Report TR87 – Protection of Wind Electric Plants.

Working Group C25 met (**virtually** and in person) on January 10, 2022 at 01:00–02:10 PM PST. There were total of 60 attendees in the meeting, 12 members and 48 guests.

a) Meeting started with the Chair describing the latest status of the paper and assignments received. Since the attendee list was available and, to save time, no formal introduction was done for the attendees.
b) Chair quickly went through the contributions made by each contributor. It was discussed that there are some pending assignments.
c) Amin Z. took the action to review the whole paper with focus on the section summarized by Martin (Protection).
d) Ritwick C. took the action to summarize Transformer Protection (3.d) as Duane B may not be available to do so.
e) Chair will follow up with the people who have not made their contribution to get an update. If no response is received, the Chair/Vice-Chair will consider asking for people to summarize some parts (re-assignment).
f) At this stage, December 2022 is considered as the completion date such that the paper can be presented in 2023/2024 time frame (WPRC, Texas A&M, etc.)
g) It was discussed that the paper is aimed for relay conferences that do not have strict page limits.
h) It will be OK to share the papers with others, but the authors will be defined based on their contribution including review.
i) As the Chair will retire in June, the WG is looking for a new chair. The new Chair will require committee approval. Martin will be the chair for next meeting in May 2022.

Respectfully submitted,
Amin Zamani and Martin F. Best

Meeting adjourned at 1:45 PM PST 1/10/2022

C26: Revision to C37.233, Power System Protection Testing Guide
Chair: Don Ware
ice Chair: Matt Black
Secretary: Zach Zaitz
Output: Revise Guide

Established Date: January 2016
Expected Completion Date: December 2022
Draft: 5.0
Assignment: Revise C37.233-2008 Power System Protection Testing Guide

The C26 working group met with a combination Hybrid in-person and virtual online meeting on Monday, Jan. 10, 2022 with 21 attendees, 9 members and 12 Guests. Only 2 people were in the meeting room in California. Membership quorum was not satisfied (12 Required).

Matt Black hosted the meeting as he has done on all Web meetings.

Matt reviewed the IEEE Patent Policy and Copyright Policy slides.

Meeting Notes:

- Matt Black presided over meeting.
- Since quorum was not met earlier minutes were discussed but not approved. An email request will be sent out for previous meeting minutes approval.
- The patent slides were displayed. No patent concerns were raised.
- Comment resolution was discussed:
    - Total # of ballot comments = 431
    - Remaining to be implemented/addressed = 175
        - Comments are being either Accepted, Rejected, or Revised
        - When the Vice Chair is uncertain of how a comment should be implemented he is flagging it as a question to be addressed by a technical review team at a later date
        - Comment priority is currently on the Wordsmithing team (mentioned below)
- Several technical comments on the guide as a group was discussed:
    - Definition of application tests, agreed to table discussion about Type Tests at this time.
    - Wording of commissioning
- With the list of comments needing to be addressed, the C26 WG will begin meeting bi-weekly to address the comments of a technical nature
- Discussed that many of the editorial comments pertain to uses of words such as “should” which should not be used in a guide
    - Shown below are the volunteer team to meet bi-weekly to address these comments:
        - Matt Black
        - Zach Zaitz
        - Tony Seegers
        - Vahid Madani
        - Angelo Tempone
        - Don Ware
    - PAR Related rewording has been handled on 77/117 pages to date
- The latest version of the draft 5.9 may be found at https://ieee-sa.imeetcentral.com/pc37233/folder/WzIwLDc5MTY3OTdd
- Motion called to adjourn meeting. Jun Verzosa moved to adjourn and Rafael Garcia 2nd the motion. The meeting adjourned.
- Our next meeting will need a single session with maximum participation of 40 people. We please request conflict avoidance with C38, D47, H45, H46, I43 and I45.
-

C28: 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
PAR and PAR Expiration: December 2021
Established Date: October 2015
Expected Completion Date: Completed
Draft: Published
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: Hybrid meeting, On Jan 10, 2022 at 2:40 pm PDT

Attendance: 4 members out 17 attended. 5 guests also attended.
Call to order
Officer presiding: Allen Goldstein
Officer recording minutes: Allen Goldstein

Quorum was no reached,

Call for Patents: Slides were not shown since the work was completed and the working group was voting to disband

Summary of Activities and Discussions

The guide has been published and the working group was voting by email to disband. Motion to disband made by Ken Martin and seconded by Yi Hu.

Meeting was adjourned at 3:12 PM PDT.

Post Script: Motion to disband was passed unanimously. Motion to disband was made at C subcommittee meeting and passed. C28 is disbanded.

Next Meeting:
None.

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

Chair: Kevin W. Jones
Vice Chair: Mike Kockott
Secretary: N/A
Output: Tutorial
Established Date: May 2016
Expected Completion Date: May 2023
Draft: 1.07
Assignment: Create a report on test instructions/parameters to accompany the PSRC documents Application of Out-Of-Step Protection Schemes for Generators, and Tutorial for Setting Impedance Based Power Swing Relaying on Transmission Lines, to aid the users in quality testing of their settings and systems when following the working group outputs which recommend testing of complex relay settings and systems.

Working Group C29 met in a hybrid session with 3 attendees in-person and 15 attendees virtual on Tuesday, January 11, 2022, 8:00-9:00 AM PST with a total of 18 attendees (8-Voting Members, 1-Non-Voting Member and 9-Guests).

Kevin welcomed all attendees. The first order of business was to approve the minutes from the September 2021 WebEx meeting. Kevin asked if there were any comments on or objections to approving the minutes. Hearing none, the minutes from September 2021 were thus approved.

The meeting kicked off with Mohit Sharma sharing a presentation on the work that has been done on Chapter 2 – Types of Tests. He shared the work done especially in static and dynamic testing portions. Kevin merged the changes in the latest draft along with comments from other members.

Next there was a discussion on performance criteria for PSB and OST functions. Deepak Maragal e-mailed that he had faced trouble setting tolerances for pass/fail. Some members shared thoughts on the usefulness of tolerances in schemes that involve reach and timer settings. It was thus concluded to include a write-up in Section 5.

Benton Vandiver brought up good points on his recent experience with EM and numerical relay testing related to test equipment limitations when doing transient playback. He suggested to include the fact that test equipment scales up the sampling rate to its max capacity (10 kHz) to replicate true behavior. Also, COMTRADE files with higher than 10 kHz sampling rate cannot be tested. Consensus was to put that in Section 3.

Action Items for Next Meeting:

1. Mohit to provide a power-point/live demonstration of dynamic test described in section 2.2.1 (d)
2. Mohit, Scott, Jun, and Deepak to work on merging Section 2 with the latest draft inclusive of editorial comments
3. Mohit to work on polishing overview for dynamic test as per Gene's suggestion
4. Benton, Scott, Jun, and Mohit to work on the writing assignment for Section 3
5. Deepak and Scott to work on dynamic test content using their RelaySimTest experience

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

C31: <u>Guide for Protection System Redundancy for Power System Reliability</u>
Chair: Solveig Ward
Vice Chair: Alla Deronja

Secretary: Alla Deronja
Output: Guide
Established Date: September 2017
Expected Completion Date: December 2021 (Completed)
Draft: 13.1
Assignment: Development of a guide for protection system redundancy

WG C31 met on Tuesday, January 11, 2022, in a single session with 7 voting members, 2 non-voting members, and 11 guests attending.

The meeting chair displayed the IEEE patent and IEEE-SA Copyright policy slides as required for the working group with PAR related activities. There were no patent claims from the meeting participants.

The quorum was not met (7 voting members out of 20 were in presence). Therefore, the May 4, 2021 meeting minutes will be approved electronically.

The IEEE-SA ballot was successfully completed in August of 2021. The new guide was approved by the IEEE-SA on November 10, 2021 and is about to go through editing for publication.

To introduce the new guide to the industry, especially, because it was developed per the NERC request to PSRC, there was a proposal to write a summary paper focusing on the guide contents and present it at relay conferences. About a half of the meeting participants supported the proposal.

The WG would approach the Subcommittee C to propose creating a task force to write this summary paper, develop a PP presentation for the PSRC Main Committee, and, possibly, develop a PP presentation for an IEEE webinar.

The WG will be maintained until the guide is published. We do not plan to have a meeting at the PSRC May 2022 meeting.

C33: <u>Support for WG-P2004 Recommended Practice for Hardware-in-the-Loop (HIL) Simulation Based Testing of Electric Power Apparatus and Controls</u>
Chair: Dean Ouellette
Vice Chair: Sakis Meliopoulos
Secretary: Aaron Findley
Output: Recommended Practice
Established Date: September 2018
Expected Completion Date: June 2022
Draft: D2
Assignment: Support the development of this IEEE recommended practice in cooperation with PELS, IAS, and IES efforts

Teams Meeting 12 January 2022, 08:00 – 09:10 PST [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 19 attendees, 5 members, and 14 guests in attendance.

A quorum was not achieved, minutes of the previous meeting and this meeting will be mailed out for approval.

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 writing assignments from the previous meeting. Several contributors to the writing assignments were absent; Aaron Findley will draft an email to reach out to the authors for a status update.

Aaron's contribution was reviewed and it was noted that something about CCVT should be added. Also the I26 work should be reviewed for possible content.

Nicole's contribution was reviewed and it was noted that there could be more content to be added.

Amin Zamani will add some description on data capture and the process for running a large number of cases, recording the data, and re-evaluating failed cases with more detailed data capture.

Mischa Stuerer the Chair of P2004 gave a status update on the P2004 draft. The next consolidated draft will be ready at the end of February and he expects the draft will be ready for review by the fall of 2022. He expects the contribution from C33 to be ready by June 2022.

Kang Lee expressed an interest in contributing a section on Interoperability testing.

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

Outstanding writing assignments:

- Internal Faults, Normann and Ali to review and revise
- Figure F.1, Ali, Dinesh, Norman to review. Replacing protective functions with more generic box, in addition to other comments.
- F.3.1: Normann suggests a re-write adding discussion of GCC and salient vs. cylindrical rotor.
- F.4: Normann suggested adding a note pointing to the software specific documentation for data entry format.
- F.5.1.1/F.5.1.2: Ali to provide an example and reference.
- F.6.1: Normann to add explanation of H and D constants.
- F.7.2: Dale Finney, Normann, Ali to expand this section discussing both overload and overexcitation.
- F.8: Dale, Ali, Normann, Deepak to provide content.
- F.2: Norman, Ritwik to provide better diagram from other standards.
- ~~F.11: Aaron to add discussion of adjacent generators.~~
- F.12: Aaron to include discussion of CCVT modeling.
- F.15: Dinesh, Normann, Dale to provide content

- Figure F.3 to be revised by Dinesh and Normann
- F.19: Normann to provide comments on this section including a discussion of which functions cannot bet tested via HIL.

New Business

Meeting was adjourned at 08:55 am PST.

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 9-voting members and 27-guests (36-total). The Chair presided over the meeting and the Vice-Chair recorded the minutes. The meeting was called to order by Kevin Jones on Wednesday, January 12, 2022 at 0920 PST. The minutes from the September 22, 2021 WebEx meeting were reviewed and approved.

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

- C38 Guide for the Design of Microgrid Protection Systems - Mike Higginson: Going out for WG ballot next month, PAR expires this year, SA ballot this year (2022).
- C45 Protection and short-circuit modeling of systems with high penetration of inverter-based Resources – Manish Patel: Subgroups formed, writing assignments made.
- D29 Tutorial on Setting Impedance-Based Power Swing Blocking and Out-of-Step Tripping Functions on Transmission Lines - Kevin Jones: EPRI presentation on impact of EMT vs pos seq planning model. As IBR penetration increases, swing rate increases, time between blinders decreases. CAPE-TS link studies indicate swing rate increases (0.62Hz to 1.65Hz) for sample system; setting adjustments on blinders/timers required. Document addresses these studies using examples. Section on impact of IBR on PSB/OST complete. Target May 2023 for document completion. D29 no further report to CTF34.
- D38 Impact of High SIR on Distance Relaying - Christopher Walker: Still working on Draft 0.5. The report will have a section on the impact of IBR on SIR. Targeting completion in 2023.
- J18 Investigate the effect sub-synchronous oscillations due to inverter based resources (IBR) on rotating machinery protection and control- Normann Fischer: No report
- NERC – No report
- P2800 – Manish Patel: Draft submitted to RevCom, balloting finished, final stages of publication.

Michael Higginson made to adjourn, Mike Jensen seconded.

Chair Kevin Jones adjourned the meeting at 0940 PST.

C36: <u>Summary of Role of Protection Relaying in the Smart Grid</u>
Chair: R. Benjamin Kazimier
Vice Chair: Steve Klecker
Secretary: Steve Klecker
Output: Summary Paper
Established Date: January 2018
Expected Completion Date: February 2022
Draft: Final
Assignment: To develop an IEEE summary paper based on the C2 report "Role of Protective Relays in the Smart Grid"

Steve Klecker called the meeting to order on January 11, 2022, at 1:05 p.m. with nine guests in attendance. Steve Klecker presided, and he was the only voting member in attendance. Non-voting members were not in attendance. Quorum was not achieved.
The paper has been presented as follows:

1. May, 2021: Georgia Tech Protective Relaying Conference – Taylor Raffield
2. May, 2021: Power System Relaying and Control Main Committee meeting – Taylor Raffield
3. August, 2021-September, 2021: PAC World Americas Conference – Yuan Liao
4. October, 2021-Western Protective Relay Conference – Steve Klecker
5. November, 2021 – Minnesota Power System Conference – Steve Klecker

Some of the planned presentations will be as follows:

1. 2022 Iowa/Nebraska System Protection and Substation Conference
2. 2023 Texas A&M Conference for Protective Relay Engineers
3. IEEE General Meeting
4. IEEE Transmission and Distribution Meeting

A ballot to disband the working group will be sent by e-mail.
A request to disband the working group will be presented at the May, 2022, Power System Relaying and Control Main Committee meeting.

Respectively submitted,
Steve Klecker
January 20, 2022

C38: <u>P2030.12 Guide for the Design of Microgrid Protection Systems</u>
Chair: S. S. (Mani) Venkata
Vice Chair: Michael Higginson
Secretary: Geza Joos
Output: IEEE Guide, P2030.12
Draft: 1.0
Expected Completion Date: February 2022
PAR Expiration Date: December 2022
Assignment: To create P2030.12, Guide for the Design of Microgrid Protection Systems

January 11, 2022 Meeting Minutes

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

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

The meeting commenced at 3:40 PM PST. There were 48 attendees, with 19 voting members, 8 non-voting members, and 21 non-members. Quorum was met.

The working group began with introductory remarks by the Chair. He reminded the attendees that the deadline for completing the guide and obtaining approval from the IEEE SA Board is December 2022, the expiration date of the PAR. The guide must be approved by PSRC before balloting can start.

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

Minutes for the September 2021 and November 2021 meetings were reviewed. No comments were raised. Ward Bower made a motion to approve the September 2021 minutes, with a second from Matthew Reno. The minutes were approved with no objections. Sukumar Kamalasadan made a motion to approve the November 2021 minutes, with a second from Rob Fowler. The minutes were approved with no objections.

The working group reviewed the agenda was presented and approved by the working group.

Geza Joos presented the version, Draft 1.0, that he transcribed, without changes to the technical content, from the latest version, Draft 0.9.1, into the IEEE SA template. The work also included: (a) organizing the Bibliography (Annex A), generated by moving the references associated with each section to this Annex and cross-referencing them in the text; (b) numbering figures and tables in sequence and cross-referencing them in the text. No duplications were identifying, no text was removed, and no regrouping of topics was done.

During the presentation, the following issues were raised, requiring action:

a) identifying the source of all figures and tables: if copied from existing and published documents, the source must be identified and permission to reproduce obtained from the copyright owner; if the source is an IEEE document, reproduction is permitted in principle; the alternative is to redraw and adapt the figures and tables, identifying the source; a spreadsheet will be generated listing and identifying the source and copyright owner of all figures and tables; section leads are asked to contribute to completing this task
b) issues related to the document and text layout where raised, including whether the main sections should start with an introductory text; the 2021 IEEE SA Standards Style Manual, which is the reference manual, does not feature this approach; this issue will be clarified with IEEE SA

The steps to move the guide to balloting were presented and discussed. The PSRC P&P clauses related to the standard approval process will be followed. They include:

a) approval of the draft guide by WG P2030.12/C38 and request to PSRC to move to balloting;
b) approval by the relevant PSRC subcommittee to move the guide to balloting, a step which should be completed by the May 2022 PSRC meeting;

c) IEEE SA ballot group formation, mandatory editorial review (can be done concurrently with or after ballot group formation);
d) balloting and ballot comment resolution.

Mani Venkata proposed to hold a WG meeting approximately four weeks after the WG receives the draft standard to ballot, to discuss comments, resolution, and next steps. Members will have access to the draft guide, to be posted on iMeet by 17 January 2022. Geza Joos will provide the latest version of the guide by Friday, 14 January 2022.

The meeting was adjourned at 5:15 PM PST.

C39: 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: Third edition draft.

C39 did not meet at this meeting.

C40: Paper, Summary of C37.247 Standard for Phasor Data Concentrators for Power Systems
Chair: Vasudev Gharpure
Vice Chair: Mital Kanabar
Secretary: Mital Kanabar
Output: Tutorial planned (Paper, Presentation in future)
Established Date: January 2020
Expected Completion Date: December 2022
Draft: 1.01
Meeting Date: 1/11/2022
Assignment: Develop a publication (transaction and/or conference), a tutorial and a presentation based on C37.247-2019: the standard for Phasor Data Concentrators for power systems.

Working Group C40 met on Tuesday, January 11, 2022 with 7 attendees.
The tutorial prepared has been accepted for presentation at the 2022 IEEE PES General Meeting.

C41: Investigate performance requirements for Distribution PMUs
Chair: K. Martin
Vice Chair: N. Perera
Secretary: D. Gurusinghe
Output: Technical Report
Established Date: May 2021
Expected Completion Date: TBD

Draft: 0

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

Working Group C41 met on Tuesday, January 11, 2022 at 1:00 pm (PST) with 18 attendees (4M & 14G), 1 at meeting and 17 on the Web for various intervals. Ken Martin (Chair) welcomed participants and briefed the objective of the WG, which is described in the assignment above. He reviewed the current progress. We did not have a quorum.
Since most of the attendees were new to the work, the meeting focused on the overall WG assignment and directions. The WG has held monthly meetings since March 2021 with 6 meetings devoted to a presentation topic on research, development, or analysis that can be used to develop the WG report. These presentations have included:

- Deployment and application needs for distribution systems (Romano)
- PMU accuracy requirements for distribution state estimation (Paolone)
- Falling conductor protection and other distribution applications (Dietmeyer)
- Estimating THD from distribution POW data, 2 stages (Rusch)
- Distribution Waveform Characteristics – Harmonics with IEEE and IEC Standards (Rahmatain, Koenig)
- Review of measurement needs of applications roadmapped in Quanta/SDG&E/ORNL study (Moutis)

The chair guided discussion through the 4 main sections of the report outline. Discussion focused on completeness and adequacy of the outline.

Section 1: Characteristics of distribution measurements
Comments:

- Current measurements may be different than voltage. May have more distortion, Interference may be higher.
- Current measurements may need a greater range, certainly desirable.
- Need to have compensation for signal changes from the primary to the measurement device
- 4 bullets in the section look good, make writing assignments
- This looks like writing a standard—how is this different? We are writing a report that will help writing a standard, but the standard WG may choose differently

Section 2: Use cases and their measurement requirements
Comments:

- This section was titled "Application requirements" but it is really use cases since many anticipated applications have not been implemented
- Tap into the library of examples we have
- Enlist the expertise of contributors for those sections

Section 3: Recommended performance requirements for distribution measurements

- This combines sections 1 & 2
- Looks at compromises between them and practicality

Section 4: Recommended for standard development

- This is more to recommend if standard development should be initiated and the type of standard needed
- No particular comments, the group ran out of time

These notes will be brought forward to the whole WG at the next meeting. The next meeting is planned for Feb 1.
The meeting adjourned at 2:10 PST.
Recorded by Ken Martin

C42: Summary Paper of C37.250 Guide for Engineering, Implementation and Management of System Integrity Protection Schemes (SIPS)
Chair: Gene Henneberg
Vice Chair: Yi Hu
Output: Summary Paper
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.

Gene Henneberg chaired the meeting, beginning at 10:40 am.

The WG met with 6 members and one guest: Gene Henneberg, Dean Miller, Vahid Madani, Peiman Dadkhah, Erin Jessup, Yi Hu, and Bob Crowley (guest). Attendees introduced themselves. Gene and Bob attended in-person, others virtually.

The WG has completed writing the summary paper for C37.250 and developed a presentation. Mr. Henneberg presented the paper at the Western Protective Relay Conference (virtually) last October.
The WG also submitted the paper to Texas A&M and Georgia Tech for the spring 2022 relay conferences. The paper was accepted for presentation at both conferences. Mr. Henneberg solicited volunteers from the paper authors to present the paper at both conferences. We need to identify the presenter for Texas A&M by February 1 and for Georgia Tech by February 18. COVID makes the ability to travel to present the paper uncertain for many folks, so we do not have any commitments at present.
We also discussed the possibility of presenting at PAC World 2022, but this conference is not scheduled in the United States during 2022.
Meeting adjourned at 11:07.

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

Chair: Yi Hu
Vice Chair: Adi Mulawarman
Output: Report
Established Date: January 2021
Expected Completion Date: December 2022
Draft: 0.20
Assignment: Prepare a report summarizing existing and new practical applications and challenges to use Artificial Intelligence and Machine Learning technologies for power system protection and control.

Working Group C-43 met in a double-session on January 12, 2022 with 64 attendees (24 are members). Majority attended remotely with two in-person. Yi Hu and Adi Mulawarman presided the meeting. A round-the-table introduction of attendees was taken for each session. Complete information of all attendees, including affiliations, was recorded, and subsequently provided to the Working Group chairs.

Session 1:

Chair briefly reviewed meeting agenda and WG C43 assignment with the attendees at the beginning of the first session. Several subsections of the section 5 and the section 6.2.1 of the latest draft report, for which new contributions were received, were briefly reviewed by the WG members who contributed and/or worked on these subsections since the September 2021 meeting.

After the draft report review, Chair reviewed the overall report development plan and timeline with the attendees. The plan is to have a WG member approved report by May 2022 PSRC meeting, and submit it for C subcommittee approval shortly after the May 2022 meeting. The WG aims to get the report approved by C subcommittee for publication before or by September 2022 PSRC meeting. The WG will work with IEEE editor to get the report published before the end of 2022.

The followings are the work plan for next few months:

- January 31, 2022 – Complete collecting initial contributions
- February 28, 2022 – Finish the first completed draft
- March 31, 2022 – First round of the full draft report review and comment
- April 30, 2022 – Revise and update draft report to incorporate received comments and suggested edits

Session 2:

Chair briefly reviewed meeting agenda, WG C43 assignment, and the development plan and timeline with the attendees at the beginning of the second session. Chair made a final call for participation and contributions for subsections that have not been assigned previously. The following WG members have volunteered to make contribution to these subsections:

- Section 5.2.8 Application of AI/ML in Travelling Wave Protection – Matt Reno, Ali Bidram
- Computation Platform – Ratan Das, Alex Apostolov, Ramakrishna Gokaraju, Abder Elandaloussi
- Testing and Validation – Boris Marendic, Sukumar Kamalasadan, Juan Piñeros
- User Training – Abder Elandaloussi, Juan Piñeros, Vahid Madani, and all section 5 application example contributors
- Available Tools and Resources – Andre Felipe Silva Melo

Chair will inform all other contributors who are not in attendance to send in their contributions by January 31, 2022 if they have not send them in yet.

WG will continue the regular weekly meetings to work on the draft report.

Meeting adjourned at 11:55 AM PST.

C44: Prepare a Summary Paper for IEEE Transactions on Power Delivery Based on the Contents of the Report Prepared by the C24 WG Modification of Commercial Fault Calculation Programs for Wind Turbine Generators
Chair: Sukumar Brahma (Clemson University)
Vice Chair: Evangelos Farantatos (EPRI)
Output: Summary Paper
Established Date: May 2021
Expected Completion Date: January 2022
Draft: 10.0
Assignment: Prepare a Summary Paper for IEEE Transactions on Power Delivery Based on the Contents of the Report Prepared by the C24 WG "Modification of Commercial Fault Calculation Programs for Wind Turbine Generators"

C44 met at 3:40 PST on Monday, 1/10/2022 with 22 attendees.

Sukumar summarized the status of the paper. At the time of the meeting the paper had been approved by the WG members and was under balloting by the C subcommittee members. On 1/11/2022 the C subcommittee chair informed that the paper has been approved by the C subcommittee members as well with a few comments received. Sukumar and Evangelos will address the comments and will send the updated paper to PSRC committee officers for the next round of approvals, before submitting the paper to IEEE Transactions on Power Delivery.

There was a short discussion whether the vendor names should be mentioned in the paper or whether they should be anonymized. The group agreed that it is of value to explicitly mention them.

C45: Protection and short-circuit modeling of systems with high penetration of inverter-based resources
Chair: Ali Hooshyar
Vice Chair: Manish Patel
Secretary: Ritwik Chowdhury
Output: Report
Draft: N/A
Established Date: May 2021
Expected Completion Date: December 2024
Assignment: To prepare a technical report to investigate short-circuit modeling and protection of systems with high penetration of IBRs as a continuation of the works of WGs C32 and C24

Ali (Chair) presented the agenda to the attendees. There were eight in-person attendees in California who introduced themselves. There were 52 attendees virtually, which increased to over 70 during the meeting. The latest draft and other relevant documents can be found here: https://psrc.sharefile.com/d-se3c7322d1a5741cf9ad4cffa75d81a78.

Assignments: Ratan (7.1, later 4.1), Raju (6.1). Sukumar (6.3 Capacitors), Rahim (Section 6), Steve Klecker (will get back to us later).
There were 25 members in attendance out of 48 voting members, quorum was achieved. Allen Goldstein moved to approve the minutes, which was then approved.
Ilia presented on the challenges and solutions to transmission line protection.

- Ratan – What were the different types of IBRs? Type 3, Type 4, etc. Explained the different OEMs.
- Sukumar – How do you calculate impedance of IBR? Ilia showed an equation.
- Boris – If you have delta towards the grid, you said zero-sequence is not reliable. Would that not be the case with conventional generators as well? Conventional generation will typically have ground source.
- Mukesh – For IBRs the ZS1 are variable. How is the circle still stable instead of expanding variably?
- Manish – Material based on existing equipment. We want to see how protection need to work with standardized (e.g., P2800 standard) equipment in the future.

Aboutaleb presentation on Power Swing Detection and Protection.

- Charlie – Is the report only available to EPRI members? The EPRI report is only available to EPRI members, but IEEE paper is available where there may be sufficient details.
- Raju – Studied up to 50% penetration. Come across any level of penetration where OOS function is not required anymore? Depends on the system.
- Nirmal
    - For the conventional system modeling. What was the generation mix – was it lumped? Thermally dominated? Showed IEEE D29 test system from Kevin's working group. Not sure what type of generators.
    - When changing generation mix. Is there a notion of phase swing based on generation mix? Were there transient simulations done to cross check? Yes, simulations but not calculations.
- Rama Gokaraju – IBR can go at different locations in the system. Can the swing center voltage can move? The swing center may not pass through the line at all. The OOS may not be valid anymore, could it move to another line? Yes, it could move. Depending on which side of the line the IBR is, the swing center moves to one side of the line or not. This is in agreement with your question/comment.
- Manish – Future work is whether the IBR controls actually change the swing characteristics, or whether they are based on the Thevenin equivalent changing.
- Ratan – Are you only adding IBR on one side of the system? Or are you adding it on two different sides? Yes, we can place it on both sides. The IBRs could have different capacity at the different line terminals.

Excellent feedback received for both presentations. Meeting adjourned.

C46: <u>Draft a summary paper of C37.242: Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control</u>

Chair: Allen Goldstein
Vice Chair: Deepak Maragal
Secretary: N/A
Output: Summary Paper
PAR and PAR expiration: N/A
Established Date: May 2021
Expected Completion Date: Sept 2021
Draft: 0.1
Assignment: Draft a summary paper of C37.242

Meeting Date and Time: Web-Meeting, On Sept 09, 2021 at 10:30am CT

Meeting Date and Time: Web-Meeting, On Jan 11, 2022 at 09:16am PDT

Attendance: 9 of 14 members
10 guests
Call to order
Officer presiding: Allen Goldstein
Officer recording minutes: Allen Goldstein

Quorum was reached.

Past Minutes: Previously approved via email

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

Summary of Activities and Discussions

Chair Presented agenda for the meeting

Monthly meetings are conducted

The draft is in progress, it is being drafted in Overleaf, an online collaborative drafting tool.

Some content has been added, the WG reviewed the new content, made some edits and reviewed the writing assignments.

Writing Assignments are as follows:
Deepak Maragal: Overview of the guide and general future directions
Ken Martin and Mahendra Patel: Technical Gaps and Guidance (current and future)
Erin Jessup: Summary of Guidance
TBD: Future Guidance

Meeting Adjourn at 11:38 PDT

CTF47: <u>Relay Modeling in Electromechanical Dynamic Simulations</u>

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

CTF47 met on Tuesday January 11th 2022 at 13:00 PST with 22 attendees, virtually via Microsoft Teams as well as in person.
Chair, Evangelos presided over the meeting. He brought the meeting to order and showed the agenda. Chair and Vice Chair recorded the minutes. The Chair and Vice Chair moderated the chat window.
The chair first presented the history behind the establishment of this task force. Then PSDP task force chair "Glauco Taranto" presented on "Integrating Relay Models with RMS Dynamic Simulations." The availability of three-phase RMS simulators in the market and the software vendor participation in the PSDP task force were discussed. There was also a discussion on whether the PSRC task force should become a working group or not. Most attendees recommended to not form a working group and contribute to PSDP through this PSRC task force.
Interest for membership was solicited and 5 participants indicated interest to become members.

D29: Tutorial for Setting Impedance-Based Power Swing Relaying on Transmission Lines
Chair: Kevin W. Jones
Vice Chair: Normann Fischer
Secretary: N/A
Output: Tutorial
Established Date: May 2014
Expected Completion Date: May 2023
Draft: 1.07
Assignment: Create a tutorial on setting impedance-based power swing blocking and out-of-step tripping functions related to transmission line applications. Specific relay settings examples will be provided. Other methods of detecting out-of-step conditions that exist will be summarized and referenced but will not be discussed in detail.

Attendees: 38 (9-Voting Members, 2-Non-Voting Members, 27-Guests)

1.) Minutes from the September 2021 virtual meeting were reviewed and approved.
2.) Dr. Aboutaleb Haddadi gave a presentation on the impact of IBR's on the swing rate and swing trajectory on the D29 test system.
3.) The chair gave an update on the D29 test system. Tests were performed using IBR penetrations of 0%, 25%, 50% and 67%. The tests showed that as the percent IBR increases, the power swing slip rate increases almost linearly from 0.62 Hz to 1.65 Hz. It was discussed that the increase in slip rate may require greater separation of power swing blinders and/or will require reduced PSB and OST timer settings. The results presented by the chair agree with those presented by Dr. Haddadi.

4.) The chair went through the report and assigned persons to review specific sections. The chair also identified which section could be combined and optimized.

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

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

Chair: Karl Zimmerman
Vice Chair: Ted Warren
Output: Tutorial
Expected Completion Date: Sep 2022
Draft 7.0
Working Group Assignment: Write a tutorial on factors affecting the application and setting of ground mho and quadrilateral distance elements on transmission lines

Working Group D30 met at 8:00 AM PST on January 12, 2022, with 12 voting members and approximately 15 guests. The meeting was held in person and virtual format. Quorum was established.

Chair, Karl Zimmerman presided over the meeting. Vice-Chair Ted Warren recorded minutes and moderated the Chat window.

Draft 7.0 was displayed, and the WG had discussion on a motion to ballot the WG. Sebastien Billaut indicated that a contribution he had made was not included (on resistive reach). Sebastien agreed to provide the section in Word format and agreed he could make this comment in the balloting process, so the ballot could proceed.

The latest draft had been e-mailed to WG members and guests. However, it is now going to be posted using the share file feature. Once posted, the WG chair will issue the ballot, including instructions and post a due date approximately 6-8 weeks after it is made available to the WG.

Meeting was adjourned.

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

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

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

Did not meet.

D35: Evaluation of Transmission Line Pilot Protection Schemes

Chair: Rick Gamble
Vice Chair: Brandon Lewey
Established: January 2017
Output: Technical report to the Line Protection Subcommittee
Expected Completion date: 09/2022

Draft: 12
Assignment: Prepare a technical report to the line protection subcommittee to evaluate advantages and disadvantages of common transmission line pilot protection schemes, including POTT, DCB, DCUB, and line current differential. The schemes will be evaluated in terms of speed, sensitivity, dependability and security based on the design and configuration of transmission lines and system topology. A limited number of example systems will be evaluated.

Working Group D35 met on Tuesday, January 11, 2022, at 8:00am in persona and remotely via Microsoft Teams with 18 members and 32 guests.

The WG discussed updated figures, reviewed comments provided by members and discussed the need to meet more frequently to complete the Summary Table.

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

Draft 13 will be distributed to working group members for review.

Action Items:

- Contributing Members – discuss Summary Table Options
- Brandon Lewey – revise Members and Contributors page
- Rick Gamble – review DCUB logic diagram and Vision file provided by Ted Warren
- Jeff Brown – update DCUB summary paragraph

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

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 briefly to notify the attending WG members and guests that the Chair was sick and will not be able to hold the scheduled meeting.

Next meeting request - single session for 25 attendees with computer projector. Avoid conflict with C29, C41, D29, D42, D47, D48, J18, and then if possible also D30, D38, J19.

D38: Impact of High SIR on Line Relaying

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

Presiding Officer: Chris Walker
Minutes Recorded by: Greg Ryan

Agenda:

1. Introductions/Signup sheet/roster
2. Review Working Group Membership and Membership Process
3. Approve previous meeting minutes: first Sebastien Billaut – second – Abu Bapary
4. Discuss status and progress of report
5. Review writing assignments
6. Review submitted writing assignments
7. Discussion of next steps
8. Adjourn

Minutes:

We met with 32 attendees, 25 Members and 7 Guests.

Chris Walker opened the meeting at 10:40 and introduced himself we then followed with introductions around the room first and then introductions over the virtual attendance next. Chris advised the working group that we are following the membership requirements of PAR related activities for the membership of this non-PAR related activity and showed the working group members list.

Previous minutes were reviewed, and a motion was made to approve the minutes. Minutes were approved with no opposition.

Chris discussed the status of the report and advised that he and Greg will review the report and outstanding assignments so that in February they will nudge the volunteers to complete assignments and turn them in by April 15th so that they can be incorporated prior to our May meeting.

Chris then brought up a paper by Mike Thompson "Transmission Line Settings Calculations – Beyond the Cookbook Part II" that is available for free on SEL's website. This paper has a good section on SIR, and we are requesting that a sub group gets formed and that sub group then reviews Mike's Paper and works on incorporating the relevant SIR content into the appropriate sections. The working group discussed on where Mike's paper would be best added, and we are requesting that the subgroup review and advise the working group. Melvin Moncey Joseph, Romulo Bainy, Abu Zahid, Muhammad Hamid all volunteered.

<u>Action Items</u>

- Chris and Greg will review the outstanding assignments list and nudge all volunteers in February to complete the assignments and get them turned in by April 15th.
- A subgroup (Melvin Moncey Joseph, Romulo Bainy, Abu Zahid, Muhammad Hamid) will take Mike Thompson's paper " Transmission Line Settings Calculations – Beyond the Cookbook Part II " and review it and incorporate it into the appropriate sections of the D38 report.

Next meeting request - single session for 40 attendees with computer projector. Avoid conflict with D42, D43, D46

D39: Revise C37.104 IEEE Guide for Automatic Reclosing of Circuit Breakers for AC Distribution and Transmission Lines
Chair: Manish Patel
Vice Chair: Rafael Garcia
Secretary: Josh Lamb
Output: Revised IEEE Guide C37.104
Established Date: January 2018 (TF was established in Sept 2017)
Expected Completion Date: February 2022
Draft: 1.9 (submitted to RevCom)
Assignment: Revise C37.104, IEEE Guide for Automatic Reclosing of Circuit Breakers for AC Distribution & Transmission Lines

The working group met via a conference call on January 11th, 2022, at 9:20 am PT with 19 members and 26 guests.

Officers presiding – Manish Patel, Josh Lamb, Rafael Garcia
Officer recording minutes- Josh Lamb

Chair's remarks – Rafael Garcia is taking over as Vice Chair and Josh Lamb is taking over as Secretary of the WG.

The IEEE copyright and patent slides were presented.

Quorum was met. The meeting minutes for following were approved without any dissenting vote:
- August 25, 2021, WG conference call
- September 08, 2021, WG conference call
- September 21, 2021, WG meeting at the September 2021 PSRC

It was noted that the latest SA ballot was successful. The draft 1.9 of the guide is submitted to RevCom and SASB approval is expected in late March 2022.

Pending approval, the WG then discussed interest in developing a summary paper. Benefit versus drawbacks were weighed. The WG agreed that a new Task Force would be requested at the D-SC meeting to evaluate interest in forming a WG to develop a summary paper.

The meeting was adjourned at 9:40 am PST.

Motion made by Manish Patel and seconded by Kamal Garg:

Motion: *Create Task Force DTF50 to investigate the need to Create Summary Report on C37.104 IEEE Guide for Automatic Reclosing for AC Distribution and Transmission Lines.*

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.*

Members of D Subcommittee approved and voted to create Task Force DTF50. Manish Patel will be the chair of DTF50

Next meeting request to combine D39 & DTF50 - single session for 40 attendees with computer projector

D42: Revise C37.113, Guide for Protective Relay Applications to Transmission Lines
Chair: Jeffrey Barsch
Vice Chair: Rick Gamble
Secretary: Josh Lamb
Output: Guide
Established Date: 5/5/2020
Expected Completion Date: 2024
Draft: C37.113_newtemplate_12172021.doc
Assignment: Revise IEEE Std C37.113-2015, IEEE Guide for Protective Relay Applications to Transmission Lines

a) Officers presiding – Jeff Barsch, Rick Gamble, and Josh Lamb
b) Officer recording minutes – Josh Lamb
c) Call to order – Jeff Barsch
d) Chair's remarks – Copyright and patent slides presented. No issues identified.
e) Results of call for quorum – Quorum achieved with 23 members
f) Approval of Agenda (motion and second) – Taylor Raffield 1st, Abu Bapary 2nd.
g) Approval of Minutes of previous meetings (motion and second) – Sebastien Billaut 1st, Rafael Garcia 2nd.
h) Brief summary of discussions and conclusions including any motions.
    a. Discussed Travelling wave differential protection from WG D47 and whether this should be covered in D47 or the D42 guide. To be discussed by:
        i. Alla Deronja
        ii. Mat Garver
        iii. Ritwik Chowdhury
        iv. Normann Fischer
        v. Joerg Blumschein
        vi. Ryan McDaniel
        vii. Hardesh Khatri
        viii. Ilia Voloh
        ix. Muhammad Hamid
        x. Kamal Garg
        xi. Madhap Paudel
        xii. Ross Stienecker
        xiii. Olufemi Oyebanjo
        xiv. Taylor Raffield
        xv. Steve Klecker

b. Discussed Comments from various sections to be addressed by the assigned reviewers.
c. Monthly meetings to be held 1st Thursday of each month 11:00 to 12:30 ET to work on comments except May and September.
d. Discussed Single Pole vs Single Phase terminology. Pole discordance timers (Need to check the guide for a definition) and need to make the guidance consistent on whether pole or phase throughout the guide.

i) Action item: Review and editing teams are to complete edits to their sections of the guide by May 1, 2022. The document entitled "D42 Reviews and Assignments_12172021.xlsx" indicates the following:
   a. Column H indicates if the edits and writing assignments have been incorporated into the draft. Sections that still require work are indicated in this column by either the words 'partially' or 'no' and are highlighted in yellow.
   b. Column I indicates cases where someone has provided comments, but the team now needs to work on the comments and incorporate edits, if applicable, into the text of the draft. These cases are also highlighted in yellow.
   c. Document "D42 Reviews and Assignments_12172021.xlsx" is stored in iMeet Central in the Draft Documents -> Drafts in Progress folder along with the latest draft of the guide.
j) Recesses and time of final adjournment: Adjourned by Rick Gamble at 2:11 PM PST. Mat Garver 1st, Jörg Blumschein 2nd
k) Next meeting date and location at: Online meetings to start on February 3 from 11:00-12:30 ET and continue the first Thursdays of each month; next in-person meeting to be May 10, 2022, at Reno, NV PSRC meeting

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

D43: Effect of Distribution Automation on Protective Relaying (Report)
Chair: Greg Ryan
Vice Chair: Amin Zamani
Secretary: Joshua Hughes
Output: Technical Report
Established Date: January 2021
Expected Completion Date: January 2023
Draft: 0.3

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

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

Working Group D43 met in-person and virtually on January 12, 2022, at 09:20-10:30AM PST. There were total of 18 attendees in the meeting, 10 members and 8 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

j) Meeting started with the Chair, Vice Chair, and Secretary introducing themselves. In-person and virtual attendees also introduced themselves.

k) The Chair explained the requirements for membership, which is attending 2 out of the last 4 meetings. If anyone is interested to be a member of the WG and contribute, Please email the Chair (gryan2@ameren.com) and/or VChair (amin.zamani@ieee.org).

l) The Chair discussed the status and assignments of the report. Chair requested the WG members to provide their contribution by April 15, 2022, latest.

m) Chair and Vice-chair will send a reminder to the members and guests.

n) Swagata questioned the “relay speed” portion of the line sensors in the scope. Joshua provided context on new technologies for DA and both Joshua and Amin agreed that the scope could also include line sensors that do not operate at relay speed. The scope has been revised to match this change with these minutes.

o) Juan questioned if his material was too aggressive on providing details about how many and where to locate switches for sectionalizing. Greg recommended limiting the scope to sectionalizing in terms of DA and Amin brought up points about how sectionalizing can impact protection.

p) Juan asked if he could provide more details on short circuit levels during a temporary looped condition as some do not take this condition into account for fault studies. Both Greg and Jack agreed that more discussion on this topic in the paper is warranted.

q) Juan noted that the use of multiple setting groups in relays is not taken advantage of to the full extent and will provide some further wording in the paper. Jack noted that the existing section in the report referred to transmission lines and should be limited to distribution lines.

r) The Chair noted the new Volt Var Optimization section and requested reviewers. Juan will lead the review with Colleen and Amin supporting.

s) The chair noted the new Distribution Protection and DTT sections and requested reviewers. Greg will lead the review with Jack and Swagata supporting.

t) Colleen requested review of additions made to the DER/Microgrid section. Juan will review the additions.

u) It was discussed if it is worth assigning a new section for the impact of the microgrid on the host grid protection. The team will review the existing draft and make a decision later.

v) Juan requested adding references to papers used to support the documentation added in the report.

w) Jack questioned if faulted circuit indicators are being covered in this report. Swagata is covering the topic and will work with Jack as well.

x) The Chair will send out the latest draft for review.

Next meeting request - single session for 30 attendees with computer projector. Avoid conflict with D38, I47, C38, & C25.

D44: Revise C37.114, IEEE Guide for Determining Fault Location on AC Transmission and Distribution Lines
Chair: Sebastien Billaut
Vice Chair: Karl Zimmerman
Secretary: Looja Tuladhar
Output: Guide
Established Date: January 2020
Expected Completion Date: September 2024
Draft: 0
Assignment: Revise IEEE Std C37.114-2014, IEEE Guide for Determining Fault Location on AC Transmission and Distribution Lines

Working group D44 met January 11, 2022, at 3:30 PM PST, Face-to-face and virtual online with 26 attendees.
3 were new attendees.
14 voting members were present out of 20 current voting members, so the quorum was met.
0 attendees requested to become voting members.

The Chair, Sebastien Billaut presided over the meeting. He brought the meeting to order and showed the agenda, the IEEE copyright guidelines slide for IEEE working group meetings. Amir Makki made a motion to approve the January 2022 meeting agenda, seconded by Yu Liu and approved.

Vice-Chair Karl Zimmerman and Secretary Looja Tuladhar recorded minutes. Karl Zimmerman and D SC Chair Bruce Mackie moderated the chat window.

The Chair inquired about voting to approve the minute of the September 2021 meeting. Karl Zimmerman made a motion to approve the September 2021 meeting minute, seconded by Angelo Tempone and approved.

The Chair discussed the assignments:
R1: Yu Liu reviewed the “Definitions, acronyms and abbreviations section”, and does not have any comments.
R2: Mohammad Zadeh to follow up with Lead Abu Bapary on the contribution to the section
R7: The chair asked the members and guests to volunteer as a lead to this section. Since there is no volunteer at the moment, the chair will reach out to Norman Fisher.
E2: The lead Looja Tuladhar made an inquiry about the source for the drawings in the guide. Karl Zimmerman will check with the previous WG chair of this guide and get back to Looja. Also, the WG Chair and Don Lukas will follow up with IEEE SA on the requirement of updating the drawings in the guide.

Amir Makki made a motion to adjourn the meeting, seconded by Yu Lin. There was no opposition, so the meeting was adjourned.

For the next meeting, if face-to-face, we will need a projector and a room for 35.
Avoid conflict with C38, D30, D35, D38, D42, K22, K27, K29.

D45: Protection Methods to Reduce Wildfire Risks due to Transmission and Distribution Lines
Chair: Jonathan Sykes
Vice Chair: Scott Hayes
Secretary: N/A - Bruce has agreed to help with the secretarial work.
Output: Technical Paper
Established Date: September 2020 (1st task force meeting)
Expected Completion Date: Jan 2023 (under an aggressive schedule)
Draft: None
Assignment: Prepare a technical report to the line protection subcommittee to "document protection methods used to reduce wildfire risks due to transmission and distribution lines."

This was the 3rd meeting of the D45 WG.

D45 WG met on 1/11/22 at 2:20pm (California Time)
Members = 39 listed
Attendance = 68 (39 guests, 29 members) – Quorum Established

Jonathan opened the meeting with the agenda. The team reviewed the minutes from the last WG and approved the minutes. We reviewed the scope and inclusions and discussed open topics. The team went through the organization of topics and subgroup categories. There was discussion about several topics that could be included. No new items were included.

Scott Hayes led a discussion about the various sections including the need for writers and leads of each section. Volunteer writers were added, and leads were assigned. There was group discussion on the scope of each section and the requirements of the leads.

The Chair and Vice-Chair took an action item to develop the expectations and assist the leads.

Draft – no draft yet, the team started working on several sections and the outline. Some writing assignments were received.

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

D46: Summary Paper for IEEE C37.230, Guide for Protective Relay Applications to Distribution Lines
Chair: Brian Boysen
Vice Chair: Chris Walker
Secretary: Chris Walker
Output: Technical Report
Established Date: May 2021
Expected Completion Date: January 2022
Draft: 1.6
Assignment: To develop a summary paper for C37.230-2007, "Guide for Protective Relay Applications to Distribution Lines".

Presiding Officer: Brian Boysen
Minutes Recorded by: Chris Walker

Agenda:

1. Introductions
2. Review and discuss D subcommittee review comments
3. Discuss Next Steps

Minutes:

- The working group met on Wednesday January 12, 2022, 10:40 AM PST
- There was a total of 28 people in attendance with 12 members.
- Brian Boysen presented status of summary paper
- Reviewed comments made by subcommittee members
- Discussion on length of summary paper and decision was made to attempt to shorten the paper
- Assignments made to review sections to shorten the paper
    - Section 1 – Brian Boysen
    - Section 2 – Pat Carroll
    - Section 3 – Bruce Mackie
    - Section 4 – Juan Gers
    - Section 5 – Qun Qiu
    - Section 6 – Josh Lamb
- Decision made to add conclusion to the paper. Brian Boysen to write conclusion section
- Discussion on the format that the summary paper should take.
- Brian Boysen to send out updated version of the paper with subcommittee comments included.
- After reviews are completed, paper will be sent to working group for approval and then resubmitted to subcommittee
- Reviewed non-editorial comments from the subcommittee
- Review minutes from previous meetings
- Next Steps
    - Hold meeting prior to May Meeting 3rd Week of March
    - Revision assignments due Mid-March

Next meeting request - single session for 30 attendees with computer projector. Avoid conflict with D38

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

The WG D47 met with 21 voting members, 2 non-voting members, and 23 guests on Wednesday, January 12, 2022, at the JTCM 2022 meeting. One guest joined the WG as a voting member.

The WG chair displayed the IEEE-SA patent and Copyright policy slides as required for the working group with PAR related activities. There were no patent claims from the meeting participants.

The meeting agenda was approved. Motion: Matt Black, 2nd: Taylor Raffield. There were no objections.

The quorum was met, so the WG voted to approve September 22 PSRC meeting minutes. Motion: Steve Klecker, 2nd: Matt Black.

The PAR has been approved and will expire in December of 2025. This work is a joint venture between the PSRCC leading the project and PSCCC co-sponsoring it.

The chair reviewed the previously distributed clause review assignments. Most of them were not submitted yet, so the chair made a request to submit them by March 15, 2021. Please email them to aderonja@atcllc.com.

Clause 4: Dinesh Gurusinghe [lead], Sudarshan Byreddy, Xavier Manel-la Pujol, Abu Zahid.
Clause 5: Jayaprakash Ponraj [lead], Gopal Gajjar, Fred Agyekum.
Clause 7: Bruce Mackie [lead], Qun Qiu, Vamsi Krishna Vasireddy, Kamal Garg, Jim O'Brien.
Clause 8: Sughosh Kuber, Matt Black, Arun Shrestha, Ian Tualla.

There was a discussion concerning Annex A that describes differential protection of power lines/cables based on Rogowski coil current sensors. Previously, the WG planned to move the Annex A material to the body of the guide, likely Clause 5. However, at the meeting, a point was made that we should not discuss the current sources (under which Rogowski coils fall along with conventional CTs). The current differential function uses their output for measurement comparison. A proposal was made to remove the Annex from the guide. Other participants felt it should remain until we address Clause 6 presently titled *Communication Scheme Design*. The team agreed to decide later on the Annex placement. Another option is to retain it as is.

The chair mentioned that the traveling wave topic that was previously sent to WG D42 to determine whether it belongs to the line protection guide rather than in the present guide if it is not considered a current differential operating method. It was discussed at the D42 meeting on 01/11/2022. The opinions split, and a D42 sub-team was formed to address this topic separately with the D47 member participation. D47 will set up a webex to develop a current differential definition and determine whether the TW is the current differential operating method. This will decide in which IEEE PSRCC standard the TW protection method will reside: the line guide C37.113 or line current differential guide C37.243.

A draft of the new Clause 6 outline was presented for discussion. It addresses the vital communication aspect of the line current differential function. Previously, the WG considered a re-arrangement of this Clause to streamline its contents to be easier understood by protection engineers. A goal was to have the communication material as related to the line current differential function addressed in the guide, so the users may find all the information in a single source rather than in multiple sources. This has led to the joint sponsorship of the guide by two PES committees. However, at the meeting, a concern was made that the communication topic is very broad and already fully addressed in other documents. Addressing it in this guide may cause duplication, and this topic may not be relevant to the scope of this guide. Another webex before a May 2022 meeting will be set up to further discuss this issue, and the PSCCC members who volunteered to participate in D47 are strongly encouraged to attend.

Next meeting request - single session for 40 attendees with computer projector. Avoid conflict with CTF48, K22, K31, I2

D48: Create Report on Single-phase Trip and Reclose on Transmission Lines
Chair: Kamal Garg
Vice Chair: Ilia Voloh
Secretary: N/A
Output: Report
Established Date: Sep 2021
Expected Completion Date: Dec 2023
Draft: None

Date: Monday, Jan 10, 2022
Time: 3.40 – 4.50 PM (PST)
Venue: In Person/WEB Meeting JTCM, Garden Grove, CA

Proposed assignment for WG: To prepare a report focusing on the considerations associated with single-phase tripping and reclosing on transmission lines.

First meeting of D48 working group on Monday, January 10, 2022, at 3.40 pm PST in a single session with 31 attendees. We are working to establish the membership of working group.

1. Second meeting of the working group. 31 PSRC members in attendance.
2. No comments on the prior meeting.
3. Ilia presented the goals and scope of this report.
4. Ivan from AEP presented AEP 765kv SPT line practice. Some good questions and discussion. Qun from AEP also answered some of the questions, along with Ivan.
5. Kamal presented the guide outline and existing assignment. Many other volunteers also agreed to review the document and contribute.
6. Ilia presented the section on series compensated lines. Good discussion.
7. Kamal presented the general practice on SPT and CIGRE document and world practices on SPT.
8. Mukesh and Pratap have some additional questions on AEP practices. Follow up discussion needed with AEP.
9. Karl Zimmerman indicated that this work should work closely for series compensated lines D37 sections. WG will be discussing this with D37 group chair.
10. Adjourn 4:48 PM PST

Next meeting request - single session for 40 attendees with computer projector.

DTF49: **Determine Recommendation on the term Single-Phase Trip verses Single-Pole Trip**
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. If a working group is not formed, make a recommendation regarding the term.

Some members of D48 met to create a recommendation. The DTF49 chair agreed and forwarded the finding and the recommendation to the D42 WG on Revise C37.113, Guide for Protective Relay Applications to Transmission Lines. The chair of D42 WG found the proposed change to be reasonable and will bring to discussion on the finding and the recommendation within their working group.

The finding and recommendation are as follow:

Single-pole or single-phase term usage

A. Historical background IEEE PSRC term usage

It appears that IEEE preferred usage is “single-phase”. PSRC veterans recall PSRC debate in 90s arguing that “single-phase” better represents tripping and reclosing functionality for relaying community. Subsequently, following documents support IEEE “single-phase” preference:

- “Single phase tripping and auto reclosing of transmission lines-IEEE Committee Report “, Published in: IEEE Transactions on Power Delivery (Volume: 7, Issue: 1, Jan 1992).

Abstract:
The present work has been prepared as an aid in the effective and uniform application of the single-phase tripping and auto reclosing of transmission lines. The benefits of application, relaying techniques, performance, and statistics are discussed. Such areas as system stability, single-phase tripping and auto reclosing, methods of secondary arc extinction, and related system requirements are covered. Descriptions of the various devices, definitions of terms, and references to other technical publications are included to make the present work useful not only to relay engineers, but also to other technical people who are responsible for the installation and operation of such systems

B. Current IEEE PSRC term usage

IEEE online dictionary is stating both “single-phase” and “single-pole” terms:

- “single-phase tripping and reclosing”, IEEE Std C37.113-2015

Opening the interrupters of a circuit breaker in one phase only to isolate the faulted phase in the event of a single-phase-to-ground fault and reclosing them after some time delay.

- “single-pole autoreclosing”, IEEE Std C37.104-2021

Refers to the autoreclosing of one phase of a circuit breaker following a designed single-phase trip for single-phase-to-ground faults. Also referred to as single-phase autoreclosing.

C. IEC term usage

IEC is using both “single-pole” and “single-phase” terms.

- IEC 60050 - International Electrotechnical Vocabulary gives following definition for single-pole reclosing:

single-pole reclosing equipment
single-phase reclosing equipment

automatic reclosing equipment intended to reclose one pole of a circuit-breaker following a single-phase power system fault

- IEC 61850-7 “Communication networks and systems for power utility automation – Part 7-500: Basic information and communication structure – Use of logical nodes for modeling application functions and related concepts and guidelines for substations” using terms “single-phase trip” and “single-phase control”

Figure 15 – Three-phase (left and middle) and single-phase control (right) with process bus
Figure 25 – Three-phase trip (left) and single-phase trip (right) with process bus

D. CIGRE term usage

CIGRE is equally using both “single-pole” and “single-phase” terms in their publications as shown below. Looks like it’s authors preference.

- ISH2017_471: Development of an adaptive single-pole auto-reclosing concept for VSC HVDC with fault current controllability
- C4-105_2018: Investigation of processes during single-phase auto reclosing on transmission lines with controlled shunt reactors
- 39-08_1984: Investigation and evaluation of single-phase switching on EHV networks in the United States
- ELT_240_4: Modern Distance Protection Functions and Applications. Section 2.4.7 “Single-pole Tripping Considerations”.

E. Relay manufacturers

It appears all major relay manufacturers including, ABB, Siemens, SEL and GE are using term “single-pole tripping and reclosing”.

F. Other considerations

In protective relays all terminology and functionality are refereed to “phase”. We use words Phase Selector, protection function operation in Phase A/B/C and Trip Phase A/B/C rather than using “Pole”.

It makes sense to continue using “single-phase tripping and reclosing” given IEEE terminology history and in definitions give equal priority to both terms in all upcoming normative PSRC documents.

Circuit breakers at 500kV and higher have multiple poles.

Our proposed changes (in red):

Single-phase tripping and reclosing (single-pole tripping and reclosing)

***Opening the interrupters of a circuit breaker(s) in one phase only to isolate the faulted phase in the event of a single-phase-to-ground fault and reclosing them after some time delay*.**

The assignment of DTF49 is complete and recommendation was made to the D42 WG. There was a motion by Kamal Garg and seconded by Alla Deronja to disband DTF49.

Members of D Subcommittee voted to disband DTF49.

Liaison Reports
T&D Committee / Distribution Subcommittee

The T&D Committee / Distribution Subcommittee meeting was held virtually, 10 -12 January 2022. The next planned meeting will occur during the IEEE PES General Meeting, July 17 – 21, 2022 in Denver, CO.

The Distribution Subcommittee is comprised of working groups focused on Distribution Reliability, Switching and Overcurrent Protection, Smart Distribution, Distributed Resource Integration, and Stray and Contact Voltages. Most recently the Volt-Var Control and Optimization Task Force has been elevated to a Working Group. Two new working groups have been formed: Distribution Reliability and Distribution Resiliency. 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 Vacant, Vice-Chair Kate Cummings, Secretary

P1854: Guide for Smart Distribution Applications.
Scope: This guide identifies and 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. This guide includes discussion on control, communications, and cybersecurity considerations when deploying smart distribution applications.

The Trial Use Guide was published on 31 August 2019. As a result of comments received during the balloting, a new PAR has been approved to revise the guide with PSCC and PSRC (H Subcommittee) 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 guide is currently in re-ballot.

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.

The working group has submitted a PAR: P3102, Standard for Conservation Voltage Reduction (CVR) Data Collection and Management Procedures.

Scope: This standard specifies a set of procedures for CVR data collection and management, allowing improved verification and quantification of the benefits of CVR programs.

Purpose: Utilities face a lot of challenges for conducting measurement and verification in CVR deployed feeders. This standard specifies data management and collection practices assisting in the: Identification of cycling schedule disruptions and required data cleaning; compression rates to archive values; detection of accurate CVR status; identification of load shifts and how to deal with these in terms of measurement and verification; data cleaning and reconstruction approach(es) for anomalous data; approach to determine CVR factor range and system-level CVR factor; determine data adequacy based on accurate CVR status, power and voltage data; methodology selection and assumption validation based on data availability.

Working Group on Switching & Overcurrent Protection
http://grouper.ieee.org/groups/td/dist/sop/
Clay Stocklin, Chair Tyler Jones, Vice Chair Masoud Davoudi, Secretary

P1806 “Guide for Reliability Based Placement of Overhead and Underground Switching and Overcurrent Protection Equipment” was published on 6 August 2021.

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.

Task Forces in the Distributed Resources Integration Working Group have been established for Microgrid Design Considerations (in collaboration with PSRC C38 working group), Energy Storage, and DER Interconnection.

D Subcommittee liaison to T&D Committee / Distribution Subcommittee, Fred Friend, will be stepping away from the T&D Committee. New liaison to T&D Committee / Distribution Subcommittee is to be determined.

Old Business
None

New Business
None

General Discussion
None

Line protection operations of interest
None

Adjournment

H6: IEC 61850 Application Testing
Chair: C. Sufana
Vice Chair: B. Vandiver
Output: Summary Paper
Established: January 2021

Assignment: to write a summary paper of technical report: Application Testing of IEC 61850 Based Systems Protection and Control Systems PES-TR84.

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

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

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

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

There were 7 voting members, 1 non-voting member, and 14 guests present.

After seeing the patent slides and going over the minutes, the working group worked on updating the summary paper by removing additional sections of the technical report. There was discussion as to what format the summary paper should be in and who the intended audience could be. Charlie indicated he would check with IEEE HQ to get their input.

The working group will meet at the next PSRC meeting to go over the summary paper. It is also anticipated that the working group may meet before the next PSRC meeting.

Charlie Sufana
H6 Chair

Voting members attending: 7 out of a total of 19 voting members

NAME	AFFILIATION
Charles Sufana	Retired

Jay Anderson	ComEd
Christoph Brunner	it4power
Jason Buneo	General Electric
Xiangyu Ding	S&C Electric Company
Dinesh Gurusinghe	RTDS Technologies Inc.
Aaron Martin	Bonneville Power Administration

Non-voting members attending: 1 out of total of 14 non-voting members

NAME	AFFILIATION
Daniel Nordell	Xcel Energy

Guests attending 14

NAME	AFFILIATION
Evandro de Oliveira	RC-US SI DG EA SPRO
Kamal Garg	Schweitzer Engineering Laboratories, Inc.
Abel Gonzalez	Megger
Byungtae Jang KR	KEPCO
Andre Felipe Silva Melo	TBD
Hugo Monterrubio	Beckwith Electric
Gayle Nelms	SEL
Juan Fernando Piñeros Saldarriaga	TBD
Craig Preuss	Black & Veatch
Mohit Sharma	Megger
Tuan Tran	TVA
Don Ware	Power Grid Engineering
Jackie Wilson	Ameren
Karen Wyszczelski	Schweitzer Engineering Labs

H17: <u>Establishing links between COMTRADE, IEC 61850 and CIM</u>
Chair: C. Brunner
Vice Chair: A. Apostolov
Output: Report
Established: 2010
Expected completion date:

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

Working group H17 met on Tuesday January 11, 2022.

The hybrid meeting was hosted by Christoph Brunner and was attended mostly virtually by 13 members and guests.

The meeting agenda was focused on the comments resolution of the report with specific attention on the technical comments.

Christoph Brunner led the discussion based on which the participants were able to complete the task and all comments resolutions will be reflected in the next revision of the report.

For the May meeting we need room for 20 people and projector.

H22/C19: Guide for Categorizing Security Needs for Protection Related Data Files
Chair: Amir Makki
Vice Chair: Cesar Calix
Secretary: Hugo Monterrubio
I-Meet Administrator: T.W. Cease
Output: Guide - PC37.249
Established: January 2014
Expected Completion Date: December 2022
Expected Final Draft: 8.2

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

January 2022, Meeting Minutes:

The WG met on time with 11 colleagues in attendance. Quorum was established (6 voting members attended). The Chair informed the WG that:

The PAR extension request for another year was approved by NesCom
The PAR revision request to change from PCA to PAC was also approved by NesCom
The balloting results are:
72 accepted the ballot invitation, 54 casted their votes
130 comments were submitted by 9 voters, 90 of the comments were submitted by 1 voter

The WG did a high level review of the balloting comments and then focused on forming a comment resolution group (CRG). 7 of the attendees volunteered to be members of the CRG with the objective of addressing the comments and completing the re-voting process before the next meeting.

The WG plans to meet again during the May meeting to continue their work on the balloting results.

Attendance List:
Amir Makki (Member)
Preuss, Craig M. (Member)
T W (Member)
Charlie Sufana (Member)
Hugo Monterrubio (Member)
Thibodeau, Eric (Member)
Malia Zaman (Adviser)
Jim Hackett (Guest)
Thomas Rudolph (Guest)

Shane Haveron (Guest)
Aaron Martin (Guest)

H27: PC37.251 Standard for Common Protection and Control Settings or Configuration Data Format (COMSET)
Chair: Mario Capuozzo
Vice Chair: Benton Vandiver
Secretary: Daniel Sabin
Output: Standard
Established: 2013
Estimated Completion Date: December 2023
Draft: 4.0

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

A. Meeting Location and Time

Date and Time: Monday, 2022 January 10 (1:00 to 2:10 PM Pacific Time)
Meeting Location: In-Person with Remote Attendees
Chair: Mario Capuozzo
Vice Chair: Benton Vandiver
Secretary: Daniel Sabin
The meeting was chaired by Mario Capuozzo. Minutes were recorded by Dan Sabin.

B. IEEE PC37.251 Project Scope and Purpose

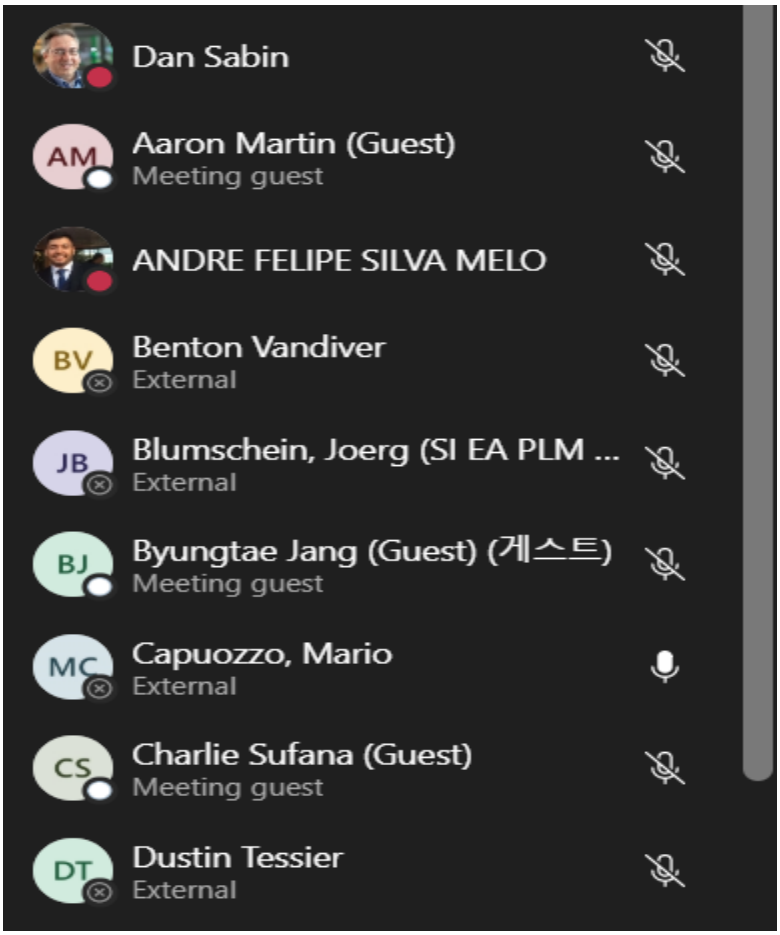
Scope: This standard defines a common format for protection and control configuration or settings data files based on the IEC 61850 System Configuration Language (SCL) format. The format will specify organizational structure and methods of content extension
Purpose: The purpose of this standard is to provide a common format that allows settings data for protection and control functions to be exchanged within systems of components from different manufacturers and third party tools. An instantiated COMSET file will contain standardized IEC 61850 logical nodes and allow vendors to add any extensions that are required.

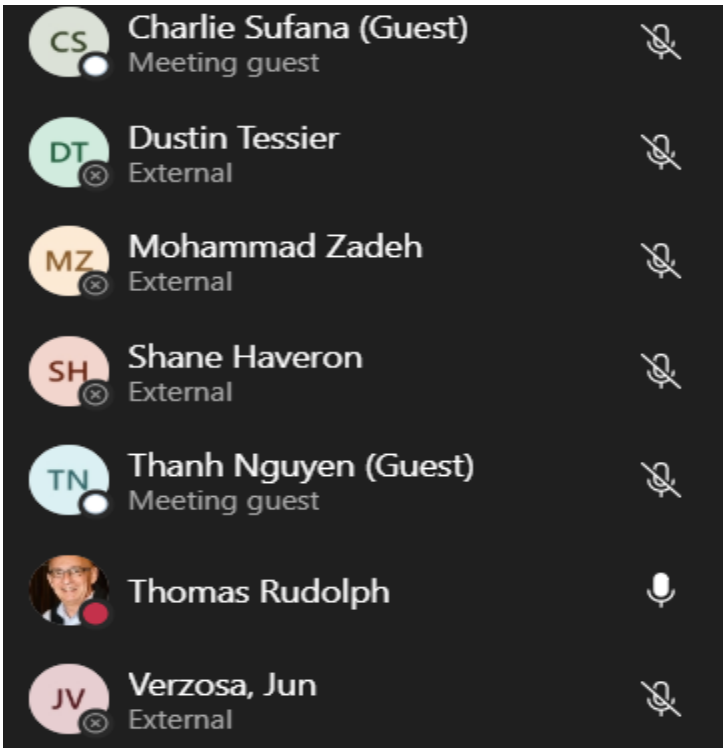
C. IEEE PC37.251 PAR

The initial project authorization request (PAR) for PC37.251 was approved by IEEE New Standards Committee (NesCom) on 2016 February 05, with an expiration date of 2020 December 31. However, an extension for this project was approved by IEEE New Standards Committee (NesCom) on 2020 December 2. The expiration date for the PC37.251 project is **2022 December 31**.

D. Meeting Attendees

The following 10 people attended the meeting on November 22.


Dan Sabin
AM
Aaron Martin (Guest)
Meeting guest
ANDRE FELIPE SILVA MELO
BV
Benton Vandiver
External
JB
Blumschein, Joerg (SI EA PLM ...
External
BJ
Byungtae Jang (Guest) (게스트)
Meeting guest
MC
Capuozzo, Mario
External
CS
Charlie Sufana (Guest)
Meeting guest
DT
Dustin Tessier
External

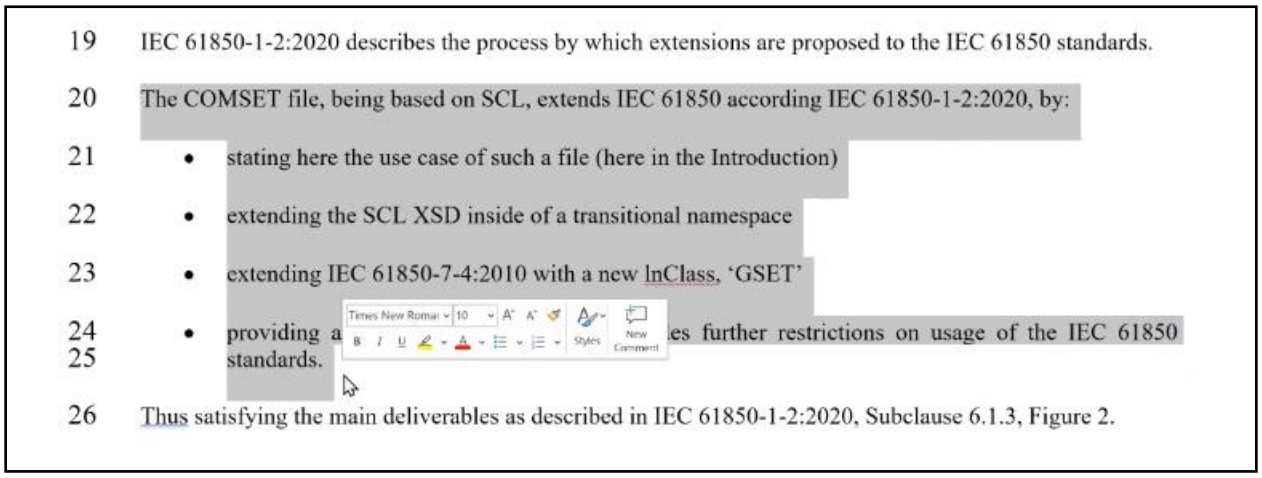

CS
Charlie Sufana (Guest)
Meeting guest
DT
Dustin Tessier
External
MZ
Mohammad Zadeh
External
SH
Shane Haveron
External
TN
Thanh Nguyen (Guest)
Meeting guest
Thomas Rudolph
JV
Verzosa, Jun
External

Herb Falk joined as well.
Melvin Joseph Moncey attended in person.

First Name	Last Name	Affiliation
Mario	Capuozzo	Doble Engineering Company
Scott	Cooper	Omicron
Herb	Falk	Outside the Box Consulting Services
Jean-Sebastian	Gagnon	Vizimax
Michael	Häcker	Schneider Electric
Theo	Laughner	Lifescale Analytics
Thomas	Rudolph	Schneider Electric
Daniel	Sabin	Schneider Electric
Harsh	Vardhan	GE Grid Solutions
Jun	Verzosa	Doble Engineering Company

E. Meeting Discussion

Mario reviewed the latest version that include a proposal for primary and secondary values.
Shane Haveron said he was OK with having a method in place to handle primary and secondary values.



Discussed whether it is possible to share COMSET draft with IEC H10 Working group. IEEE SA will work on creation of a draft-sharing liaison agreement for H27 in the same way that H30 has a draft-sharing liaison (see https://www.iec.ch/dyn/www/f?p=103:46:0::::FSP_ORG_ID:27720).

At last meeting in November, question on common data class on floats but not Booleans but not for floats. Herb explain that data attributes for status provides INT32 for status values that would be larger than a one-bit Boolean. Further discussion focused on whether 64-bit status values are needed.

Working group needs to vote to move the draft standard to the Sponsor for IEEE Standards Sponsor ballot.

Chair conducted a round table discussion on the

Previous Meeting Notes

The working group reviewed text proposed for Clause 7 provided by Michael Häcker when importing and exporting SCL setting into/out of a device. Values could be converted between primary values, secondary values, and per unit values, which could result in precision reduction during rounding. Additional discussion focused on including requirements for the number of significant digits required to be maintained to reduce the effect of floating-point rounding during conversion. Jean-Sebastien Gagnon presented a proposal on how to handle conversions.

Action Item: Jean-Sebastien Gagnon should formalize the proposal for the next draft.

The working group discussed issues related to using an IEC 61850 Common Data Class (CDC) as an attribute for IEEE COMSET DOTypes. There was a reminder that we likely would need to add a string data type. A potential problem with using CDC identified by Herb Falk previously was left unresolved in this meeting.

Action Item: Mario Capuozzo is to follow up with Herb Falk on his concern.

F. Next Meeting

To be scheduled virtually on Teams in the next few months (February/March).

H30: <u>IEC 61850 User Feedback</u>
On-Site Host: C.Brunner
Chair: D. Maragal
Vice Chair: D. Tessier
Secretary: A. Martin
Output: User Feedback to IEC 61850 TFUF, UCA, TISSUE Task Force & Vendors
Established: September/2014
Estimated Completion Date: Ongoing

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

Agenda
- IEEE H30 Logistics
- Update on IEEE H30 Issues
- Key Decision Points for IEEE H30
- Update on IEC 61850 Configuration/System Management
- Future Topics

1. IEEE H30 Logistics
- IEEE SA has confirmed there are no requirements for “Forums” in terms of keeping and

approving minutes. All members/guests have equal say, so it's difficult to get consensus.

- Aaron Martin agrees getting minutes approved is not necessary. There is also a need to educate members, as well as provide feedback. Discussions are needed so members better understand the issues that are put forward to TFUF/TISSUE database. There is a need to formalize the process – including education of members – on how issues are put forward.
- **Deepak Action:** Develop process on how to formalize feedback to TFUF and TISSUE database

2. Update on IEEE H30 Issues

- Reviewed action items from December meeting.
- **UCA/Herb Action:** Record a tutorial on how to use/apply filters within UCA's 61850 Certificate database (Redmine). Future session will focus on how to use UCA Redmine site to access certificates.
- **Deepak Action:** Review IEC 62351-7, 90-4, 90-28 to determine if additional requirements are needed outside these three documents. Relates to Redmine Issue #555.

3. Key Decision Points for IEEE H30

- Should UCA deprecate 9-2LE conformance test program?
  - **Consensus was to wait at least one year, but group agreed there needs to be a break-away point.**
  - Discussed the differences between 9-2LE and IEC 61869
  - Explained that 9-2LE is based on Ed.1 and is no longer being maintained.
  - Recommended UCA first formalize that 9-2LE is deprecated, and the market is not to expect 9-2LE Ed.2. 9-2LE has been superseded by IEC 61869, which has provisions for backwards compatibility with 9-2LE
  - IEC 61869 is an all-encompassing standard that incorporates instrument transformer characteristics **and** communication requirements (SV profile).
- Summary of H30 Issues
  - To be discussed in future meeting
- Mandatory Support of LGOS/LSVS
  - To be discussed in future meeting
- Improvements to TISSUE Process
  - To be discussed in future meeting

4. Update on IEC 61850 Configuration/System Management

- To be discussed in future meeting

5. Future Topics

Deepak Action: Organize webex to discuss remaining items.
Deepak Action: Request two meeting slots for next IEEE PSRC meeting.

Closed meeting at ~3:40AM.

H31: <u>Common Protection & Control parameters for COMSET</u>
Chair: D. Maragal
Vice Chair: A. Apostolov
Output: Report
Established: September 2015
Estimated Completion Date: September 2022
Draft: 6

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

On-Site Host: C.Brunner

Working group H31 met on Tuesday January 11, 2022.
The hybrid meeting was hosted by Christoph Brunner and was attended mostly virtually by 10 members and guests.
Discussions on the need for review of the IEC 61850 function model based on the experience and analysis of the existing models by Deepak Maragal included:

- Fundamental problem with IEC 61850-7-4 logical representation
- Review of parameters with redundancies
- Proposed Common model & Solution of creating common dictionary of attributes

An important part of the discussion included issues with data objects inheritance between common logical node classes and the need for more consistent implementations by different manufacturers.
For the May meeting we need room for 20 people and projector.

H40: Databases used in SAS
Chair: T. Laughner
Vice Chair: M. Capuozzo
Output: Guide
Established: 2017
Expected completion date: December 2022
Draft: D2

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

Theo Laughner
James Carroll
Mario Capuozzo
Anthony Johnson
Galina Antanova
Hugo Monterrubio
B.T. Jang

Minutes

Chair introduced H40.
Reviewed patent/copyright slides.
Introductions
4 voting members present out of 8 members. Quorum not established.
Action items were reviewed. Theo's two action items come first. A) Produce clean draft. B) Clean up membership roster.
The new roster was presented.

Then reviewed PAR. Expires in December 2022. Need to move through review process.

MEC, Public, Voting, Balloting. Requires TF approval but also H main committee, then the PSRC.
No quorum, so can't approve it for H or PSRC meetings. Must be done in May.

Theo offers to schedule another meeting for a vote on the document to release to H main committee.

Chapters 1 2 3 4 5 6 and 8 9 are in good shape. Deficiencies in chapter 7.
Galina did send in her revisions for Chapter 7.

Galina commented on PAR, believes we just need to be in ballot by December 2022, not completed.

Chair presented the draft standard. Section 3.1 needs some expansion. Tony offered to fill it in.

Galina offers comments: Document is very close. Seems that Section 4 should have an introductory clause into DB systems. The reference architecture in Section 4 perhaps needs more introduction.
Perhaps 4.5 should move above the reference architecture.
Section 5 could be grouped with 4, 5 and 6 could both be moved in front of section 4. They could even be
introductory clauses to section 4.

Galina presented her contribution. 4.1 to 4.4 are applications, suggests Storing IED Health to Storing Asset Health.
Galina feels that some of the items regarding specific database types could be broader strokes.
Galina led a discussion on the overall organization and presentation of specific database details and implementatoin details.
Section 4: [Talk about what we store, then we talk about concrete systems for storing that data and how it's structured.]

Theo discussed having both a reference architecture and a specific example architecture that is more concrete, and represents
a specific use case, rather than just being generic. Maybe an architecture for synchrophasors, other time series data, settings.

Chair will develop the specific architecture. Mario will polish it.

Galina suggests that benefits should be at either beginning or end, not in the middle.

Section 8, testing was reviewed. Not a lot of data there.

Galina reviewed more of her comments in her draft contribution.

Discussion about performance requirements. These will go stale. Probably we shouldn't list specific performance metrics,
like throughput and read/write speeds, as they will age faster than the rest of the document. More or less, discuss what metrics
to consider.

Anthony

For database types, rather than list types, boil this into a paragraph that talks about types and how you address them.

H41: Revision of IEEE 1646 Communication Delivery Time Performance Requirements
Chair: D. Holstein
Vice Chair: T.W. Cease
Output: Standard
Established: 2017
Completion Date: 2021
Draft: 5E4

Assignment: Revision to IEEE Standard 1646-2004

Assignment: Revision to IEEE Standard 1646-2004
The WG met on Tuesday, with 11 members and 4 guests in attendance. A quorum was present. This was the 23rd meeting. Attendees introduced themselves and affiliation.
The call for patents was presented – no response.
The copyright slides were presented.
The agenda was reviewed, and Mike Dood made a motion to approve with a second by David Dolezilek motion approved without change.
All past minutes are approved. The previous meeting (#22) lacked quorum and therefore was an informal meeting with no minutes to be approved.
Those attending focused on the following topics:
1. The lack of recording service reduced our ability to make sure we have accurate minutes.
2. Dennis Holstein approved Wayne Pawley as a new member based on past attendance.
3. Dave Dolezilek led a very active discussion on how best to harmonize the tables of message delivery time with the new technologies. The underlying requirement is to specify the maximum delivery time or latency for each application which is implementation agnostic, i.e., does not depend on the implementing technology. This discussion will continue in their monthly virtual meetings.
4. Dennis will send out a Doodle pole to determine the best Monday date in February 2022 for the next regular virtual meeting. H41 plans to conduct virtual meetings every month to complete the work.

Attendee List

Members	
Dennis Holstein, Chair	OPUS Consulting Group
T W Cease	Consultant
Craig Preuss	B&V
Dave Dolezilek	SEL
Jun Verzosa	Doble
Malcom Swanson	INIVEN
Eric Thibodeau	Hydro-Quebec
Bruce Muschlitz	NovaTech
Jay Herman	EPRI
Mike Dood	SEL
Tom Dahlin	SEL

Members	
Guests	
Anthony Johnson	SCE
Hugo Monterrubio	Beckwith Electric
B. T. Jang	
Malia Zaman	IEEE

For the May 2022 meeting, H41 will need a room for 20 people with supporting projector and teleconferencing capability.

H44: Monitoring and Diagnostics of IEC 61850 GOOSE and Sampled Values Based Systems (PC2030.100.1)
Chair: Aaron Martin
Vice Chair: Ralph Mackiewicz
Co-Vice Chair: David Dolezilek
Output: Guide
Established Date: 2018
Expected Completion Date: 2022
Current Revision: 2.1

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

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

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

H44 met with 8 members, 6 attendees in person, and 25 attendees online.
Dolezilek moved to open meeting, second made but not recorded
Aaron Martin brought the meeting to order and discussed September 21st, 2021 meeting minutes.
Scott Mix moved to approve the minutes.
Karen Wyszcelski seconded
Reviewed patent slides with no questions
Reviewed copyright policy with no comments
Old business – reviewed H44 Assignment Scope
Aaron Martin acknowledged contributions from Jose Ruiz and Karen Wyszcelski.
Dave Dolezilek presented his 45 page contribution. The plan is to meet bi-weekly to integrate Dave's contribution into Draft 2.1.
Motion to adjourn Scott Mix with second by Jose Ruiz

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

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

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

Meeting # 19 (Jan 12, 2022) Minutes – 2022 JTCM Hybrid meeting

The WG met on January 12, 2022 with 51 attendees including 32 members - 21 of them are voting members (out of 26) and 11 are non-voting members (out of 16). Two of the attendees were present in-person and others joined virtually.

Chair presided over the meeting and Secretary recorded the minutes of the meeting. Quorum was achieved during the meeting. IEEE patent policy and other guidelines for WG meetings were reviewed. No additional comments were received for the minutes of the September 2022 virtual meeting and minutes were approved.

Chair provided a brief overview of Draft 5.0 for the benefit of guests and first time attendees. Draft 5.0 of the guide was posted on Sep 22, 2021 in C37.300 workspace in iMeetCentral for WG members review and comments along with informal votes to check the readiness of Draft 5.0 for IEEE balloting. A total of 312 editorial comments and 356 General/Technical comments were received from members. Four comment resolution groups comprising of contributors, reviewers and other members were formed during the meeting to address the general and technical comments – one group each for the clauses 4.0, 5.0, 6.0 and one group for all the annexes except for Annex A.

It was decided during the meeting that each general/technical comment resolution group will meet separately every two weeks starting February 14, 2022 to resolve the comments. Chair will facilitate the general/technical comment resolution groups meetings – four one-hour meetings every two weeks based on the convenience of participants determined through polling. Chair will communicate with some other members to address the editorial comments – timing and team will be determined soon.
Next full WG meeting will be convened once all the comments resolutions are proposed. Formal working group balloting will be done based on the readiness of the draft and the agreement by members based on IEEE SA rules.

Chair discussed updated project plan with expected IEEE balloting in Q2 of 2022. Request for PAR extension, if required, will be done after the IEEE balloting.

WG will meet during the next PSRC meeting in May 2022, as per the PSRC meeting arrangements.

Sincerely,

Ratan Das Paul Myrda Mital Kanabar

Attendee List

Members (32)	
NAME	**AFFILIATION**
Ratan Das, Chair	GE Gas Power
Paul Myrda, Vice-Chair	EPRI
Mital Kanabar, Secretary	GE Renewable Energy
Alexander Apostolov	OMICRON Energy
Arun Shrestha	SEL
Austin Wade	SEL
Bharat Nalla	SEL
Bruno Andre	Schneider Electric
Catherine Dalton	EPRI
Chikashi Komatsu	Hitachi
Damir Novosel	Quanta Technology
Don Ware	Power Grid Engineering
Erin Jessup	SEL
Harsh Vardhan	GE Renewable Energy
Hugo Monterrubio	Beckwith Electric
Jay Anderson	ComEd
Jean Raymond	Hydro-Quebec
Jeff Shiles	Southern California Edison
Joe Xavier	ABB Inc
Jonathan Sykes	SEL
Jörg Blumschein	Siemens
Jose Ruiz	Doble Engineering
Mohammad Dadash Zadeh	ETAP
Qun Qu	AEP
Raluca Lascu	DTE
Ramakrishna Gokaraju	University of Saskatchewan
Rich Hunt	Quanta Technology
Ritwik Chowdhury	SEL
Sakis Meliopoulos	Georgia Institute of Technology
Thomas Rudolph	Schneider Electric
Vahid Madani	GridTology, LLC
Yuan Liao	University of Kentucky

Guests (19)	
NAME	**AFFILIATION**
Aaron Martin	Bonneville Power Administration

Abu Bapary	AEP
Byungtae Jang, KR	KEPCO
Chris Huntley	SEL
David Dolezilek	SEL
Dinesh Gurusinghe	RTDS
Evandro de Oliveira	Siemens
Galina Antonova	Hitachi
Gale Nelms	SEL
Jim Hackett	Mehta Tech
Jun Verzosa	Doble Engineering
Ken Martin	EPG
Karen Wyszczelski	SEL
Kevin Donahue	GE Renewable Energy
Madhab Paudel	Eaton
Mike Basler	Basler Electric
Mathew Garver	Hubbell
Prianka Nadkar	SEL
Tuan Tran	TVA

H46: <u>Recommended Practice for Human-Machine Interfaces (HMI) used in Substation Automation Systems (PC37.1.3)</u>
Chair: Matt Black
Vice Chair: Craig Preuss
Secretary: Shane Haveron
Output: Recommended Practice for Human-Interfaces (HMI) used with Electric Utility Automation Systems (PC37.1.3)
Established: September 2018
Expected Completion Date: January 2023
Draft: v0.52

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

H46 met at 9:20am PST on Wednesday January 12th with 13 attendees. 12 out of 24 working group members were present not quite meeting quorum, probably caused by a schedule conflict with H45. The September minutes were reviewed and are not yet approved, but no changes were requested.
After the mandatory slides, Dustin Tessier presented IEC WG10's efforts to standardise HMI design and implementation using 61850's Substation Configuration Language (SCL). IEC 61850-6-2 introduces Graphical Configuration Language and HMI Configuration Language including file formats and tools. SVG and GCL Namespaces have already been published and HCL Namespace is the main focus for 2022. 61850 is currently unable to group alarms and differentiate these from other status information. This IEC work has good synergy with H46 and the output of our WG will be extremely useful to them. SCE is already involved with this initiative and Tony Johnson stated that these developments will be of interest to many utilities.

Current draft is version 0.52 and not enough progress has been made. We are not on track to be out for ballot in May this year and completed by the end of 2023. A PAR extension may be needed.
The Chair requested more participation and asked members to volunteer for writing assignments. The draft document has many sections that require attention and better ways to assign sections to be members will be investigated.

H47: Impacts of IEC 61850 sampled values, GOOSE and PTP time synchronization on protection and control applications using process bus
Chair: M. Kanabar
Vice Chair: A. Riccardo
Secretary: D. Ouellette
Output: Report
Completion Date:
Draft: 0.5

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

- NO January 2022 Meeting Minutes Available

H49: Application Considerations on the Use of Packet-Switched Communication Channels for Pilot Protection and Teleprotection Schemes
Chair: TBD
Vice Chair: I. Voloh
Secretary: L. Erichsen
Output: Report
Completion:
Current Revision:

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

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

- WG H49 didn’t meet in January 2022

H50: Requirements for Time Sources in Protection and Control Systems
Chair: Dean Ouellette
Vice Chair: Jay Anderson
Secretary: None

Output: Report
Established Date: May 2019
Expected Completion Date: 12/31/2022
Draft: 1.4b

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

Meeting 11 January 2022, 14:20 – 15:30 PST. All working group officers were present. The chair presided over the meeting and Jay Anderson recorded minutes.

The meeting was called to order there were 26 in attendance of which 10 are members; 2 are non- voting members and 14 guests. Quorum was not achieved.

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 were displayed but not approved due to lack of quorum and will be emailed for approval.

Presentations:
none

Old Business
The Scope and Assignment was reviewed.

New Business
- Work continued reviewing writing assignments (including submissions) and a number of topics were raised and discussed.

Review of comments on Draft 1.4b:
- Discussion of the role of NTP in substation clocks, including whether NTP would be an Input or an Output (i.e., SNTP generated in the clock from other reference sources such as GNSS)
- Inputs: Discussion of Terrestrial reference time sources and GNSS time sources. For this purpose, radio sources originating on the Earth (vs Satellite) would be considered terrestrial, along with fiber, telecom profile, etc.
- Discussion of primary vs secondary time sources (inputs)
- Discussion of clock sources (GNSS, terrestrial, etc.) vs distribution mechanisms.
- Discussion of interfacing with the IEEE Resilient Position, Navigation and Time (PNT) initiative (IEEE P1952). The Chair, Vice-chair, and others have been participating. Need to spend some time understanding “needs” from that effort and determining how we can contribute.
- Reviewed writing assignments still to be submitted.
- Discussion on re-synchronization to a reference time source following loss of synch. At present, we don’t know if that has been addressed by C37.118; it has been looked at in conjunction with Sampled Values (IEC 61850-9-2 and IEC 61869-9). Discussed re-synch methods (step vs slew), and impact of re-synch from either leading or lagging the reference. This considered for addition to the Paper.

Action Items:

- Latest version (which includes assignments) to be posted in iMeet as **Rev 1.5**.
- Contact voting members who are not coming to meetings and remove from membership as needed

Meeting was adjourned at 15:28 PST. Motion to adjourn by Nick Kraemer; second by Jay Anderson.

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

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

Avoid Conflicts: P1, S15, C33

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

Chair: Mark Adamiak
Vice Chair: NA
Output: Standard Revision
Completion Date: December 2021
Current Revision: 2010

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

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.
Mark Adamiak

H52: Common Format for Naming Time Sequence Data Files (IEEE Standard C37.232-2011, COMNAME)

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

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

January 2022, Meeting Minutes:
The WG met on time with 10 colleagues in attendance. 7 of the attendees became the first volunteers to become members of the WG. 100% quorum was established, the patent slides were presented, and the minutes of the last meeting were approved. This was the second meeting of the WG.

The Chair informed the group that the PAR to revise the existing standard was submitted and approved by NesCom so the WG is now officially PC37.232.

The WG discussions focused on addressing the needed revisions to the standard starting with the use for naming folders and allowing for underscore delimiters including backward compatibility. A number of useful and workable ideas resulted including: Using the 7th character to automatically identify the delimiter (Shane Haveron assignment), and naming folder structures and scripts for changing delimiters (Ellery Blood assignment).

The WG plans to meet again at the next PSRC meeting. The meeting objectives are to review the submitted assignments, formalize the scope, and continue work on recruiting volunteers for officers and additional membership.

Attendance List:
Monterrubio, Hugo (Member)
Malia Zaman (Adviser)
Jim Hackett (Member)
Verzosa, Jun (Member)
Watson, Joshua S. (Member)
Shane Haveron (Member)
Ellery Blood (Member)
Amir Makki (Member)
Byungtae Jang (Guest)
Garver, Mathew (Guest)

H53: <u>Use Guide for Smart Distribution Applications P1854</u>
Chair: Xiangyu Ding
Vice Chair:
Output: Standard Revision
Completion Date: December 2021
Current Revision: 2010

Attendance: 3 Members and 5 Guests

Officer Presiding: Xiangyu Ding

Officer Recording Minutes: Xiangyu Ding

Introductions

Call for Patents

IEEE Copy Right Slides

Summary of Activities and Discussions

Xiangyu presented officers of the working groups and asked for volunteers for vice chair.

The revised PAR Scope of P1854 was read to the working group. Xiangyu explained that new changes involves communication, control and cybersecurity where PSRC and PSCCC members hold expertise.

Jason provided an update to the team on the work that the T&D committee have done on the guide. T&D has completed their updates to address ballot comments, waiting for PSRC and PSCCC to complete updates.

Ding explained the comment that T&D would like for PSRC to address, which was related to definition and use of the term “RTU” in the guide.

Jason explained a task assigned to PSCCC which is to expand on the discussion of communication and wireless communication technology in the existing guide.

When asked about interest level, two attendees’ express interests in reviewing the latest version of the guide. Anyone interested in taking writing assignment is asked to reach out to Ding or Jason.

Future Meetings:
T&D working group hold bi-weekly meetings to work on the guide. Will continue to hold joint PSRC/PSCCC meetings as well.

Adjourn

Meeting in May is currently expected to be virtual.

HTF54: <u>Revision of IEEE C37.111-2013/IEC 60255-24:2013 Standard for Common Format for Transient Data Exchange (COMTRADE)</u>
Chair: Mark Adamiak
Vice Chair: Zach Makki
Secretary: N/A
Output: Standard Revision

Meeting Proceedings:
The Task Force did not meet on January 11, 2022 as the then draft of the PAR had just been approved by the Task Force. The January 11, 2022 version was subsequently sent to H Subcommittee for approval. There was a comment on the Scope from H Subcommittee as to

whether the original implementation would be maintained. Maintaining the existing implementation (albeit, with modifications) was intended in the scope. This was clarified in a subsequent draft (copy with change noted below) and has, as of February 18, 2022 been re-approved by the HFT54 Task Force. The Rev. 1 version of the PAR will be re-submitted to H Subcommittee for re-approval.

Scope Rev. 1:
This standard defines a format for files containing transient waveform and event data collected from power systems and power system models. The format is intended to provide an easily interpretable form for use in exchanging data. An XML-based format is defined while maintaining backward compatibility with the existing formats. Changes have been made in COMTRADE to keep pace with changing technology. The standard is for time-sequenced data files stored on physical media and cloud storage. It is not a standard for transferring data files over communication networks.

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I2: <u>Terminology Review</u>

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 meeting was called to order by Mal Swanson, Chair at 10:40 am (Pacific Time) on January 12, 2022 with Fred Friend, Vice-Chair recording minutes with 7 members in attendance. Quorum was achieved. The minutes from September 2021 were reviewed with no corrections provided, Claire Patti motioned for approval and was seconded by Roger Whitaker, and unanimous approval was given. The agenda was approved. The copyright policy was reviewed and discussed.

Updates were given on of each of the assignments. No new words were discussed.

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 11:25 am (Pacific Time)

I4: <u>International Standards Development Working Group</u>
Chair: Eric A. Udren
Vice Chair: Normann Fischer
Output: IEC TC 95 USNC standards votes and PSRC status report
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 5:00 PM PST/8:00 PM EST on Tuesday January 11, 2022 using PSRC Teams platform, with 7 members and 5 guests.
September 2021 minutes were not reviewed and require e-mail comments if any from recirculation.

- The Chair reviewed the recently-circulated Committee Draft for Vote (CDV) versions for the core IEC relay design and type testing standards:
  a) 60255-1 Ed 2 - *Common Requirements*
  b) 60255-26 Ed 4 - *EMC requirements*
  c) 60255-27 Ed 3 - *Safety requirements*

  These CDVs are all in a technically stable state and have been subject to vigorous USNC review in prior DC voting cycles. We are to review these near-final versions for commenting and vote by February 25. Review volunteers included Bill Morse, Travis Mooney, Scott Hodge, Todd Martin, Hani Al-Yousef, and Jim Niemira. Jerry Ramie has already analyzed 60255-26 for EMC gaps with IEEE documents.
- The latest 60255-1 was separately introduced to the PSRC WG revising C37.90. That WG is already incorporating IEC requirements where they fit and attending to gaps to minimize conflicts for product designers.
- The latest 60255-26 CDV was separately introduced to the PSRC WG revising C37.90.2. That WG is already incorporating IEC requirements where they fit and attending to gaps to minimize conflicts for product designers. Jerry Ramie's comparisons are shared with I4 members. Notably, IEEE uses the same test setups and some higher test levels, so the more severe IEEE tests effectively includes the IED tests.
- 60255-216-1 – *Requirements for relays with digital I/O* – the IEC WG had proposed joint work with PSRC H47 on the same topic. The PSRC WG has designated Jörg Blumschein as Liaison and the groups are developing one common document section, per H47 Chair Mital Kanabar. The US had commented on the prior draft of 216-1 and a new CD is in preparation.
- TC 95 was seeking experts for new project for Part 216-3: *Digital Interface - Requirements for protection data exchange interfaces, a*imed at teleprotection data interfaces beyond IEEE C37.94 which is a SONET starting point but needs more channels and layers. The project has been accepted, but the US and Canadian representatives (Eric Udren, and Gustavo Brunello with Dustin Tessier for Canada) are now to propose a revised project description to the Austrian convenor. The US and Canada are to offer experts to participate in development. Chris Huntley has volunteered on behalf of Canada and US representatives are being sought.

PSRC Chair and TC 95 Chair Murty Yalla attended and shared additional updates:

- The PSRC H35 report on recommended changes for the next version of dual-logo COMTRADE, 60255-24/C37.111 has been submitted to the Secretary of TC 95 for initiation of the IEC side of the joint development process.
- 95/410/RVC 60255-187-1 Functional requirements for differential protection – *Restrained and unrestrained differential protection of motors, generators and transformers* is now published.
- 60255-187-2 – *Functional standard for busbar differential relays* – Work will restart on this standard in April/May 2022
- 60255-187-3 – *Functional standard for line differential relays* – CD is under development with PSRC inputs. Normann Fischer, MT member, reports some pandemic-induced development delay. Expect to have a CD in 2022, once in CD state D34 in PSRC will restart.
- 60255-132 – *Functional standard for directional power relays* – new project; CD expected in 2022.
- 60255-167 - *Functional standard for directional overcurrent relays* – new project; CD expected in 2022.

I26: <u>Mathematical Models of Current, Voltage, and Coupling Capacitive Voltage Transformers</u>

Chair: Mike Meisinger
Vice Chair: Steve Turner
Secretary: Amir Makki
Output: Report
Established Date: 2012
Expected Completion Date: 2022
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.

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

Writing assignments have been tasked. Complete writing assignments and produce report.

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

Chair: Joseph Valenzuela
Vice Chair: Michael Higginson
Output: IEEE Guide
Established Date: January 2015
Expected Completion Date: May 2022
Draft: 20210919
Assignment: Revise C37.110-2007 Guide for the Applications of Current Transformers for Protective Relaying Purposes.

The working group did not meet. Expect to send to recirculation ballot prior to next meeting.

I30: 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: 14
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. The document is in the final IEEE approval process.

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

Chair: Brian Mugalian
Vice Chair: Jerry Ramie
Secretary: Craig Preuss
Output: Standard
Established Date: 05-Feb-2016 (PAR approval date)
Meeting Date: January 11, 2022
Expected Completion Date: 31-Dec-2022 (PAR extension approved October 2020)
Draft: 2.8
Assignment: Revise 1613

a) Officer presiding: Brian Mugalian
b) Officer recording minutes: Craig Preuss
c) Call to order, approximately 8 am pacific time
d) Chair's remarks, general welcome
e) Results of call for quorum: 14 of 16 members in attendance
f) Approval of Agenda: Mike Dood motion, Mike Meisinger, second. No objections. Motion passed.
g) Approval of Minutes of previous meetings: Sept 21, 2021 motion Mike Meisinger, second Fred Friend. No objections. Motion passed.

h) Patent slides were shown, no claims were made.
i) Copyright slides were shown.
j) Comments from the working group ballot were reviewed and changes accepted in the draft to create draft version 2.8
k) Approve draft version 2.8 for ballot – motion Jerry Ramie, second Mike Meisinger. No objections. Motion passed.
l) No items reported out of executive session
m) Recesses and time of final adjournment, approximately 9:10 am pacific time.
n) Next meeting date and location, conference calls as noted above.

Meeting Participants:

Name	**Affiliation**	**Voting Status (voting member, non-voting member, guest)**
Brian Mugalian	S&C Electric Company	Chair
Craig Preuss	Black & Veatch	Secretary
Malia Zaman	IEEE	Guest
Claire Patti	Portland General Electric	Voting Member
Bill Morse	SEL	Guest
Fred Friend	AEP	Member
Gerald Ramie	ARC Technical Resources	Vice-Chair
Zitao Wang	S&C Electric Company	Member
Marilyn Ramirez	Power Grid Engineering	Guest
Dave McGuire	Hubbell Power Systems	Member
Louis Garavaglia	G&W Electric Co.	Guest
Jim Niemira	S&C Electric Company	Guest
Thomas Rudolph	Schneider Electric GmbH	Voting Member
Chris Huntley	Schweitzer Engineering Laboratories, Inc.	Guest
Jeffrey Pond	National Grid	Guest
Adrian Zvarych	Power Grid Engineering	Guest
Peiman Dadkhah	NuGrid Power	Guest
Michael Dood	Schweitzer Engineering Labs	Voting Member
Michael Meisinger	S&C Electric	Voting Member
Jay Anderson	ComEd - Exelon Corp.	Voting Member
Hani Al-Yousef	Eaton Corporation	Voting Member
Roger Whitaker	Unaffiliated	Guest
Seth Nelson	Basler	Guest
Farnoosh Rahmatian	NuGrid Power	Guest

I32: A Survey of Protective System Test Practices

Chair: Andre Uribe
Vice Chair: Don Ware
Secretary:
Output: Report
Established: 05/2015

Expected Completion Date: 01/2023
Assignment: To review report prepared by working group I11 in 2001 called "Survey of Relaying Test Practices" and update the survey accordingly to today's industry environment.
Draft: Ver 1.0

The working group did not meet.

I33: <u>Review of Relaying Testing Terms</u>

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

a) Officer presiding-Scott Cooper
b) Officer recording minutes-Scott Cooper
c) Call to order- 2022-01-10 14:20
d) Chair's remarks- Review of project status.
e) Results of call for quorum: 1 new member, 1/5 members present
f) Approval of Agenda (motion and second)-NA
g) Approval of Minutes of previous meetings (motion and second)-NA
h) Summary of discussions and conclusions including any motions
    a. I-subcommittee vote not to approve the report
i) Action items
    a. Communicate with Fred Friend to discuss objections
    b. Correct and resubmit report for I-subcommittee approval
j) Items reported out of executive session (if such sessions have occurred)-NA
k) Recesses and time of final adjournment (if different from our published face-to-face meeting agenda) 14:58 EST
l) Next meeting date and location (if different from our published face-to-face meeting schedule) TBD

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

Chair: Mike Dood
Vice Chair: Marc Lacroix
Vice Chair: Marc Lacroix
Output: Standard
Established Date: January 2016
Expected Completion Date: September 2022
Draft: 0.7
Assignment: To revise and update C37.2, Standard for Electrical Power System Device Function Numbers, Acronyms, and Contact Designations

The working group met virtually on January 13th, 2022.

a) Mike Dood presided.
b) Marc Lacroix recording minutes.
c) 3 Members and 2 guesses attend the meeting.
d) The quorum was not met.
e) Discussion on the latest draft
    a. Table in annex. It is difficult to have a one-to-one relationship between IEEE/ANSI standard functions and 61850 objects.
    b. Some words of caution should be added before the table to emphasize this fact.
    c. The new graphics should be modified to use the DOT convention.
    d. We can reintroduce the reference to IEEE 315 since this document is still on sale.
    e. Adding a new device 95. This should be rejected and postpone to a future project.
f) Next step: Reallotting will be started as soon as the BRC finalize the draft. (Early February)

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

Output: Standard
Established (month/year): September 2017
Expected completion date (month/year): December 2022
Date and Location of Meeting: January 11, 2022, WebEx & In-person, Garden Grove CA, JTCM
Chair (or Presiding Officer): Chase Lockhart
Recording Secretary (usually, the Vice Chair): Mat Garver

Meeting Participants:

Name	Affiliation	Voting Status (voting member, non-voting member, guest)
Chase Lockhart	Leidos	Chair
Mat Garver	Hubbell (Beckwith)	Vice-Chair
Gerald (Jerry) Ramie	ARC Technical Resources Inc.	Voting Member
Hani Al-Yousef	Eaton	Guest

Suresh Channarasappa	Westinghouse Electric	Guest
Bill Morse	SEL	Guest
Jackie Wilson	Ameren	Guest
Tony Bell	Ametek	Voting Member
Malia Zaman	IEEE SA	Guest
Zitao Wang	S&C Electric Company	Guest
Travis Mooney	SEL	Guest
Todd Martin	Basler	Guest
Jeff Pond	National Grid	Voting Member
James Niemira	S&C Electric Company	Guest
Louis Garavaglia	G&W Electric Co.	Guest
Marilyn Ramirez	Qualus	Guest
Roger Whittaker	Self Affiliated	Voting Member

Time called to Order and Chair's remarks: The meeting was called to order at 1:00pm Pacific Time and introductions were made. Due to technical difficulties, screen sharing was not available so this was more of an informal information session.
IEEE Policy Reminders (patents and copyrights): These were not reviewed due to technical difficulties.
Confirm that call for Patent issues was made and record any responses: These were not reviewed due to technical difficulties.

Topics discussed:

- PAR extension was approved, now expires December 2023.
- Working on MEC comments before sending to already formed balloting body
- Plan to meet in February to look at corrections from MEC

Times of any recesses and time of final adjournment: Motion to adjourn at 1:27pm first by Tony Bell, 2nd by Jerry Ramie. Approved by all, meeting adjourned.
Date, time, and location of next meeting: May, 2022

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

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

Meeting Participants:

Name	Affiliation	Voting Status
Marilyn Ramirez	Qualus Power Services	Chair
Todd Martin	Basler	Voting Member

Jim Niemira	S&C Electric	Guest
Dolly Villasmil	Power Grid Engineering	Voting Member
Hani Al-Yousef	Eaton	Voting Member
Travis Mooney	SEL	Voting Member
Bill Morse	SEL	Guest
Roger Whittaker		Guest
Tony Bell	Ametek	Voting Member
Malia Zaman	IEEE SA	Guest
Chase Lockhart	Leidos	Guest
Steve Conrad		Guest
Eric Udren		Guest
Zitao Wang		Guest
Tom Key		Guest

- Officer presiding: Marilyn Ramirez
- Officer recording minutes: Marilyn Ramirez
- Call to order, approximately 9:20 am Pacific Time
- Chair's remarks, general welcome
- The meeting had 6 members (out of 9) and 9 guests in attendance. Quorum was met.
    - September 2021 Meeting Minutes were approved at the meeting
        - Motion by: Tony Bell; Second by: Dolly Villasmil
- Patent slides were shown, no claims were made. Copyright slides were shown.
- Agenda was approved
    - Motion by: Todd Martin; Second by: Tony Bell
- Latest draft with proposed changes, including updates to harmonize with IEC were reviewed.
    - Members will re-visit and review the latest draft and will advise of any other input.
- New Assignments:
    - Hani/Bill– Review Section 5 for Harmonization
    - Members – Review Draft and provide input before May meeting
    - Marilyn – Request PAR extension
- Final adjournment, approximately 10:10 am Central Time.

Motion by: Tony Bell; Second by: Todd Martin

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

Chair: Ritwik Chowdhury
Vice Chair: Eric A. Udren
Output: Standard
Established Date: January 2019
Expected Completion Date: September 2022
Draft: 4.3
Assignment: To revise and update C37.92

WG I38 met on January 12, 2022 at 10:40 AM PST by PSRC Teams virtual platform.

The Chair and Vice Chair introduced themselves. 6 members were identified to comprise a quorum. The Chair reviewed IEEE standard patent slides, meeting participation rules, and copyright slide.
Rich Hunt moved to approve September minutes; Eric Udren seconded. The motion was carried, and the September minutes were approved.
Ritwik began a review of Draft 4.3 in consideration of assignments. Specific review highlights:

- The PAR update is being processed by NESCOM. New document title is "(Draft) Standard for Low-Energy Analog Interfaces between Protective Relays and Power System Signal Sources." The new Scope is "This standard defines the performance requirements of the interface between voltage and 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." The new Purpose is "This standard defines the electrical performance requirements of an analog interface intended for use between voltage and current transducers used to produce power system measurements and protective relays or metering instruments that make use of those measurements for protection and control applications. Transducers may be of any type, such as magnetically or capacitively coupled, resistive, or capacitive dividers, or optical transducers, and may use electronics to provide an output analog signal as defined by this standard that is a scaled representation of the measured instantaneous voltage or current."
- The attendees reviewed the list of definitions in Clause 3, clarifying and supporting those defining terms used in the current draft, and deleting others that are not to be used in the text, or that are already defined and understood in other standards or broader use. Ritwik will contact Malia to find a way to acknowledge IEC for a few of the definitions that we would like to use that are in their draft, yet unpublished, documents. There are a few definitions that fall in that category.
- Eric Udren described progress in discussions with IEC TC 38 Convenor Veselin Skendzic on a statement of requirement for the Class HZ interface in Clause 5.3. Input impedance of 2 Megohms is the existing single IEC standard; 1 Megohm is in widespread use in North America. Eric and Veselin are working on new wording that will state that 2 Megohms is the preferred value; but that 1 Megohm is supported via a second correction factor value on the nameplate of the transducer source for 1 Megohm loads, and/or by ability of the consuming device to connect or invoke a shunt 2 Megohm input resistor to yield a combined 1 Megohm input impedance. 10 Megohm input impedances are not supported as a standard application at this time – to determine acceptability.
- The WG discussed in detail the physical layer specifications, focusing on the choice between convenient and economical RJ-45 connectors with CAT 5/6 cables versus IP67 weatherproof M12 industrial connectors with more elaborate cable assembly procedure. RJ- 45 is reported by some as better than its weak reputation, but the WG generally regards environmentally robust M12 as important for reliable installations.
- Clause 5.9 states that 10 m is the maximum interconnection length, and this may need more background. 10 m is a broadly used limit for environments with grounds at the two ends well bonded and with limited EMI exposure, such as inside switchgear or substation control houses. Eric suggested that we consider an addition to the informative Annex B describing application use cases, and clarifying that more challenging applications like connection of outdoor pole-top sensors to remote IEDs must engineer these installations to reduce ground potential and interference risks, especially during faults.
- Connector discussions led to questions about who in the industry might have views on suitable choices. Peiman Dudkhah of NuGrid will solicit from his manager Farnoosh Rahmatian, current or past Chair of PES Power System Instrumentation and Measurements

(PSIM) Committee, for guidance on which PSIM experts might consider the application and inform us on current practices not known to WG I38. Eric will contact Dr. Keith Lindsay of Lindsay Sensors to review applications and the use of C37.92.
- Veselin and Peiman are to clarify requirements in Clause 5.6 on bandwidth and transient response.

WG I38 will schedule a February on-line meeting to continue development progress.

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

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

Task Force I40 met on Wednesday, January 12 at 8:am pacific daylight time in a single session. This was a hybrid meeting with three people attending in person and the remainder attending online. A quorum was achieved with 10 of 13 voting members present. Additionally 13 non-voting members and guests were in attendance. The make up was 3 in person and 17 remote.

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

The agenda was reviewed and approved. The motion was made by Mike Meisenger and seconded by Jerry Ramie.

Minutes from the September 2021 meeting were reviewed and approved. The motion was made by Michael Meisenger and seconded by Jerry Ramie.

The assigned review of Clauses 8,9, and 10 is completed and this information was viewed and discussed by the workgroup. New tables showing IEC test values (from standards IEC 60255-26, and IEC 61000-4, and IEC 61000-18?), were presented and discussed. It was decided not to include these new tables and that existing tables showing the IEEE C37.90.1 test values will be retained. It was mentioned that in several instances the 90.1 test values are more severe than the IEC values. It was agreed to, that within the existing test specification and adjacent to the range of burst frequency specified, a note of ***(400 Hz)*** will be included in parenthesis.

The group decided not to combine Annex C into Annex B as proposed by the chair.

A request for WGI40 members to review and comment on the latest draft of IEC standard 61255-1, -25,and -26, was made by Eric Udren, chair of the PSRCC/IEC advisory workgroup.

The 90.1 Chair volunteered to help route information to and from volunteers. There is a deadline.

Chair will gather together completed assigned reviews and create draft 3 to upload at Imeetcentral space before may meeting.

Vice chair will manually maintain documentation of meeting attendance. The 123signup system has become obsolete and is no longer functional.

Chair identified that he has not yet received reviews for clause 7, annex C and annex D. He will follow up.

Chair explained that remaining information at the end of clause 10 and also some partial information related to clause 7 can be discussed next meeting once the entire clause 7 review has been turned in by the assigned reviewers.

Chair adjourned the meeting due to lack of time.

These minutes pieced together by Todd and Roger after online meeting interruptions. Jan 14, 2022.

I41: Draft Standard for Electrostatic Discharge Tests for Protective Relays

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 10:40 a.m., Pacific Standard Time, on January 11, 2022.

4. Chair's remarks

Chair Turner welcomed all to the hybrid (in-person and virtual) meeting. He stated that we need to prepare the standard for ballet today.

5. Results of call for quorum

The quorum check established that a quorum was present.

6. Approval of Agenda (motion and second)

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

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

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

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

Various working groups met to reconcile acceptance criteria; a discussion with other WG chairs in a November 4, 2021 meeting. Chair Turner reported the result, for which the attendees discussed the following:

- Relay outputs do not change state as covered by "No changes in the states of the electrical, mechanical, or communication status outputs occur. This includes alarms, status outputs, or targets."
- Analog values for SCADA of not more than 2 percent of full-scale. Changed to "During tests, momentary changes of analog values (for example, SCADA) are allowed. After test, accuracy must revert to the manufacturer-claimed accuracy." This changed passed on a unanimous vote of approval.

9. Action items

AI5: Chair and Vice Chair to prepare for balloting.

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

There was no executive session.

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

Chair Turner adjourned the meeting on time at 11:50 a.m. Pacific Standard Time.

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

The next meeting will be in May 2022 at the PSRCC meeting.

I43: Investigate Response to USA Executive Order Regarding EMP Protection

Chair: Angelo Tempone (Presiding)
Vice Chair: Art Buanno
Secretary: Dolly Villasmil
Output: Report
Established Date: May 11, 2020
Expected Completion Date: 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 17:00 PST on Tuesday, January 11, 2022

1. Introductions

The chair introduced himself and the other working group officers. The meeting opened with 11 members and 7 guests.

2. Quorum verification

A quorum was not obtained since less than 12 members attended the meeting (under 50%). All documents will need to be approved at a later date.

3. Review received contributions (sections 2)

We reviewed Section 2 (Background) in its entirety. Comments and accepted changes were taken for this section.

4. Status update on Section 4 or re-assign pending contributions

A status update for the other sections was provided. Of particular note, Section 4 (Assessment & Testing of HEMP on Substation Protection, Control and Communication Equipment) has several subclauses completed and is ready to be reviewed. Additional subclauses in this section still need to be written.

5. Adjourn

The meeting was adjourned at 18:09 PST.

Our next meeting will be TBD in May of 2022 (time TBD). A room for 40 people will be needed.

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

Chair: Andre Uribe
Vice Chair: Mike Dood
Secretary:
Output: Report
Established: 01/2020
Expected Completion Date: 01/2023
Draft: Ver 4.0

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: Andre Uribe, Chair
b) Officer recording minutes: Mike Dood, Vice Chair
c) Call to order at 3:40 pm
d) Agenda Items:
    a. Chair's remarks – The title on the I-subcommittee agenda needs to be updated to "*Skills Required to Program, Commission, Test, and Maintain Ethernet Based PAC Systems*"
    b. Reviewed reports 12 topics from our contributors. 9 of 12 sections have been worked on.
    c. Several guest and members volunteered to contribute.
        i. Section 1: Karen Leggett assigned to peer review.
        ii. Section 2: Will Knapec, Marcos Velazquez assigned to contribute.
        iii. Section 3: David Dolezilek assigned to contribute.
        iv. Section 4: Karen Leggett, Wyszczelski, Peiman Dadkhah assigned to peer review.
        v. Section 5: Yujie Yin assigned to peer review.
            1. Section 5.6: Bharat Nalla assigned to contribute. Austin Wade assigned to peer review.
        vi. Section 6: Mike Cunnigham, Tim Mathias, Gaina assigned to peer review.
        vii. Section 7: Andre Uribe assigned to peer review.
        viii. Section 8: Jonathan Sykes assigned to contribute.
        ix. Section 9: Mike Cunnigham assigned to contribute.
        x. Section 10: Will Knapek, Sughosh Kuber assigned to contribute.
        xi. Section 11: Bharat Nalla assigned to contribute.
        xii. Section 12: Mike Dood assigned to contribute.
e) Working group agreed that we will consolidate any redundancies after all sections have been completed.
f) Need to provide members with a share file to access the report.
g) Recessed and time of final adjournment: 12:18pm Central.
h) Next meeting date and location: Reno, NV.

I45: <u>Grounding and Bonding Issues Associated with Substation Wiring Practices & Instrumentation</u>

Chair: Adrian Zvarych

Vice Chair: TBD

Secretary: Jalal Gohari

Established: May 2020

Output: Report on Grounding and Bonding of Instrumentation and Control Circuits

Expected Completion date: May 2022

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.

- Call to Order – by Adrian Zvarych 2:44 PM Eastern

- Check for quorum – 8 Voting Members in Attendance; Quorum Achieved!
- For Reference Only:
- IEEE Patent Policy: Call for Patents: https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.pdf
    a. IEEE Copyright Policy: https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/copyright-policy-WG-meetings.potx
    b. Patent slides (any concerns?)
    c. Copyright slides presented
- Approve past minutes 1st Jalal 2nd Mike PASSED
- Approve Agenda 1st Jalal 2nd Prasad PASSED
- Unfinished Business (Action Items)
    a. Review highlights of the Report as it stands
    b. Review highlights of the Gap Analysis as it stands
- New contributing members received today:
    a. DJ Moreau
    b. Baker Chance
    c. Bruce Magruder
    d. Dan Nordell
- Other business
- Future Meeting: 2 February 2022, 11:30 AM – 12:30 PM Eastern via Teams
- Adjourn: 1st Mike , 2nd Jackie, - PASSED @ 3:54 PM Eastern

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

Chair: Bruce Magruder (Chair)

Vice Chair:

Secretary: Brian Mugalian (recording of minutes)

Virtual Meeting/Teams: 10 January 2022, 3:40 – 4:50 PM PST

Output: Revise IEEE C57.13.3-2014
Established Date: September 2021
Expected Completion Date: January 2024
Draft: N/A
Assignment: Prepare PAR for IEEE C57.13.3-2014

a) Call to order – Brian Mugalian, 3:40 PM PST
b) Chair's greeting & remarks, 6 attendees were present, 5 voting members
c) Brian Mugalian introduced Bruce Magruder who will be Chair of I46. The Chair is looking for a Vice-Chair.
d) Agenda was presented and reviewed
e) Quorum was not reached, so minutes of the September 2021 meeting could not be approved
f) Patent slides were reviewed. The attendees did not present any patents requiring further action.
g) Copyright slides were presented. No comments from the attendees.

h) Previous review and comments on the 2014 edition of C57.13.3 are below from the May 2021 Task Force (ITF46) attendees and will be considered for the revision:
    a. Review the word “safety” and how it is used in the Guide
    b. Coordinate with I45 as they are writing a report where our Guide will be referenced
    c. General review of figures in the Guide
    d. NEC versus NESC in the text of the Guide needs review
    e. Annex B needs update to convert the IEC 60044 standards to the new IEC 61869 standards
    f. Add new examples to Annex C
i) The working group reviewed the existing scope and purpose. We will hold a WebEx meeting in early February with the voting members to see whether the Scope and/or Purpose needs revision.
j) At the May 2022 meeting, we will enter a motion to review/approve the PAR so that we can open a project in myProject. The working group will request a new iMeet Central workspace for the voting members.
k) Meeting adjourned at 4:15 PM PST

Name	**Affiliation**	**Voting Status (voting members)**
Bruce Magruder	SOLV Energy	Chair – Voting Member
Brian Mugalian	S&C Electric	Voting Member
Zitao Wang	S&C Electric	Voting Member
Jim Niemira	S&C Electric	Voting Member
Jeff Pond	National Grid	Voting Member
Rafael Garcia	Oncor	Voting Member
Jim O’Brien	Duke Energy	Voting Member
Jalal Gohari	WSP Group	Voting Member
Jie Ren	China Southern Power Grid	Voting Member
Josh Warner	Commonwealth Associates	Voting Member
Sudarshan	Univ. of Missouri – Kansas City	Voting Member

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

Chair: Amir Makki
Vice-Chair: N/A
Output: Revision of an Existing Standard
Established: September 2021
Expected Completion Date: December 2025
Draft: N/A

Assignment: Revise the C37.231. The revisions include clarification on the use of the Standard and on the impact of the latest NERC CIP and PRC requirements.

The WG met on time with 24 members and guests in attendance. Quorum was established. This was the second meeting of the WG.

The WG focused on preparing for the PAR submission. A draft scope was developed that includes:
Adding firmware BOM,
Moving to a joint effort with PSCCC,
Moving to a full use standard, and
Addressing the need for compliance testing requirements

The WG plans to meet again at the next PSRC meeting. The meeting objectives are to formalize the PAR scope, and to continue work on recruiting volunteers for officers and membership.

Attendance List:
Amir Makki
Gopal Gajjar
Pond, Jeff
Gohari, Jalal
Lombardo, Jason
Swagata Das
Gayle Nelms
Kanabar, Mital (GE Renewable Energy)
Nicholas Kraemer
Malia Zaman
Niemira, Jim
Wang, Zitao
Al-Yousef, Hani E
Yuchen Lu (Guest)
James, Robbie
Black, Matthew L
Preuss, Craig M.
Fourkas, Rena
Randy Hamilton
Paul Krell (Guest)
Baker, Philip A
Rafael Garcia
B. T. Jang
Juan M Gers (Guest)

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

Chair: Mohit Sharma
Vice Chair: N/A
Output: Recommendation to either revise the IEEE standard or let it expire
Established Date: September 2021
Expected Completion Date: September 2022
Draft: N/A
Assignment: Consider revision of IEEE Std C37.103-2015, IEEE Guide for Differential and Polarizing Relay Circuit Testing, and develop a PAR if applicable

ITF48 met in a hybrid format with 1 attendee in-person and 5 virtual attendees on Tuesday, January 11th, 2022, at 2:20 PM Pacific Time.

Mohit started the meeting with the review of patent and copyright policies. There was no potential claim raised.

Mohit reviewed the existing standard and pointed out a few areas where additions can be made as part of the revision -

1. Inclusion of low impedance bus differential application
2. Expanding the section titled “Power Sources for tests” to include availability of convertible voltage and current channels in modern test equipment
3. Single phase tests for transformer differential relaying and the need of single phase pickup factors
4. Inclusion of differential relays with Rogowski inputs
5. Update drawings
6. Transformer REF differential relaying – Auto transformer application

We had a decent discussion on the above topics especially if they fall under the scope. However, we were not able to reach to any conclusions due to low attendance.

The plan is to invite more attendees with commissioning and service background in the next meeting so we can strongly investigate the need for revision. We need to form a WG even if only editorial changes are required. Just a reminder that the current state of guide expires in 2025.

Meeting was adjourned at 3:25 PM PT.

11. Liaison Reports
    a. Instrument Transformer Subcommittee – (need liaison representative)
12. Old Business
    a. Email ballots since September 2021 meeting:

        - Motion to Approve for publication I33 WG Report – “Review of Relay Testing Terms”. Requires 75% of I-SC Voting Members to Approve.

- Insufficient response and insufficient approval. WG is addressing comments received and will revise and resubmit the report for approval by I-SC.

- Motion to Revise PAR for PC37.92 – Revise Title, statement of Scope, and Purpose. Revisions are for clarity, without substantive changes to the scope of the standard. Requires majority of votes cast provided a majority of eligible voters respond.

  Proposed Title: Standard for Low-Energy Analog Interfaces between Protective Relays and Power System Signal Sources

  Proposed Scope: 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.

  Proposed Purpose: This standard defines the electrical performance requirements of an analog interface intended for use between voltage and current transducers used to produce power system measurements and protective relays or metering instruments that make use of those measurements for protection and control applications. Transducers may be of any type, such as magnetically or capacitively coupled, resistive, or capacitive dividers, or optical transducers, and may use electronics to provide an output analog signal as defined by this standard that is a scaled representation of the measured instantaneous voltage or current.

  Motion by Ritwik Chowdhury; Second by Eric Udren

  - Motion APPROVED – (34 members at the time of the ballot; 19 Responses; 19 Approve; 0 Disapprove; 0 Abstain).

13. New Business
    a. Move P1613 to IEEE SA Ballot

       Motion 1 Begin IEEE SA Ballot of P1613
       Working Group I31 moves to begin IEEE SA Ballot of P1613 Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus
       Motion by: Brian Mugalian; Second by: Craig Preuss
       The I31 WG has unanimously approved the latest draft – Draft 2.8 – for ballot.
       MOTION 1 APPROVED

    b. Move PC37.90.3 to IEEE SA Ballot

       Motion 2 Begin IEEE SA Ballot of PC37.90.3
       Working Group I41 moves to begin IEEE SA Ballot of PC37.90.3 Standard Electrostatic Discharge Tests for Protective Relays
       Motion by: Steve Turner; Second by: Brian Mugalian

The I41 WG has unanimously approved the latest draft – Draft 5.0 – for ballot.
MOTION 2 APPROVED

c. additional new motions or new business?
Discussion of I-SC Scope and Scope Statement (5 minutes)
Form Task Force to make proposal for consideration at next meeting.

14. Other announcements?
    a. PSRC Panel Session at PES GM week of July 17, 2022, Denver, CO.
        - Session can be 2 hours or 4 hours as appropriate for the topic and scope.
        - Panelists must participate in face-to-face meeting, travel to Denver required.
        - Proposals required before end of next week. Contact Mike Thompson.
15. Motion to Adjourn, by _Uribe___, second by _Donahoe_
    Adjourn time: __5:16 PM_____

Next meeting will be on May 2022, presently planned as in-person meeting, possibly hybrid, in Reno, NV. I hope you stay well and look to meeting with you soon!

J13: Modeling of Generator Controls for Coordinating Generator Relays
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 6 members and 7 guests present. A quorum was not achieved.

The working group will approve minutes of the September 21, 2021 meeting by email.

Phil Tatro provided a summary of the final changes to the report addressing comments from the J Subcommittee. The final report has been submitted to the Main Committee officers for approval.

The working group discussed the subject of preparing a summary paper of 8-10 pages in length covering the principles and conclusions addressed in the working group report. No objections were raised and the chair will make a request to the J Subcommittee to request formation of a new group to write the summary paper.

Juan Gers reviewed the draft PowerPoint presentation for the May 2022 Main Committee meeting and members provided comments and recommendations. The presentation is expected to be 20 minutes with 10 minutes allocated for answering questions. Additional work is required to consolidate the material to align with the allotted presentation time. Members agreed with a recommendation from Charlie Henville that the working group remain active to provide input on the presentation. The chair will plan to request disbanding the working group at the May 2022 meeting of the J Subcommittee.

In the J Subcommittee meeting the following motion was made by Juan Gers, and seconded by Mike Thompson. The motion was approved unanimously.
Motion: Working Group J13 motions to form a working group to write a summary paper of the report Modeling of Generator Controls for Coordinating Generator Relays

The Working Group will be designated J26.

Next Meeting:
J13 will not meet. For J26, the requirements for the next meeting are a single session, a meeting room for 40 people and a computer projector.

J15: <u>Investigation of the Criteria for the Transfer of Motor Buses</u>
Chair: Wayne Hartmann
Secretary / Vice Chair: Doug Weisz
Established 2015 (1/15)
Output: Report (Draft 8C)
Status: 20th Meeting (1-11-22)

Assignment:

1. Review, compare, and contrast NEMA MG-1 with ANSI C50.41 regarding transfer criteria.
2. Examine published reports and papers on motor bus transfer criteria to compare the conclusions with NEMA MG-1 with ANSI C50.41 regarding fast transfer criteria.
3. Investigate existing open-transition motor bus transfer (MBT) actual data from multiple events at the medium voltage level. Examine for current and torque ratio versus Volts/Hz at transfer periods to see if there is a correlation.
4. Examine published reports, papers, C50.41 and NEMA MG-1 on motor fast bus transfer criteria to reconcile the conclusions with the field-measured results.
5. Study existing motor protection oscillography voltage and current to identify which motors are generating and which are motoring. Examine v/Hz of composite bus and individual motors, and individual motor reacceleration current versus total bus reacceleration current (if available).
6. Produce a Report to Subcommittee with findings of the above

WG Report

Activity:

1. The Working Group (WG) met for a double session on January 11, 2022, with 7 members and 8 guests.
2. Ryan Carlson Chaired and Will English Vice Chaired (thank you Ryan and Will)
3. Quorum was not met, therefore the September 2021 Minutes Approval will be accomplished through email.

4. The WG assignment was reviewed as well as a brief history of WG activities.
5. The WG reviewed Draft Report 9-A where several comments, edits, and additions in Sections 1, 2, 7, 8, and 9 were discussed and resolved by the WG.
6. There was discussion about the equation on page 53. The WG agreed that the equations were specific for a phase to ground approach. Dr. Yalla agreed to work on this section to provide an alternative if the user has an open delta set of VTs.
7. Dale Finney reviewed the updated modeling starting on page 79. Dale is open to presenting the tables as is / graphing them or simply summarizing them for the user. The discussion was that it might be most useful to simply summarize the results; Dale will summarize.

Assignments:

1. Jason Eruneo and Bracy Nesbit will review your Conclusion section for the next meeting and send edits to the Chair for inclusion in the next Draft.
2. Chair to examine paper from that discusses genesis of 1.33 V/Hz criterion and include information as appropriate.

Other Business and Adjournment:

1. There was no time left for other or new business
2. Meeting was adjourned

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: 13th Meeting
PAR Expiration: Dec 2024 (extension approved)

Assignment: Revise C37.101 Guide for Generator Ground Protection

WG Report

The WG met with 9 out of the 24 voting members present. A total of 18 participants joined the hybrid meeting. We did not meet quorum so the meeting minutes will be approved via email.

Ryan reviewed the patent slides required for IEEE PAR WGs.

Ryan mentioned that the 3 year PAR extension request was approved by IEEE SA. The PAR now expires on December 31, 2024.

Moving forward the working group schedule is as follows:

2022 & 2023: Review the Body of the Guide (1st Priority) & the Annex (2nd Priority)
2024: Balloting

The C37.101 second draft outline was reviewed. The working group members assigned sections of the body of the report for review. Ryan would like the reviews returned by April 1, 2022 for incorporation into the guide prior to the May 2022 meeting.

- **Ryan** agreed to take the lead on updating Section 1 Overview.
- **Zeeky** agreed to review Section 4 Summary of Grounding Methods.
- **Raju** agreed to review the new acceleration scheme sections that were added based on the J12 report 5.2, 5.3, 5.4, & 5.7.1.
- **Steve Mueller** agreed to review the 5.12 Injection Schemes writeup.
- **Dale Finney** to review comments previously provided by JC Theron for the 5.13 Resonant Grounding Section.
- **Ryan Carlson** agreed to review the 5.14 Multiple High-Impedance Grounded Generators Sharing A Common Bus
- **Todd Martin & Ritwik** agreed to review the 6.1 & 6.2 Low Impedance Overcurrent and Differential Schemes Section
- **Ryan, Steve Mueller, & Zeeky** agreed to review the 6.3 Hybrid Grounding Section
- **Will English** agreed to review the 7.0 Tripping Philosophy Section.

New Writing Assignments:

- **Ryan** proposed adding a writeup on 59N fusing. Ryan will make a first pass at the addition 59N section. Ritwik commented that there may be some coordination required with fusing and protection schemes. This will be considered in the writeup

Next Meeting:
Single session, room for 30 people and a projector. Provision for 40 attendees if WebEx. The WG also request no conflict with other J meetings, especially J17 (C37.102) & J19 (C37.106).

J17 - Revision of C37.102 Guide for AC Generator Protection
Chair: Manish Das
Vice Chair: Gary Kobet
Output: IEEE Guide
Draft: 5.7
Established: May 2017
Status: 18th meeting, Jan 2022 (hybrid)
Expected completion date: -
PAR Expiration: Dec 2022 (extension approved)

Assignment: Revise C37.102 Guide for AC Generator Protection

WG Report

WG met on Jan 10, 2022 virtually via Teams and in person for a double session with attendance recorded from 6 members and 2 guests in person, and 8 members and 20 guests virtually, for a total of 14 members and 22 guests in attendance. Quorum was not achieved. The Sep 2021 minutes will be approved via email.

Patent slides were presented, no claims were made.

The Chair shared that PAR for this WG has been extended for 1 year and is now valid until end of this year. WG is in process is resolving comments from WG ballot which was completed with

2/3rd approval in May 2021. Good progress has been made on discussing and resolving ballot comments, with 3 virtual meetings held since the Sep meeting.

It was suggested that a recirculation from the WG ballot and initiation of IEEE-SA ballot be done within the next 2 months to allow sufficient time to resolve the many SA ballot comments that can be expected for this guide. Per IEEE-SA Malia Zaman, a further PAR extension request, if required, will need be made to RevCom by Oct 2022.

Additional ballot comments were reviewed in this meeting as follows:

- Comment 71: Subclause 3.2 Reworded existing sentence.
- Comment 72: Subclause 3.2.1.2 Accepted. Reworded existing sentence.
- Comment 73: Subclause 3.2.1.2 Accepted. Phil will look up and add an explanation on the "reactor coil constant" terminology.
- Comment 74: Subclause 3.2.2 Accepted. Added disadvantage of grounding scheme.
- Comment 75: Subclause 3.2.4 WG unclear on present verbiage. For consistency, chair will coordinate with J16 where a new write up has been introduced on this topic.
- Comment 76: Subclause 3.4.2 Renamed title to "Generator-transformer configuration with GCB on low-voltage side of GSU", redo Fig 90 and use it to replace Fig 8.
- Comment 81: Subclause 4.3.2.1 Accepted. Added "low-impedance" in title.
- Comment 94: Subclause 4.3.3 Accepted. Deleted sentence.
- Comment 98: Subclause 4.3.3.1.1 Accepted. Will check with IEEE style manual.
- Comment 286: Subclause 4.3.3.1.1 Accepted. Sungsoo and Rahim Jafari to review and craft a revised language to clarify.
- Comment 295: Subclause 4.3.3.3 Accepted. Paragraph reworded.

Recently received assignments will be merged and additional virtual meetings will be scheduled over the next couple of months to continue to discuss and resolve the remaining comments.

Next Meeting:
Request a double session for May 2022 with space for 40 people and a computer projector. The WG also requests no conflict with 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

Attendance:
Total 35

Overview:

- No comments provided on September 2021 meeting minutes
- The vice chair requested updates on the writing assignments.
    - Sukumar Kamalasadan has drafted Section 3 “Overview of Type 3 Controls” and will be submitting to the Chair/Vice-Chair for inclusion in the main report document on sharefile.
    - Subsequent sections of report are on hold. The working group is presently performing comparisons of WTG model performance in various software packages and is also performing analysis to determine the effect of various power system and control system parameters on susceptibility to SSCI. Test system will be better defined/documented after completion of these activities.
- Presentation by Romulo Bainy “Effects of PLL Parameters Over Type 3 Wind Parks”
    - Presentation provided a summary of simulations performed by Dr. Bainy to compare the Conventional PLL and Decoupled Double Synchronous Reference PLL.
        - Overview of PLL models
        - Effects of changes in proportional and integral gains for each PLL type demonstrated in an EMT model consisting of Type 3 wind park, series compensated line, and an uncompensated line (used for fault application / disturbance initiation).
        - Demonstrated that PI parameters affect WTG transient response
        - SSCI responses for the PLL models differ slightly from one another
            - Conventional PLL – Proportional gain doesn’t have large impact on the SSCI frequency, but the higher the gain, the amplitude at expected SSCI frequency is increased. Frequency more concentrated around expected SSCI frequency.
            - DDSR PLL – Frequency is less concentrated at expected SSCI frequency.
        - Poorly tuned PI will have slight impact on SSCI frequency
        - Further study is required.

Next meeting:
For the next meeting, if it is not held virtually, J18 will need a room for 40 and an overhead projector. Avoid conflicts with D29, D34, I4.

J19 PC37.106 Guide for Abnormal Frequency Protection for Power Generating Units
Chair: Ritwik Chowdhury
Vice Chair: Jason Eruneo
Output: Guide
Draft: 10.2
Established: January 2019
Status: 14th WG meeting, Hybrid (Garden Grove, CA and virtual) – January 11, 2022
Expected Completion Date: June 2022
PAR Expiration Date: December 2022

Assignment: To revise and update C37.106, IEEE Guide for Abnormal Frequency Protection for Power Generating Plants

WG Report

- We did not meet quorum. 10 out of 21 members in attendance (11 required to meet quorum).
- WG reviewed Draft 10.2
  - Comment I4
    - Comment has been accepted and figure has been modified.
    - Raju commented that UAT is typically grounded through a resistor.
    - **Action Item**: Ritwik will add the resistor.
  - Comment I52
    - Commenter has requested for WG to keep existing nuclear power plant section
    - WG decided to add section back to the guide
  - Comment I56
    - WG believes that IBRs are outside the scope of the guide
    - Mike/Murty suggested replacing “power” with “synchronous” in title of the guide
    - Will recommended we could reject the comment and refer the commenter to P2800
    - Murty recommended we could add a footnote providing clarity (add footnote to comment I57)
    - Will made a motion to add “synchronous” to scope, and add a footnote to scope referencing P2800
      - Jason E. seconded (motion will be carried over through email)
  - Comment I57
    - Motion from I56 may resolve this comment
  - Comment I7
    - WG accepted proposed modification
  - Comment I12
    - WG accepted proposed modification
  - Comment I17
    - Zeeky has stated that GE does not include the accumulation speed scheme in their base package. They only include it if the customer requests it.
    - WG decided to soften the language to “monitor and alarm”
    - Modified language in section 6.1.3 to account for the softened language above
    - Gary provided an example where it was used to trip, related language added
  - Comment I32
    - Removed the term “only” from sub bullet c
  - Comment I30
    - WG accepted proposed modification
  - Comment I18
    - **Action Item**: Jay Mearns will craft language to address concerns
  - Comment I21
    - Added language to provide hybrid methodology to balance the protection of the machine and the system needs
  - Comment I28
    - **Action Item:** Jason Eruneo to modify language and figure (20%, 45%, 90% bands within example)
  - Comment I22
    - WG accepted proposed modification
  - Comment I23
    - WG modified language to “primary control function”

Action items are due January 31, 2022.

In the J Subcommittee meeting the following motion was made by Ritwik Chowdury, and seconded by Steve Conrad. The motion was approved unanimously.
Motion: Working Group J19 motions to revise the scope of IEEE Standard PC37.106 Guide for Abnormal Frequency Protection for Power Generating Units as follows:

Scope

This application guide assists the protection engineer in applying relays for the protection of synchronous generating plant[1] equipment from damage caused by operation at abnormal frequencies including overexcitation. Consideration is given to the effect of abnormal frequency operation on those associated station auxiliaries whose response can affect plant output. The guide also presents background information regarding the hazards caused by operating generation equipment at abnormal frequencies. It documents typical equipment capabilities and describes acceptable protective schemes. Underfrequency protection can be provided by load shedding and/or a discrete underfrequency protection scheme.

Guidance is provided to help meet requirements from regulatory bodies. The protective functions discussed in this guide may be implemented with a multifunction microprocessor-based protection system.

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[1] This document does not provide guidance on inverter-based resources which are covered in IEEE Std 2800 Standard for Interconnection and Interoperability of Inverter-Based Resources Interconnecting with Associated Transmission Systems [B29].

[B29] IEEE 2800, IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources Interconnecting with Associated Transmission Systems

In the J Subcommittee meeting the following motion was made by Ritwik Chowdury and seconded by Jason Eruneo. The motion was approved unanimously.
Motion: Working Group J19 motions to form a task force to investigate the need to write a summary paper of IEEE Standard PC37.106 Guide for Abnormal Frequency Protection for Power Generating Units.

The Task Force will be designated JTF27.

Next meeting:
Single session, room for 25 and a projector.
Request no conflict with I38, J20, J25 and C45.

J20 Practices for Generator Synchronizing Systems
CHAIR: Jason Eruneo
VICE-CHAIR: Luis Polanco
Output: Report
Established: January 2019
Status: 8th WG Meeting, Garden Grove, CA Hybrid January 11, 2022

Assignment: This report will discuss all aspects related to implementation of a generator synchronization system. This includes design, settings, testing, commissioning practices, monitoring, and protective schemes for generator synchronizing systems. The report will include a range of common system configurations.

WG Report

- WG met with 8 in person attendees and 14 virtual attendees (12 members & 10 guests) in attendance
- The chair will send out an email for approval of the meeting minutes from May
  - Action Item: Jason Eruneo will send WG email requesting approval of previous meeting minutes
- Presentation: Out of Phase Synchronization Case Study – Joe Simpson
  - Joe Simpson provided the WG with a presentation on an Out of Phase Synchronization event he experienced in 2020
  - The generator was 821 MVA
  - The cause of the synchronization failure was a combination of human performance issue and a failed relay
    - They were implementing a semi-automatic synchronization scheme. The plant operators are responsible for manually adjusting the voltage and frequency and the autosynchronizer is responsible for initiating a close command
    - The initial close from the automatic synchronizer was not successful. The relay experienced a failure due to the circuit board and failed in a close position
    - The operator then attempted a manual close initiate; however, they initiated the close too early without realizing the synch check relay had failed with its output closed.
    - The rotor was damaged; however, they decided to try to bring the unit back online. They discovered a field ground once they flashed the field over
    - The field ground caused thermal damage that required the rotor to be sent back to the OEM for repair
    - The OEM pretty much had to strip the rotor completely down to repair and then re-wound the rotor
    - Costs were projected to be over 10 million dollars and over 90 days of down time

Next meeting:
Single session. With room for 30 and a projector.
Request no conflict with J17, J19, J25, and K31.

J21 - <u>Motor Protection Tutorial</u>
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 (5th meeting 20220112)

WG report
- 15 were in attendance.
- Previous meeting minutes reviewed.
- Outstanding assignments were reviewed.
- Coordination with J22 (revision of C37.96) discussed

    - J21 and J22 chairs to coordinate efforts.
    - J22 is actively reviewing and suggesting revisions for sections
    - As much as practical don't duplicate work, ensure J22 is feeder material for J21
    - Example some reviewed sections are getting reviewed in J22 and may undergo revision
    - Discussion about coordinating the meetings (either double session including both WG's, or ensure J21 and J22 are scheduled back-to-back
- Chair has a file sharing site set up and is to distribute link this week to WG.
- Discussion about WG deliverables – tutorial document & presentation
    - Tom B. made suggestion to work on presentation first
- Emphasis on Figures and Examples (for tutorial)
- Gary K. suggested starting with Annex A material and add other material from guide to supplement
- Gary K, and Zeeky to work with IEEE SA to get figures from C37.96

Next meeting:
A single session is requested with room for 30 and a projector for the May 2022 meeting. Also request no conflict J22. Schedule J21 to immediately follow J22.

J22: Revision of C37.96 Guide for AC Motor Protection
Chair: Zeeky Bukhala
Vice Chair: Jason Buneo
Secretary: --
Output: Guide
Draft: -
Established Date: May 2021
Status: WG Meeting 4
Expected Completion Date: May, 2025
PAR Expiration Date: December, 2025

Assignment: To revise and update C37.96, Guide for AC Motor Protection

WG Report
The Working Group held its fourth meeting on Wednesday, January 12th, 2022. There were 14 attendees with 9 members.

I. Welcome/Introduction
    a. The Chair kicked off the meeting at 9:21am PT and welcomed members and guests to the working group's fourth meeting.
    b. Chair reminded attendees that 123signup was no longer active and asked those who had not received the agenda and meeting minutes to email him directly to added to circulation.
II. Quorum check
    a. Quorum was not met.
III. Approval of Meeting Minutes
    a. Chair will circulate September and November 2021 meeting minutes for approval.
IV. Patent Slides
    a. Patent Slides were shared, and no issues were raised.
V. Status of PAR

a. PAR was submitted to IEEE-SA for approval on October 6, 2021 and was approved by NesCom on December 8th, 2021.
b. PAR expires December 31st, 2025

VI. Assignments
a. Reviewed the following contributions
i. Section 4, Equipment Description. Will English
1. Will shared his comments, and all were accepted without comment. Will asked that Section 4.3.6.1, Brush-type (Slip Rings) be reviewed further as it was not clear. Bracy Nesbit agreed to review. There was some discussion on whether references should include revision details. Chair will follow up with IEEE-SA for guidance.
2. Jalal Gohari shared the assignment for this section with Will English. Jalal will review Will's contributions. Contribution is available in iMeet Central and Chair will email a copy to Jalal.
3. Will identified some references that he needed help validating. Chair will complete validation.
ii. Section 2, Normative References. Sunil Kabra shared his comments. He will email his assignment to the Chair.
1. There was further discussion on whether to show revision levels for references. Chair will seek guidance from IEEE-SA.
2. It was pointed out that IEEE Color Books were being transitioned to IEEE standards and section should reflect this. Sunil will follow up.
3. JC Theron asked that IEEE Std. 3004.8 be considered as a normative standard
4. NEMA ICS 3 & 19 were identified as potential additions based on Andy Kunze's findings in Section 6.2
iii. Appendix B, Bibliography. Sunil Kabra had no comment other than seeking clarification of using revision levels in the Bibliography. Chair will seek clarification from IEEE-SA.
iv. Section 6.2, Motor Protection Tables. Andy Kunze followed up on his previous contribution and confirmed that NEMA designations are no longer covered in NEMA ICS 1, 2 or 3. They are covered in NEMA ICS 19. Working Group agreed that tables should show both IEEE and NEMA nomenclature
v. A question was raised if tables/standard should include IEC (and other international) nomenclature and practices. Chair will seek clarification from IEEE-SA.
b. General Comments – Jason Eruneo
i. Section 8, Microprocessor Relays. The Guide seems to have not kept up with modern technology as evidenced by the existence of a dedicated Multiprocessor relay section. Chair confirmed that one of the working groups goals is to integrate multiprocessor relays in the body of the guide and eliminate this section. This will be done while retaining material on electro-mechanical devices as appropriate.
ii. General flow of document. The document has references to difference sections distributed throughout. Jason asked the working group to consider re-organizing the document to eliminate the need for cross-references. This can be achieved by consolidating sections. Chair asked assignees to take this into consideration as they review their sections.
iii. Section 4, Motor Bus Transfer. Tom Beckwith reminded the working group that he continues to work on the new sections that he had identified at the November 2021 meeting.

iv. Tom Beckwith reminded the working group that a number of organization, e,g., IAS PCIC and API have strong interest in motors and may be worthwhile contacting. He continues to reach out them. Chair encouraged members to reach out to other possible stakeholder associations/organizations. to recruit more members to the working group.

c. Chair asked members to upload assignments to iMeet Central or email directly to Chair if unable to do so.
d. The following sections are assigned for review:
   i. Section 2 – Sunil Kabra
   ii. Section 3 - Open
   iii. Section 4 – Will English, Jalar Gohari
   iv. Section 5
      5.1-5.5 – Derrick Haas, Jason Eruneo
      5.6-5.8 – Nabil El-Halabi
      5.9 – Hasnain Ashrafi
   v. Section 6
      6.1-6.2, 6.5 – Andy Kunze
      6.3 – JC Theron
      6.4 – JC Theron, Tom Beckwith
   vi. Section 7 – Jason Buneo, Nabil El-Halab
   vii. Section 8 – Zeeky Bukhala
   viii. Annex A – Dale Finney
   ix. Annex B – Sunil Kabra
   Chair asked members to upload assignments to iMeet Central or email directly to Chair if unable to do so.

VII. Next Steps.
   a. Chair asked for assignments to be completed and posted to iMeet Central or emailed to the Chair by February 28th, 2022.
   b. Chair will schedule a potential virtual meeting for March 2022 once a critical mass of assignments is received.

VIII. Adjournment. Meeting Adjourned at 10:23am PT.

Next meeting:
Single session with accommodations for 40 people and a projector is requested.
Also request no conflict with J15 and J21. Schedule J22 to immediately precede J21.

J23: Generator Condition Monitoring
Chair: Steve Turner
Vice Chair: Open
Secretary: Open
Output: Report
Established Date: May 2021
Expected Completion Date: Open
Draft:
Assignment:
Develop a report that covers the following aspects of condition-based monitoring for synchronous machines:

- Describe and develop guidelines for online condition monitoring of large synchronous machines, including salient-pole rotors as well as cylindrical rotors.

- Use online machine condition-based monitoring to detect potential problems before an actual fault develops and schedule maintenance.
- Provides information on online condition monitoring techniques as well as proposing typical thresholds to trigger alarms and initiate remedial or compensating action.
- Demonstrate how to use specific the protection functions to monitor machines.
- Describe mechanisms of degradation and applicable monitoring devices.
- Some relays can monitor RTDs and other transducer-based signals. Some relays monitor field voltage and current. Some relays also include thermal models for the stator and rotor.
- Pilot projects to explore this technology.
- Work with other technical committees as necessary.

WG report

Presentation was given by Steven Turner covering reason for rotor ground fault alarms that occurred this past summer at a power plant in Arizona. Writing assignments were given to several working members.

Chairman will contact other members to work on writing assignments.

Next meeting:
Single session with accommodations for 25 people is requested.

J24: Investigate the Need for a Disturbance Recording WG
Chair: Shane Haveron
Vice Chair: JC Theron
Secretary: open
Output: Report
Established Date: September, 2021
Expected Completion Date: -
Draft: -
Assignment: Establish a working group to publish a document on the use of disturbance recording for synchronous generators and critical associated auxiliary systems which will include: Digital Fault and Dynamic Disturbance Recorder basics, NERC disturbance monitoring and reporting requirements (PRC-002), detection of events and oscillations, and creation/handling of data files.

WG Report
The working group met on 01/11/2022 at 3:40 pm PST with 4 people in attendance, 1 in person and 3 virtually.

Low attendance may be due to a schedule conflict with J19. We would ask J subcommittee to encourage more members to join us, assuming schedule conflicts can be avoided.

Shane Haveron volunteered to chair J24 and JC Theron volunteered as Vice Chair. Thanks to Dennis Tierney for chairing the Task Force.

The JTF2 minutes and new working group assignment were reviewed.

An outline document was created to begin to define the report structure and flow. Sections identified by the task force were added.

It was pointed out that Alberta Electric System Operator (AESO) require that voltage synchrophasors are measured for both high and low voltage sides at generation sites. All data is to be retained for 1 year.

J subcommittee chair will create a new ShareFile folder for the working group files and resources.

Next meeting:
Single session with accommodations for 30 people is requested.
Please avoid conflicts with H46, PSCC S15 and all J especially J19.

J25: Report on Synchronous Condenser Protection
Chair: Jason Eruneo
Vice Chair: Dale Finney
Secretary: open
Output: Report
Established Date: September 23, 2021
Expected Completion Date:
Draft: -

- **Assignment:** Develop a report for Synchronous Condenser Protection. This report will discuss all aspects related to the protection of synchronous condensers. This includes design, settings, and protection schemes for synchronous condensers. Specifically, identify functions that apply to a synchronous condenser and refer to IEEE C37.102 for functions that align with the synchronous generator guidance.

WG Report

- WG met with 6 in-person attendees and 13 virtual attendees in attendance
- The following new members were added
  - Rob Messel
  - Sungsoo Kim
  - Geno Stewart
  - JC Theron
  - David Lopez
  - Steven Mueller
  - Gary Kobet
  - Zeeky Bukhala
  - Ryan Carlson
- The Chair presented possible system configurations/applications of synchronous condensers the report may outline
  - Ryan C. suggested to add starting methods and protection during starting, generator/turbine coupling

- Steven C. suggested to include a synchronous condenser connected to HV side of an IBR Generating Facility as an additional application for the report
- WG discussed the protection functions that should be included in the report
  - WG discussed whether or not 46, 32, 78, or 81 elements are needed for a synchronous condenser
    - WG agreed that 46 should be used for a synchronous condenser since the machine still utilizes a rotor
    - Chair expressed to the WG that we must do our due diligence in determining whether or not 32, 78, or 81 are not needed. We must try to find objective engineering reasoning to support our decision
  - WG discussed if the report should cover protection function within control systems. Gary K. referenced that C37.102 has a section dedicated to “other protection functions”. It was decided that protection functions outside of the relay will be discussed on a case by case scenario for inclusion in the report
  - Sungsoo K. expressed that the remote location of a hydro machine, in synchronous condenser mode, can impact the 40 scheme
- Action Item: Jason Eruneo will send report template to WG members
- Various members of the WG volunteered for writing assignments.
  - Action Item: Gary K. Section 1
  - Action Item: Ryan C. Section 2
  - Action Item: Sungsoo K. and JC Theron Section 3
  - Action Item: Dale F. Section 5
- Steve C. brought up the conversion of old synchronous machines into synchronous condensers
- WG discussed reaching out to manufacturers to have them provide a presentation to the WG covering their practices for synchronous condensers
  - Action Item: Ratan D. will arrange a presentation by GE expert on synchronous condenser practices
  - Action Item: Murty Y. will send Siemens expert contact information to chair and vice chair
  - Action Item: Rob M. will review PES SC tutorial and provide a review and check if the document can be shared. Will also reach out to Siemens synchronous condenser expert and request to present to the WG the manufacturers synchronous condenser practices

Next meeting:
Single session. With room for 30 and a projector.
Request no conflict with J17, J19, J20 and K31.

K10 SCC21 Distributed Resources Standard Coordination
Chair: R. Benjamin Kazimier
Vice Chair: Wayne Stec
Secretary : Matt Garver
Established, 1999
Output: Standard through the SCC 21
Expected Completion Date: 20xx
Assignment: To interface with SCC21/P1547 in order to reduce unnecessary delays by getting PSRC input into the process without having to wait for after-the-fact coordination.

PSRC WG K10 did not meet.

K12: PC37.431.20 IEEE Guide for Protecting Transmission Static Shunt Compensators
Chair: Satish Samineni
Vice Chair: Martin Best
Secretary: -
Output: Guide
Established Date: 2013
Expected Completion Date: 2021
Draft: 23
Assignment: To work jointly with Substations WG I9 to write a guide for protecting transmission static shunt compensators. PSRC WG K12 will provide guidance and review on topics that are already covered in other IEEE guides to prevent overlap and identify areas where interpretation of existing guides is necessary to meet the specific application challenges unique to transmissions static shunt compensators.

PSRC WG K12 did not meet, but the group did meet virtually with WG I9.

K22: C37.234, IEEE Guide for Protective Relay Applications to Power System Busses
Chair: Abu Bapary
Vice Chair: Alla Deronja
Secretary: Alla Deronja
Output: Guide for Protective Relay applications to Power System Busses
Established Date: January 2017
Expected Completion Date: December 2021 (Completed)
Draft: Final
Assignment: Revise and ballot IEEE Standard C37.234 prior to its expiration in 2019

Brief Summary

Call to order
The IEEE patent and policy slides were presented. There were no responses or questions regarding the slides.
The meeting was attended by 15 voting members, 3 non-voting members and 10 guests. Quorum was not achieved. Therefore, the May 2021 WG meeting minutes will be routed for an approval via email.
The meeting agenda was reviewed, and no revisions were made to it. A motion was made to approve the agenda by Jay Anderson and seconded by Jeff Barsch.
The IEEE-SA ballot was successfully completed in August of 2021. The guide revision was approved by the IEEE-SA and now is going through editing for publication.

Technical topics:

1. An outline discussing significant revisions in the guide was developed.
2. To publicize the new guide version, there was a proposal to write a summary paper focusing on the specific guide's revisions and present it at relay conferences. Some members objected because a summary paper was created for the guide's original version, and it appeared an extra effort to create a summary paper for every revision of the standard. With a lot of work going in the PSRC, it would distract the resources from working on standards and reports. A simple show of hands indicated low interest in developing a conference summary paper.
3. Another avenue is to create a Power Point presentation to the PSRC Main Committee. This is typically done for all completed work. A new working group may or may not need to be created for this task. A show of hands indicated moderate interest in conducting this activity.
4. IEEE organizes webinars on the work done by its societies (like PES) and committees (like PSRC), so a Power Point presentation could be created for this purpose. It would need to be more detailed than the presentation for the PSRC Main Committee. There was no interest expressed to take on this project.

Recesses and time of final adjournment: 3:20 pm 01/10/2022

Next meeting: We tentatively plan to have a meeting at the PSRC May 2022 meeting. Please avoid conflicts with CTF48, D47, and I2.

K25: <u>PC37.99 IEEE Guide for the Protection of Shunt Capacitor Banks</u>
Chair: Meyer Kao
Vice Chair: Rick Gamble
Secretary: NA
Output: Guide
Established Date: January 2019
Expected Completion Date: 2023
Draft: 1.5

Assignment: Revise and Update C37.99, IEEE Guide for the Protection of Shunt Capacitors

Formalities:

- The WG met via a Virtual/Face-to-Face Meeting on 1/12/2022 from 9:20 to 10:30 AM PST.
- Officer presiding – Meyer Kao
- Officer recording minutes – Rick Gamble
- The meeting was called to order by the Chair
- Introductions were made
- The Chair reviewed the patent copyright slides
- The meeting was attended by 13 members out of 24, and several guests. Quorum was met.
- Don Lukach moved to approve the 9/22 minutes, Steve Conrad seconds

Meeting Summary:

The conversation opened with a question on how current limiting reactors are sized. A recommendation was made to clarify the references to the underlying material and standards when sizing reactors. Currently C37.012 has some information. The future standard to reference will be C37.04. This information will fit in Section 10. Taylor Raffield will take this assignment, Pratap Mysore will review.

The next topic of discussion was on updating the Section 8 tables, along with Table C.1. The formatting and variable consistency needs some work. The WG would also like to draw a diagram that corresponds with some variables in the table equations. Rick Gamble and Claire Patti will look at providing updates. Ilia Voloh may have the original spreadsheet, John Harder may also have some resources. Visio Diagrams are available on iMeetCentral. Per Don Lukach, tables are allowed to be in landscape format.
For the numerical calculation examples that will be added to the annex, Meyer Kao will work on adding this information. Rick Gamble to review.
Rick Gamble moved to adjourn the meeting, Andy Kunze seconds.

Assignments:

- Taylor Raffield to add information to Section 10 regarding references to sizing reactors. Pratap Mysore to review.
- Claire Patti and Rick Gamble to work on formatting and updating the tables in Section 8 and Table C.1 for consistency, as well as working up Visio Diagrams with corresponding variables.
- Meyer Kao to work on adding numerical examples to the annex. Rick Gamble to review.

For K25 WG Chair to do:

- Send assignment reminders.

Next Meeting:

- The next meeting will be in May 2022. Single session, 25 participants, overhead projector. Avoid meeting conflict with D35, D42,

K26: C37.109 IEEE Guide for the protection of Shunt Reactors
Chair: Kamal Garg
Vice Chair: Ilia Voloh
Output: Guide
Established Date: Aug 2019
Expected Completion Date: 2023
Draft: V 3.1, Jan 7, 2022
Assignment: Revise and update the C37.109 Guide

Meeting Notes

1. Introduction and agenda (23 participants and 6 members). Could not reached Quorum. (Total WG members 20).
2. Approval previous meetings-Sep 21, 2021 will be approved via email.
3. Patent and copyright slides were presented.
4. Kamal gave progress update. K26 Guide is under review of WG members for approval. Except Annex B and F, all other sections are complete and ready for review. Ilia and Kamal is working with contributors to finalize Annex B and Annex F.
5. During the meeting and review, there were comments regarding using level 6 text. SA group confirmed that level 6 headings can be used as long as there is text.
6. Reviewed the addition made for oil reactor thermal protection in guide, no additional comments from WG members.
7. Three new definitions proposed by WG are pending with I2 group for approval.
8. Reviewed some additional sections of guide and updates made from last time. No major comments. Some comments on ungrounded system and negative sequence alarm. WG members will work on language in section 6.2.4.2.7.

9. Ilia and Kamal discussed the plan for WG. Plan is to collect all the comments by February 2022, and may be arrange WG meetings to resolve comments.
10. Adjourn

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

7th WG Meeting

1. Welcome
2. Patent Slides - https://mentor.ieee.org/myproject/Public/mytools/mob/slideset.pdf
3. Quorum
    - 11 Members & 15 Guests
    - No Quorum
4. Approve Agenda
    - Motion – Brandon Davies
    - Second – Steve Klecker
5. Approve Minutes
    - September 2021 PSRC Meeting
    - We will approve by email vote.
6. Follow up on Assignments Received
    - 8.4.3 Edits – Joshua Watson
        - Group discussed X/R ratio definition. The IEEE dictionary has 4 entries for the X/R definition. May need to remove or improve definition in our document. May need to run by I2. Term is used two times in the document.
        - The WG then moved to review 8.4.3. The goal of the assignment was to re-write the anti-islanding section. The group had significant discussion on the topic:
            - New standards like IEEE 1547 may have provisions to allow for islanding.
            - We need to be clear on what is being islanded. The consumer may want to operate as an island if utility is lost, which is common.
            - It is less common to allow the consumer to island with the utility system and feed other customers, yet some in the group felt that given the way technology was moving some applications may be possible soon.
        - WG discussed defining Islanding (and checking if a definition exists). It was also discussed that it was important to set up an expectation where utility guidelines needed to be followed when planning the system. It is not in the best interest for the consumer to allow an uncontrolled island with its generation and result in equipment

malfunction. It may not be in the best interest of other utility customers for the same reasons.
        - Ted Warren and Juan Pineros will work more on the section.
    - Hot Transfer and 4.3.11 - Dean Miller
        - The WG moved to discuss Dean's assignment. The WG reviewed addition in the transformer connection section to clarify need to match transformer phasing to allow hot load transfers.
        - The second item was left for the next meeting.
    - The next assignment reviews are left for the following meeting:
        - Section 9 - Lubo (follow-up)
        - Figures – Steve Conrad and Steve Klecker
        - Section 7 – Gopal Gajjar
7. Continue Guide Editing
    - Hillmon and Paul will send a poll to schedule an online meeting in the March/April timeframe.
8. Motion to Adjourn
    - Motion – Ted Warren
    - Second - Lubo

Room for 30
K25, K26 and 29

K29: Write PES technical report based on K3 report entitled 'Reducing outage durations through improved protection and autorestoration in distribution substations'.
Chair: Sebastien Billaut
Vice Chair: Mohamed Zedh
Secretary: Lalitha Devarakonda
Established: 2019
Output: Recommendation to K SC
Expected Completion Date: 2020
Assignment: Create a PES technical report based on the K3 report entitled 'Reducing outage durations through improved protection and auto restoration in distribution substations'.

Meeting Notes

K29 met Monday January 10th at 15:40 PST with 21 attendees**,** via the virtual online Teams as well as in person.
Chair, Sebastien Billaut presided over the meeting. He brought the meeting to order and showed the agenda. The vice chair recorded the minutes. The host moderated the Chat window along with the Vice Chair Mohammad Zadeh.
Quorum was not reached. Decision was made to approve the September 2021 meeting electronically.
4 attendees were new to the group. No one requested to become a voting member.
The chair first reviewed the new topic assignments to check the progress. Below is the status

Item 3: will be submitted by the end of January
Item 5: the work is in progress.
Item 8: we need to review the report as there is IEC 61850 related subjects
Item 9: Hillmon did not attend. Chair will need to follow up with him.
Item 11: Sebastien will work as liaison with D sub-committee to resolve.

Then chair reviewed the assignments for existing topics as following.

1- Item 2: met twice each month, they should be done by the next meeting
2- Items 5 and 9: to be submitted by the end of January.

3- Item 6: work is in progress.

For topics that leaders were absent, chair will follow up after the meeting.
Nirmal Nair moved the motion to adjourn, Swaggata Das seconded the motion
For the next meeting, if face-to-face, we will need a projector and a room for 40.
Avoid conflict with C38, D30, D35, D38, D42, D44, K22, K27, C44, CTF47

K31: Revision to C37.119 IEEE Guide for Breaker Failure Protection of Power Circuit Breakers.
Chair: Vahid Madani
Vice Chair: Brandon Davies
Secretary: Jason Eruneo
Assignment: Revise C37.119-2016, IEEE Guide for Breaker Failure Protection of Power Circuit Breakers
Draft: N/A (Work on document has not started)

Summary:

- Total Attendees: 42, Seven (7) in-person attendance, and 33 virtual participants
- No updates or suggestions were made to the agenda
- Chair presented IEEE patent slides. No essential patents were identified
- Eight (8) out of 12 members of the September 2021 TF, helped prepare the scope section of the draft PAR. Scope is based on the 2016 Guide.
- Chair updated everyone on the status of the PAR process. We have not submitted a request for PAR approval; pending subcommittee approval

The draft PAR, developed during December WebEx meetings, was reviewed with the group. Minor editorial comments to the revised scope, purpose and other sections were discussed and applied to the draft PAR.
The group discussed if this guide should be updated to a recommended practice. There was a concern raised that that there may be too much variation in acceptable practices within industry to agree on a single industry recommended practice. Attendees decided that the document should remain a guide.
The group discussed if this revision represents a substantial change in scope. The general opinion is that the language used to describe the scope changed but the content or intent of the existing guide presents will not change substantially.
Gene Henneberg made a motion to approve the language presented for the PAR for presentation to the main committee, Don Ware seconded. After discussion and 1 editorial change, all members approved and no objections or abstentions were noted, the motion passed.

Details:

- The WG reviewed the PAR draft:
- Titles revision was proposed; we added “system” to the titles since we are protecting all of the elements of the power system from the fault & breaker failure event
- Scope revision was proposed:
    - Minor change was made to remove “that”
    - Don Ware mentioned breaker operating times being too slow and BF operating erroneously; requested this topic be added to the body of the guide
    - Claire Patti brought up the importance of the existing language “failure to interrupt” within the scope. It was discussed and consensus was that the proposed language is OK.

- Alla Deronja asked WG if circuit switchers are going to be included in the guide; chair advised that the guide scope only covers circuit breakers
- Concerns were brought up about simplifying existing scope; it may limit what we can cover within the guideline
- Alla Deronja recommended changing “protective” to “protection”; members of WG agreed with the proposed modification
- Minor changes were made to the Purpose section
- Roger Whittaker expressed that he believed the guide should be a recommended practice. Don L. expressed that he does not believe it should be a recommended practice because the guideline is too broad; there may be too much variation in acceptable practices within the industry to agree on a single industry recommended practice. Roger W. agreed with Don L. WG decided that the document should remain a guide
- Don Lukach explained to the WG to determine whether the changes to the draft scope are deemed “major” than it may require additional approval from the main committee. Roger Whittaker expressed that the changes do not modify the meaning of the original scope; the wording was just simplified. The general opinion is that the language used to describe the scope changed but the content or intent of the existing guide will not change substantially.
- Gene Henneberg made a motion for WG to approved changes to the PAR draft
  - Don Lukach seconded
  - Alla D requested a minor modification to the scope.
- Gene Henneberg amended his motion to approved changes to the PAR drat with the inclusion of All D. latest modification request
  - Alla Deronja seconded
  - Motion passed unanimously

Action Item: Vahid will present the PAR to the K subcommittee for approval to submit to IEEE-SA

Next meeting: May PSRC, Reno, NV

- For our next meeting we request a single session with room for 40 people and a projector
- Request to avoid conflicts with J17, J19, J20, J25 – If possible, retain the Tuesday 9:20 AM block of WG to avoid conflicts

M. Presentations: Gene Henneberg

H35, COMTRADE: Next Generation, Mark Adamiak

Adjournment:

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