



**POWER SYSTEM RELAYING AND CONTROL COMMITTEE
of the IEEE POWER AND ENERGY SOCIETY
MINUTES of the MEETING in Reno, NV**

May 9-12, 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, May 12, 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 (84 of 134 Main Committee voting members). Attendance was recorded via webex 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 | Returning | New Attendees | In-Person | Virtual | Total |
|-----------|-----------|---------------|-----------|---------|-------|
| Both | 100 | 5 | 29 | 76 | 105 |
| PSCCC | 12 | 2 | 3 | 11 | 14 |
| PSRC | 183 | 19 | 79 | 123 | 202 |
| Total | 295 | 26 | 111 | 210 | 321 |

Quorum check: 35 in person, 49 on line, total=84 (need 68)

Meeting registrants came from the following 14 countries:

Canada, China, Colombia, France, Germany, India, Ireland Japan, New Zealand, Republic of Korea, Saudi Arabia, Spain, UK, USA

II. Approval of Minutes / Financial Report: Gene Henneberg

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

The PSRC committee financial status is healthy. In person registration increased from January to May from about 60 to 100, and total registration also increased from just under 300 to more than 320.

Expenses for the joint JTCM January meeting were low. Expenses for the 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
 - studies
- **GM 2022 (In Person Meeting, July 17 to 21, Denver, CO)**
 - 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
 - 14 Papers 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 | Sebastien Billaut |
| Manish Patel | Pratap Mysore | Shuhui Li |
| Marc Lacroix | Rafael Garcia | Taylor Raffield |
| Mark Adamiak | Ramakrishna Gokaraju | Tony Bell |
| Matchyaraju Alla | Randy Cunico | Veselin Skendzic |
| Mike Dood | Rene Midence | Vinod Yedidi |
| Mohammad Zadeh | Rich Hunt | Wayne Hartmann |
| Mukesh Nagpal | Roger Whittaker | Yi Hu |
| Nathan Gulczynski | Rui Fan | Yu Liu |
| N Paul Elkin | Sakis Meliopoulos | Zhiying Zhang |

PSRC Committee Featured in PES Mailing

Centralized Protection and Control (CPC) Systems within a Substation



Centralized Protection and Control (CPC) Systems within a Substation, the next great disruptive technology to design and implement electrical power substation protection and control systems is being examined today.

<https://www.ieee-pes.org/technical-activities/trending-technologies/>

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
 - New system supplied by MemberPlanet
 - Anticipate implementation in time to support meeting attendance records for the Sept 2022 PSRC meeting, but not in time for meeting registration

Meeting Breaks

- PSRC expresses much thanks to Sargent & Lundy for sponsoring our refreshments during the Wednesday morning break
- PSRC also expresses thanks to Qualus for donating the shirts for the awards ceremony

B. Future Meetings: Murty Yalla

- September 2022, Nashville, TN
- January 2023, JTCM, Jacksonville, FL
- May 2023, Las Vegas, Nevada
- September 2022, Myrtle Beach, SC (tentative)

Details for the September 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

C. 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 is [posted](#) along with the minutes.

C. CIGRE B5 Activities Report: Rich Hunt

General News:

My 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 me.

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:

- Requirements for IT and OT managed PACS
- PACS design for reliability
- 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. The last three Working Groups are looking for a Convener to head up the working group.

New Publications

Technical Brochures

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

Webinars

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

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

2022 CIGRE Grid of the Future Conference, Chicago, IL.

The 2022 CIGRE Grid of the Future Conference will be held in Chicago, IL from November 7 to 10, 2022. The GOTF presents papers over 6 CIGRE Study Committees (A2, A3, B1, B4, B5, C1), and includes a NGN (next generation engineer) paper contest.

The Call For Papers is out. Complete manuscripts must be submitted by July 31, 2022 for consideration for inclusion in the Conference, with authors notified by August 22, 2022.

For complete details on the CIGRE Grid of the Future, visit the website at <https://cigre-usnc.org/grid-of-the-future-2022/>.

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.

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

The report is very long and will be [posted](#) along with the minutes.

E. IEC Report for May 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.

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* – Passed Feb. CDV vote to technically stable Final Draft for International Standard (FDIS).
- 60255-26 Ed 4 - *EMC requirements* – Same - FDIS.
- 60255-27 Ed 3 - *Safety requirements* – awaiting outcome from CDV vote.
- These standards are highly impactful to designers and manufacturers.
- We have engaged PSRC WGs working on IEEE equivalents to align with IEC.
- 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* – published.
- 60255-187-3 – *Functional standard for line differential relays* – CD soon.
 - PSRC will restart D34 to review and comment.
 - Splitting out channel issues for a separate project TR 60255-216-3.
- 60255-187-2 – *Functional standard for busbar differential relays* – work restarted as 187-3 CD approaches.
- 60255-132 – *Functional standard for directional power relays* – *new project*, CD in 2022.
- 60255-167 - *Functional standard for directional relays* – *new project*, CD in 2022. Directional functionality only; overcurrent covered in published 60255-151.

- TC 95 and PSRC are starting JWG for 60255-24/C37.111 dual logo COMTRADE revision.
- 60255-216-1 – *Digital Interface - Requirements for relays with digital I/O* (e.g., merging units) – Technical Report to be issued soon based on CD.
- 60255-216-3 - *Digital Interface - Test specification for protection data communication of Line Current Differential Protection*
 - Line Current Differential Protection with TDM or Ethernet, e.g. T1 or MPLS. Specify tests to verify correct operation in support of 87L function during healthy or faulted power system conditions considering comms problems of data loss,

corrupt data bits, changes of latency, asymmetric latency, path interruptions and re-routing, and jitter or packet delay variation (PDV).

- Split out from 187-3 development of protection function performance.
 - US & Canada fixed scope with Convenor – New project (NP) vote to be repeated
 - Topic of shared interest with PSCC.
 - **Soliciting more volunteers with expertise in teleprotection data channels.**
- IEC Advisory Committee on Safety (ACOS) asked about TC 95 interest in *collaborative safety* standards
 - USNC responded that *coexistence* safety is all that is needed for relay systems in substations.
 - Trained experts perform infrequent on-site maintenance on unattended automatic equipment.
 - Coexistence safety requirements well covered in 60255-27 Ed 3.
 - Previously reported joint TC 8/TC 95 projects on travelling wave fault protection, fault location, and HVDC protection all report little or no progress so far (TC 8 management).

TC 95-PSRC standards collaboration summary

- US TAG comments in depth on TC 95 standards drafts.
- US has participants in TC 95 working groups and maintenance teams – thanks to supportive employers.
- US participants are supporting administrative steps including project scope definitions.
- PSRC WGs are established for each complex IEC standard project to evaluate drafts and to contribute to IEC content.
- PSRC product standard WGs are focused on alignment with IEC – especially test procedures for manufacturers
- 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

WG and SC Chairs continue to do well processing PARs!

31 Active PARs with 4 more soon to be added.
13 are due in 2022. Extensions expected later this year for a few of them.
10 Joint Committee Projects

- New P&Ps will be discussed and voted upon in a few minutes.
- Training on the new P&Ps planned for September.
- The O&P is also due this year and is expected to be voted on in September. Drafts will be forwarded out this summer.
- Mandatory IEEE SA Training for all PSRC, Subcommittee, and WG officers has started. Some of the details still being worked out with SA.
 - 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
- New Participant Behavior Slides for Standard Working Groups
- These are in addition to the Copyright and Patent ones
- IEEE SASB Operations Manual clause 5.3.3 recently changed to require the presentation of the slides developed in 2019.
 - Option 1: Present slides at the beginning of every meeting
 - Option 2: Distributed slides with agenda prior to the meetingNote that if the slides are distributed with the meeting agenda, all meeting participants shall be informed at the beginning of the meeting that participant behavior shall comply with the outlined requirements.
<https://standards.ieee.org/content/ieee-standards/en/about/policies/index.html>

New P&Ps

Due by the end of 2022

New templates.

Wanted to keep as much as we do now and clean up holes in our processes.

SA template is locked down with many sections or sub-sections not allowed for edits. So, an Addendum document was created to help us understand and discuss PSRC applicability.

P&Ps distributed weeks ago to all PSRC Main Committee members for review and comment.

These versions have been through PSRC officer Approval and initial SA editorial.

Editorial from the SA initial review indicates that I need to realign the section numbers with the template so AudCom can use their checklist.

I will do this as editorial before submission.

Motion 1:

***The PSRC Standard's Coordinator* motions to approve the PSRC_SA_P&P dated 2022-4-25 with the additional comments:**

- 1. All SA AudCom editorial comments after PSRC approval be addressed using the same process as a Standard for publishing and P&P is not required to go back through PSRC Main Committee.**
- 2. If SA AudCom rejects Notes 1 and 2 in the Responsible Subcommittee section that the information be placed in the IEEE PSRC SA and WG PP Addendum to**

reflect the current and approved PSRC practice with delegated authority to the SC.

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

Motion 2:

The PSRC Standard's Coordinator motions to approve the PSRC_WG_P&P dated 2022-4-25 with the additional comments:

- 1. All SA AudCom editorial comments after PSRC approval be addressed using the same process as a Standard for publishing and P&P is not required to go back through PSRC Main Committee.**

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

- This report summarizes the status of PAR related projects as of the May, 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 \(ieee.org\)](https://www.ieee.org/standards/content/ieee-standards/en/about/policies/individual-method.pdf)
- 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**

- C37.120 Protection System Redundancy for Power System Reliability
- C37.108 Guide for the Protection of Secondary Network Systems
 - Standard Inverse-Time Characteristic Equations for Overcurrent
- C37.112 Relays
 - Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and
- C37.242 Control
- C37.91 Guide for Protecting Power Transformers
- C37.234 Guide for Protective Relay Applications to Power System Buses

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

| Project Number | Project Title |
|----------------|---|
| 2800 | Standard for Interconnection and Interoperability of Inverter-Based Resources (IBR) Interconnecting with Associated Transmission Electric Power Systems |
| PC37.243 | Guide for Application of Line Current Differential Protection Using Digital Communications |
| P1854 | Guide for Smart Distribution Applications |
| PC37.431.20 | Guide for Protecting Transmission Static Shunt Compensators |
| P2800.2 | Recommended Practice for Test and Verification Procedures for Inverter-based Resources (IBRs) Interconnecting with Bulk Power Systems |

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

| Project Number | Project Title | Expiration PAR Date | Project Status |
|----------------|--|---------------------|---|
| PC37.102 | Guide for AC Generator Protection | 31 Dec 2022 | SA Ballot: Invitation SA Ballot: Comment |
| PC37.233 | Guide for Power System Protection Testing | 31 Dec 2022 | Resolution |
| PC37.300 | Guide for Centralized Protection and Control (CPC) Systems within a Substation | 31 Dec 2022 | Draft Development |
| PC37.90 | Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – General Requirements and Tests | 31 Dec 2022 | Draft Development |
| PC37.92 | Standard for Low-Energy Analog Interfaces between Protective Relays and Power System Signal Sources | 31 Dec 2022 | SA Ballot: Comment Resolution |
| P2030.12 | Guide for the Design of Microgrid Protection Systems | 31 Dec 2022 | SA Ballot: Ballot |
| 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 |
| PC37.1.2 | Guide for Databases Used in Utility Automation Systems | 31 Dec 2022 | Draft Development |
| PC37.249 | Guide for Categorizing Security Needs for Protection, Automation, and Control Related Data Files | 31 Dec 2022 | SA Ballot: Comment Resolution |
| PC37.251 | Standard for Common Protection and Control Settings or Configuration Data Format (COMSET) | 31 Dec 2022 | Draft Development |
| P1613 | Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus | 31 Dec 2022 | SA Ballot: Comment Resolution |
| PC37.2 | Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations | 31 Dec 2022 | SA Ballot: Comment Resolution |

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|-------------|---|-------------|-------------------------------------|
| PC37.1.3 | Recommended Practice for Human Machine Interfaces (HMIs) used with Electric Utility Automation Systems | 31 Dec 2023 | Draft Development |
| PC37.110 | Guide for the Application of Current Transformers Used for Protective Relaying Purposes | 31 Dec 2023 | SA Ballot: Recirculation |
| PC37.90.2 | Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – Radiated Electromagnetic Interference Withstand Capability Requirements and Tests | 31 Dec 2023 | SA Ballot: Comment Resolution |
| PC37.252 | Guide for Testing Automatic Voltage Control Systems in Regional Power Grids | 31 Dec 2023 | Draft Development |
| P1646 | Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation | 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 | Development |
| PC37.431.20 | Guide for Protecting Transmission Static Shunt Compensators | 31 Dec 2023 | Draft Development |
| PC37.113 | Guide for Protective Relay Applications to Transmission Lines | 31 Dec 2024 | Draft Development |
| PC37.90.1 | Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus-Surge Withstand Capability (SWC) and Electrical Fast Transient (EFT) Requirements and Tests | 31 Dec 2024 | Draft Development |
| PC37.90.3 | Standard Electrostatic Discharge Tests for Protective Relays | 31 Dec 2024 | SA Ballot: Ballot |
| PC37.95 | Guide for Protective Relaying of Utility-Consumer Interconnections | 31 Dec 2024 | Draft Development |
| PC37.114 | Guide for Determining Fault Location on AC Transmission and Distribution Lines | 31 Dec 2024 | Draft Development |
| PC37.101 | Guide for Generator Ground Protection | 31 Dec 2024 | Draft Development |
| P1854 | Guide for Smart Distribution Applications | 31 Dec 2024 | Development |
| P2800.2 | Recommended Practice for Test and Verification Procedures for Inverter-based Resources (IBRs) Interconnecting with Bulk Power Systems | 31 Dec 2025 | Draft Development |
| PC37.239 | Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems | 31 Dec 2025 | Draft Development |
| PC37.243 | Guide for Application of Line Current Differential Protection Using Digital Communications | 31 Dec 2025 | Draft Development |
| PC37.232 | Standard for Common Format for Naming Time Sequence Data Files (COMNAME) | 31 Dec 2025 | Draft Development |
| PC37.96 | Guide for AC Motor Protection | 31 Dec 2025 | Draft Development |

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| PC37.119 | Guide for Power System Circuit Breaker Failure Protection Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric | 31 Dec 2026 | Draft Development |
| P1547 | Power Systems Interfaces | 31 Dec 2026 | Draft Development |
| P1547.10 | Recommended Practice for Distributed Energy Resources (DER) Gateway Platforms | 31 Dec 2026 | Draft Development |
| PC37.111 | IEEE/IEC International Standard - Measuring relays and protection equipment – Part 24: Common format for transient data exchange (COMTRADE) for power systems | NA | NesCom Agenda (20 Sep 2022) |

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

| Project Number | Project Title | Project Status |
|-----------------------|---|-------------------------------|
| PC37.110 | Guide for the Application of Current Transformers Used for Protective Relaying Purposes | SA Ballot: Recirculation |
| PC37.102 | Guide for AC Generator Protection | SA Ballot: Invitation |
| PC37.233 | Guide for Power System Protection Testing | SA Ballot: Comment Resolution |
| PC37.92 | Standard for Low-Energy Analog Interfaces between Protective Relays and Power System Signal Sources | SA Ballot: Comment Resolution |
| PC37.249 | Guide for Categorizing Security Needs for Protection, Automation, and Control Related Data Files | SA Ballot: Comment Resolution |
| P1613 | Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus | SA Ballot: Comment Resolution |
| PC37.2 | Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations | 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 | SA Ballot: Comment Resolution |
| P2030.12 | Guide for the Design of Microgrid Protection Systems | SA Ballot: Ballot |
| PC37.90.3 | Standard Electrostatic Discharge Tests for Protective Relays | SA Ballot: Ballot |
| PC37.111 | IEEE/IEC International Standard - Measuring relays and protection equipment – Part 24: Common format for transient data exchange (COMTRADE) for power systems | NesCom Agenda (20 Sep 2022) |
| PC37.300 | Guide for Centralized Protection and Control (CPC) Systems within a Substation | 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 |
| P2030.100.1 | Monitoring and Diagnostics of IEC 61850 Generic Object Oriented Status Event (GOOSE) and Sampled Values Based Systems | Draft Development |
| PC37.1.2 | Guide for Databases Used in Utility Automation Systems | Draft Development |

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|-------------|---|-------------------|
| PC37.251 | Standard for Common Protection and Control Settings or Configuration Data Format (COMSET) | Draft Development |
| PC37.1.3 | Recommended Practice for Human Machine Interfaces (HMIs) used with Electric Utility Automation Systems | Draft Development |
| PC37.252 | Guide for Testing Automatic Voltage Control Systems in Regional Power Grids | Draft Development |
| P1646 | Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation | Draft Development |
| PC37.109 | Guide for the Protection of Shunt Reactors | Draft Development |
| PC37.99 | Guide for the Protection of Shunt Capacitor Banks | Draft Development |
| PC37.431.20 | Guide for Protecting Transmission Static Shunt Compensators | Draft Development |
| PC37.113 | Guide for Protective Relay Applications to Transmission 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 |
| PC37.95 | Guide for Protective Relaying of Utility-Consumer Interconnections | Draft Development |
| PC37.114 | Guide for Determining Fault Location on AC Transmission and Distribution Lines | Draft Development |
| PC37.101 | Guide for Generator Ground Protection | Draft Development |
| P1854 | Guide for Smart Distribution Applications | Draft Development |
| P2800.2 | Recommended Practice for Test and Verification Procedures for Inverter-based Resources (IBRs) Interconnecting with Bulk Power Systems | Draft Development |
| PC37.239 | Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems | Draft Development |
| PC37.243 | Guide for Application of Line Current Differential Protection Using Digital Communications | Draft Development |
| PC37.232 | Standard for Common Format for Naming Time Sequence Data Files (COMNAME) | Draft Development |
| PC37.96 | Guide for AC Motor Protection | Draft Development |
| PC37.119 | Guide for Power System Circuit Breaker Failure Protection | Draft Development |
| P1547 | Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces | Draft Development |
| P1547.10 | Recommended Practice for Distributed Energy Resources (DER) Gateway Platforms | Draft Development |
| C37.90.3 | Standard for Electrostatic Discharge Tests for Protective Relays | Completed |
| C37.102 | Guide for AC Generator Protection | Completed |
| C37.109 | Guide for the Protection of Shunt Reactors | Completed |
| C37.231 | Recommended Practice for Microprocessor-based Protection Equipment Firmware Control | Completed |

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|-------------|---|-----------|
| C37.90.1 | Standard Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus | Completed |
| C37.96 | Guide for AC Motor Protection | Completed |
| C37.99 | Guide for the Protection of Shunt Capacitor Banks | Completed |
| C37.111 | Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems | Completed |
| C37.114 | Guide for Determining Fault Location on AC Transmission and Distribution Lines | Completed |
| C37.95 | Guide for Protective Relaying of Utility-Consumer Interconnections | Completed |
| C37.113 | Guide for Protective Relay Applications to Transmission Lines | Completed |
| C57.13.3 | Guide for Grounding of Instrument Transformer Secondary Circuits and Cases | Completed |
| C37.103 | Guide for Differential and Polarizing Relay Circuit Testing | Completed |
| C37.119 | Guide for Breaker Failure Protection of Power Circuit Breakers | Completed |
| C37.243 | Guide for Application of Digital Line Current Differential Relays Using Digital Communication | Completed |
| 1613.1 | Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Transmission and Distribution Facilities | Completed |
| C37.241 | Guide for Application of Optical Instrument Transformers for Protective Relaying | Completed |
| C57.13.1 | Guide for Field Testing of Relaying Current Transformers | Completed |
| 2030.100 | Recommended Practice for Implementing an IEC 61850 Based Substation Communications, Protection, Monitoring and Control System | Completed |
| C37.246 | Guide for Protection Systems of Transmission to Generation Interconnections | Completed |
| C37.248 | Guide for Common Format for Naming Intelligent Electronic Devices (COMDEV) | Completed |
| 60255-118-1 | Measuring Relays and Protection Equipment - Part 118-1: Synchrophasor for Power System - Measurements | Completed |
| C37.237 | Standard Requirements for Time Tags Created by Intelligent Electronic Devices - COMTAG(TM) | Completed |
| C37.245 | Guide for the Application of Protective Relaying for Phase Shifting Transformers | Completed |
| 2030.101 | Guide for Designing a Time Synchronization System for Power Substations | 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 |
| C37.250 | Guide for Engineering, Implementation, and Management of System Integrity Protection Schemes | Completed |
| C37.230 | Guide for Protective Relay Applications to Distribution Lines | Completed |

| | | |
|---------|---|-----------|
| C37.120 | Protection System Redundancy for Power System Reliability | Completed |
| C37.108 | Guide for the Protection of Secondary Network Systems | Completed |
| C37.112 | Standard Inverse-Time Characteristic Equations for Overcurrent Relays | Completed |
| C37.242 | Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control | Completed |
| C37.91 | Guide for Protecting Power Transformers | Completed |
| C37.234 | Guide for Protective Relay Applications to Power System Buses | Completed |
| 2800 | Standard for Interconnection and Interoperability of Inverter-Based Resources (IBR) Interconnecting with Associated Transmission Electric Power Systems | Completed |
| C37.104 | Guide for Automatic Reclosing on AC Distribution and Transmission Lines | Completed |
| C37.106 | Guide for Abnormal Frequency Protection for Power Generating Plants | Completed |
| C37.235 | Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes | Completed |

G. PSCC Committee Report: Mark Benou, Secretary PSCCC

- PSCCC held 30 meetings this week including sub-group meetings of the P, S, and C subcommittees, a new comers meeting on Monday, and 3 subcommittee meetings. At 11AM today [May 12], we will have our main committee meeting.
- We are especially appreciative of the close working relationship with the PSRC. As we see more joint WGs, we all are benefitting from the partnership between the TCs
- C0 –Power Line Carrier Subcommittee
 - C2 – Study Group for IEEE C93.4 – Standard for Power Line Carrier Line-Tuning Equipment (30 kHz to 500 kHz) Associated with Power Transmission Lines submitted their PAR this week
 - PC93.5 – Standard for Power Line Carrier Transmitters/Receivers used to Transfer Discrete Teleprotection Signals – Corrigendum 1, successfully formed their ballot body and should publish by the end of the week.
Congratulations to PC93.5 Working Group
- P0 – Protocols and Communication Architecture Subcommittee
 - Galina Antonova was appointed as the liaison to D47 for the joint sponsorship of the C37.243 Guide for Application of Digital Line Current Differential Relays Using Digital Communication.
 - P19 P2030.103 - Standard for Universal Utility Data Exchange (UUDEX), has submitted a PAR and has been converted to a WG.
 - Tom Dahlin was appointed as liaison to PSRC H41, Revision of IEEE 1646 Communication Delivery Time Performance Requirements, in a joint effort to add a relevant testing section to P1646.
 - The P21 SG finished its work on System Architectures Supporting the Virtualization of Substation Protection and Control Applications that is complementary to the ongoing H45 work. P21 recommended to the P0 Subcommittee to continue its work as a task force that is joint with the PSRC. P0 started but did not complete its deliberations this

week, so that discussion will be continued and coordination with the PSRC subcommittees is still in progress.

H. IEEE P1952 Resilient PNT UE Standard Working Group -- Jeff Dagle

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

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

- Line current differential protection
- Traveling wave fault location
- Synchrophasors (IEC/IEEE 60255-118-1)
- Sampled values (IEC 61850-9-2)
- Synchronized Sequence-of-Event (SOE) logging

These electricity precision timing use cases will be combined with use cases from other sectors, and with consideration of potential threats, hazards, and disruptions to resilient PNT, will serve as an input to the newly emerging resilient PNT UE standard.

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

I. IEEE SCC21 / P1547 Update – Ben Kazimier

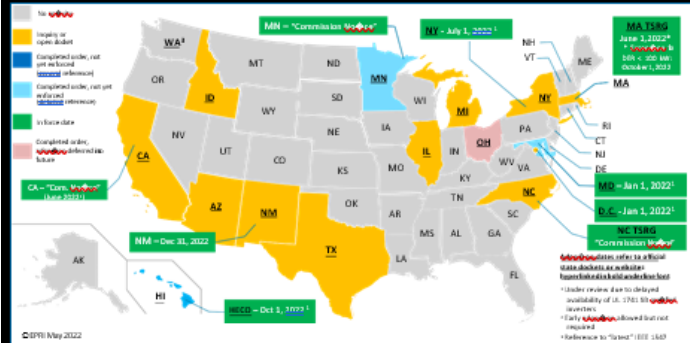
Standards under development

Interconnections

- IEEE P1547.2 - Application Guide for IEEE Std 1547(TM), IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems
 - Guidance for application of IEEE 1547-2018 for all DER technologies. Covers details for a wide variety of applications and technologies.
- IEEE P1547.9 - Guide to Using IEEE Std 1547(TM) for Interconnection of Energy Storage Distributed Energy Resources with Electric Power Systems
 - Guidance for application of IEEE 1547-2018 for battery and other storage technologies.
- IEEE P1547.3 - Guide for Cybersecurity of Distributed Energy Resources Interconnected with Electric Power Systems
 - Guidance for cybersecurity of DER and associated communications systems.
- 1547 - Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces
 - Main standard revision 1547-2018

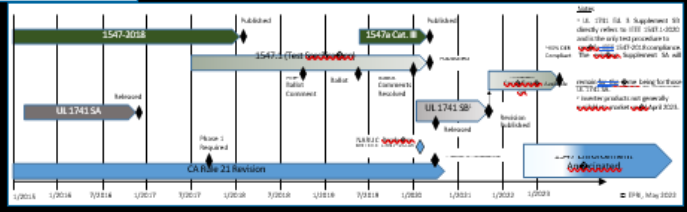
IEEE Std 1547

IEEE Std 1547-2018 Adoption and Certified Inverters Availability



- States are inquiring or are opening dockets to adopt IEEE 1547-2018
- IEEE 1547a-2020 Amendment not widely known; need to raise awareness
- SCC21 is tracking progress on website at <https://sagroups.ieee.org/scc21/standards/1547rev/>
- For inverter-based DER, UL 1741 Ed. 3 Supplement B is the only test procedure to certify IEEE 1547-2018 compliance.

- First set of UL 1741 SB certified inverters entering the market.
- Certified inverter products not generally available to market until April 2023.



IEEE Std 1547

Approved PAR for Next Revision

PAR was coordinated across many PES committees and across IEEE societies

approved on March 24, 2022 by SCC21
 unanimously approved at April NESCOM

Sponsors:

1. SCC21 Standards Coordinating Committee 21 (main sponsor)
2. PE/PSCC Power System Communications and Cybersecurity
3. PE/PSRC Power System Relaying and Control
4. PE/PELS Power Electronics Society Standards Committee
5. PE/T&D Power and Energy Society Transmission & Distribution Committee
6. COM/PLC Communications Society Power Line Communications Standards Committee
7. PE/EDPG Energy Development and Power Generation Committee
8. PE/EM Electric Machinery Committee

Links

- <https://standards.ieee.org/ieee/1547/10906/>
- <https://development.standards.ieee.org/myproject-web/public/view.html#pardetail/9843>

Establishing formal P1547 WG Liaison and Vice-Chairs

Standards Under Development Interconnection – Recent Projects

- IEEE P1547.10 - Recommended Practice for Distributed Energy Resources (DER) Gateway Platforms
 - Enable direct integration of DER with the monitoring and control systems of grid operators
 - Approved by NESCOCOM on April 27

Interconnection BPS – Recently Started

- IEEE P2800.2—Recommended Practice for Test and Verification Procedures for Inverter- based Resources (IBRs) Interconnecting with Bulk Power Systems [IEEE PES EDPG]
- Test and verification procedures to confirm plant-level conformance of inverter-based resources (IBRs) interconnecting with bulk power systems in compliance with IEEE Std 2800.

Standards Under Development / Review

***Content Review for Consistency**

Interoperability

- IEEE P2030 – Revision of IEEE 2030-2011
- IEEE 2030.5™-2018 - a protocol that has been instrumental in integrating interoperability into California regulations, and is critical to establishing vehicle-to-grid energy-transfer protocols. Currently Under Revision
- IEEE P2030.4; Guide for Control and Automation Installations Applied to the Electric Power Infrastructure
- IEEE 2030.2-2015 Guide for the Interoperability of Energy Storage Systems

Microgrid (Approved Standards)

- IEEE 2030.7-2017; Standard for the Specification of Microgrid Controllers
- IEEE 2030.8-2018; Standard for the Testing of Microgrid Controllers
- IEEE 2030.9-2019 Recommended Practice for the Planning and Design of the Microgrid
- IEEE P2030.10 IEEE standard for DC Microgrids
- IEEE P2030.11 Guide for DERMS (Aggregation of DER)
- IEEE P2030.12 Guide for Protection of Microgrid Systems

Advanced Inverter Interactions with Electric Grids

- White Paper to be Published Soon
 - IEEE SCC21 Sponsored Study Group
- Inverter operating modes and functionality of modern inverters described
- Focus on the comparison of grid-following (GFL) and grid-forming inverters.
- Identify Opportunities and Challenges related to GFM

J. NERC Report: Rich Bauer

- **Standard Developments**
- **SARs on the horizon**
- **Disturbance Reports**
- **IBR news**

PRC-005-6

- SAR accepted by the Standards Committee on 10/20/2021
 - 4 SAR postings

- Maintenance required for protective functions enabled within excitation control systems (AVR) and other control systems that trip BES elements directly or through aux relays
- Control systems that do not contain BES protective functions are not applicable to the Standard
- Enhance the Standard for other DC supply technologies (battery and non-battery based)

PRC-019-2

- SAR accepted by the Standards Committee 12/15/2021
- Multiple clarifications requested
- Dispersed power resources, reactive devices, steady state stability limit
- In conjunction with MOD-025 revision

PRC-023 SAR

- Proposal to remove/modify R2 and Attachment A - 2.3
 - R2. Each Transmission Owner, Generator Owner, and Distribution Provider shall set its out-of-step blocking elements to allow tripping of phase protective relays for faults that occur during the loading conditions used to verify transmission line relay loadability per Requirement R1.
 - 2. The following protection systems are excluded from requirements of this standard:
 - 2.3. Protection systems intended for protection during stable power swings.
- SAR accepted by Standards Committee on 12/15/2021

PRC-002 SARs accepted by Standards Committee on 1/19/2022

- **2 SARs**
- **IRPTF SAR – current Standard is based on short circuit MVA – IBRs are low short circuit facilities**
- **Glencoe SAR – clarify connected versus directly connected**

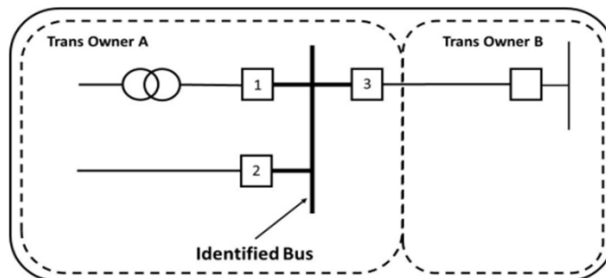


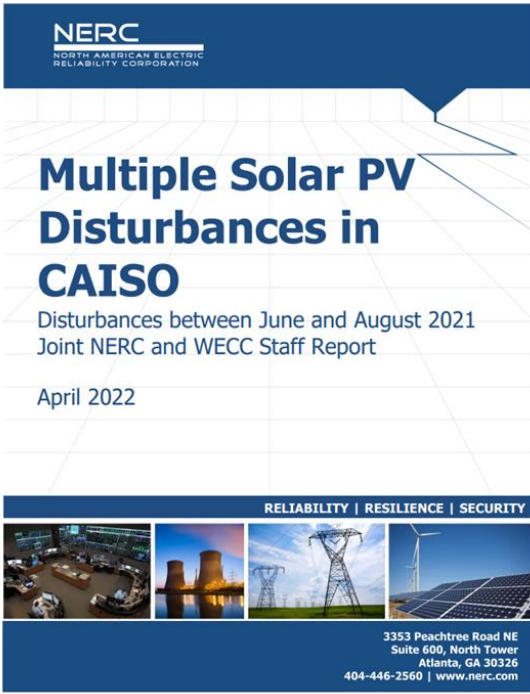
Figure 3

PRC-004 SAR coming

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

PRC-024 SAR coming

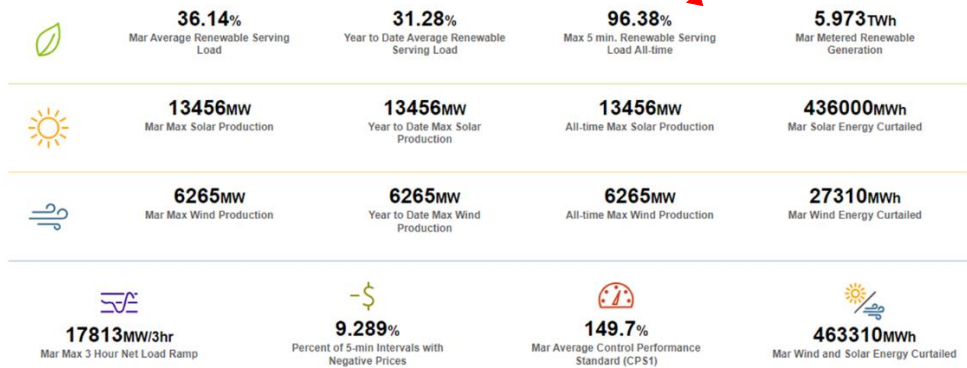
- Make it a ride through Standard rather than a relay setting Standard



California ISO Monthly Renewables Performance Report

Mar. 2022 Summary Net Load Pricing VER Curtailment Reliability Metrics

Summary



Note the level of renewable generation

J. Advisory Subcommittee Reports - Murty Yalla

- We want to encourage our IEEE Members who aren't already IEEE Senior Members to apply for the upgrade. We have a lot of PSRC committee attendees who will be able to provide recommendations.
- 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>

- IEEE SA elections are open, closing on October 1. If you are an SA member, please remember to vote.

K. Administrative Working Groups

B1: Awards and Technical Paper Recognition Working Group

Chair: Hugo Monterrubio

Vice Chair: Mal Swanson

PSRC Awards Ceremony

- Our first PSRC Awards Ceremony took place this Monday during our welcome reception
- Individual and WG awards were given including:
 - PSRC Service Awards for 25, 40 and 50 years of service
 - PSRC Career Awards
 - Completed WG Awards
- IEEE Fellow Class of 2022
 - Prof. Tianshu Bi
 - Prof. Chul-Hwan Kim
 - Dr. Mukesh Nagpal
- PSRC Young Professional Award
 - 2020 Jason Espinoza
 - 2021 Ritwik Chowdhury
- Backlog of pending awards will continue to be delivered in future Awards Ceremonies

Our next PSRC/PSCC Awards Ceremony will be: **Monday September 12, 2022** at:

Sheraton Music City Hotel

777 McGavock Pike

Nashville, TN 37214

During our Monday Reception starting at 6:30PM

REMINDER

Standards WG Awards/Certificates

- The IEEE Standards Association Working Group Awards procedure to request certificates of appreciation for completed (Approved Standard) work has to be initiated online by the WG Chair or Vice Chair
- IEEE SA Awards website:
<http://standards.ieee.org/develop/awards/wgchair/wgawards.html>
- You may ask for these awards to be shipped directly to each member if you provide individual shipping addresses or to you at the hotel where we will meet next

IEEE Standards Awards

- Address to Ship Award:
 - Sheraton Music City Hotel
 - 777 McGavock Pike
 - Nashville, TN 37214
 - c/o <Your Name Here> (Guest PSRC Meeting 9/12 ~ 9/15/2022)
 - Cell: <Add your Cell #>
- Presentation Date (Allow six weeks for processing): Monday September 12, 2022

B3: Membership Working Group

Chair: Mal Swanson

Vice-Chair: Cathy Dalton

Assignment: Assist in searching for new attendees.

Requesting support from attendees' employers.

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

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

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

B4: Long Range Planning Working Group

Chair: Pratap Mysore

No report.

B5: Publicity Working Group

Chair: Cathy Dalton

Vice Chair: Mal Swanson

Assignment:

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

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

Chair: Don Lukach

No formal report.

B9: Web Site Working Group

Chair: Rick Gamble

No report.

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

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

Chair: Fred Friend fafriend@aep.com

Vice Chair: Michael Higginson Michael.Higginson@sandc.com

System Protection Subcommittee Scope

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

Meeting Minutes

The System Protection Subcommittee of the PSRC met on May 11, 2022 at 2:30 PM Pacific Time in a hybrid meeting (both in person and via Webex).

In-person participants introduced themselves and indicated their affiliations. Online participants were displayed by the teleconferencing software tool. A quorum was achieved (41 of 59 members and 47 guests).

The Subcommittee reviewed the agenda. Chris Walker made a motion to approve the agenda, Alex Apostolov seconded, and the agenda was approved with no opposition.

The January 2022 minutes were reviewed. Ken Martin made a motion to approve the minutes, Jonathan Sykes seconded, and the minutes were approved with no opposition.

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, May 20. 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 321, including about 1/3 on-site.
- There will be a new member management system (Member Planet) possibly 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 for general correspondence.
- 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 Policy, Patent Policy, and Participant Policy (new addition) slides at each meeting.
- New templates for the O&P will be voted on at the September meeting, and P&P will be voted on at the May meeting. 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 mandatory IEEE SA training for PAR-related working group officers. You should have received an email from Mike and Fred about this on Friday, May 6.
- The Awards Ceremony will take place during the Monday night reception for the May and September meetings. Please consider this when making your travel plans.
- WG officers should request certificates for their members upon completion of their work. Hugo Monterrubio can address any open questions.
- All are reminded and encouraged to apply for Senior Membership in the IEEE if you are eligible.
- Emails with some attachments are blocked by some participants' firewalls. Please be aware of this when sending files via email.

Working Group Reports

The minutes of the Working Groups are attached.

Old Business

No old business was discussed.

New Business

Working group C31 moved to disband. C37.120, Redundancy Requirements for System Protection Reliability has been published, completing the working group's assignment. Alla Deronja moved to disband, with a second from Don Ware. There was no opposition, and the working group has been disbanded.

Working group C42 moved to disband. Their summary paper of C37.250, Guide for Engineering, Implementation and Management of System Integrity Protection Schemes has been completed, completing the working group's assignment. Yi Hu moved to disband, with a second from Alex Apostolov. There was no opposition, and the working group has been disbanded.

Working group C36 moved to disband. Their summary paper of Role of Protective Relays in the Smart Grid has been completed, completing the working group's assignment. Ben Kazimier moved to disband, with a second from Alex Apostolov. There was no opposition, and the working group has been disbanded.

Working group C38 moved to send P2030.12 Guide for The Design of Microgrid Protection Systems to IEEE SA ballot. Michael Higginson made the motion, with a second from Steve Klecker. There was no opposition, and the standard ballot will proceed.

Working group C38 moved to extend their PAR to develop P2030.12 Guide for The Design of Microgrid Protection Systems for an additional two years. Michael Higginson made the motion, with a second from Manish Patel. There was no opposition, and the PAR extension will be filed by WG leaders.

Task force CTF48 moved to become a working group. Gene Henneberg made the motion, with a second from Alla Deronja. There was no opposition and working group C48 was established. Alla Deronja agreed to chair the new working group C48.

There are two new proposed works:

- A Liaison, Task Force, and/or Working Group to support the Joint Committee support of the IEEE 1547 IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces revision.
- A Working Group to investigate if there is a need to revise and expand PES-TR87 Protection of Wind Electric Plants to explicitly address other IBR plants (e.g., solar and battery energy storage).

These proposals were discussed but not fully resolved at the Subcommittee meeting because of a lack of time. Subcommittee leaders will solicit feedback on these proposals via email.

General Discussion

Fred Friend noted that he has retired as of February 2022. He can now be reached at fafriend@ieee.org.

Adjourned

The subcommittee meeting adjourned at 3:53 PM Pacific Time.

Working Group Minutes

C23: Coordination of Synchrophasor Related Activities

Chair: Allen Goldstein

Vice Chair: Gustavo Brunello

Secretary: N/A

Output: Discussion Forum

PAR and PAR expiration: N/A

Established Date: September 2013

Expected Completion Date: On Going

Draft: N/A

Assignment: The ongoing task force will provide three main functions: -Liaison with NASPI (North American Synchrophasor Initiative) (specifically the PRSVTT) to keep the PSRC in sync with the changes and needs in the industry with respect to the development and usage of PMU devices. Formalize transfer process of PRSVTT developed documents to PES PSRC including making recommendations which PRSVTT activities should be transferred to IEEE reports, guides and standards. -Make recommendations to PSRC for assignments that would require the creation of working groups in PSRC and also recommend what the output of those working groups might be (Guides, reports, etc.) based on the needs of the industry. -Coordinate related activities with other IEEE PES committees.

Meeting Date and Time: Hybrid meeting, On May 10, 2022 at 5:00 pm PDT

Attendance: 6 members out 15 attended. 8 guests also attended.

Call to order

Officer presiding: Allen Goldstein

Officer recording minutes: Allen Goldstein with help from Ken Martin

Quorum was not reached,

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

Summary of Activities and Discussions

- Overview of PMU related standards work was shown.
 - Removed asterisk indicating draft behind 60255-118-1
- IEEE PSRC ongoing PMU related activities were discussed and updated
- IEEE PSCC ongoing PMU related activities were discussed and updated
- NASPI past work and publications were discussed and updated
- NASPI current work was discussed and updated
- NASPI upcoming webinars and next work group meeting date were announced.
- Old Business:
 - None: no new work items to be carried from NASPI to IEEE or vice versa
- New Business:
 - Ken asked about the focus of the database guide being produced by H40 Working Group and other considerations: how can data be transferred between DBs?

CSV, XML? Perhaps there are no practical generalized solutions (standard or guideline). Some discussion about what is being done and what might be done

Adjourn at 6:10 PDT, moved by Ken Martin, second by Yi Hu

Next Meeting:

Next NASPI Work Group Meeting, October 18 - 20, 2022, Charlotte NC (if in-person)

Next C23 meeting will be during PSRC meetings September 12 – 15 2022, Nashville, TN

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: December 2022

Draft: 1.0

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 May 10, 2022 at 08:00–09:10AM PST. There were total of 42 attendees in the meeting, 12 members and 30 guests.

Meeting Agenda

- Introductions
- Review January 2022 meeting minutes
- New Chair discussion
- Review Draft 1 updates.
- General Discussion
- Adjourn

Summary of Meeting Discussion

- a) Since the attendee list was available and, to save time, no formal introduction was done for the attendees. Host will share the attendee list.
- b) Meeting started with the Chair describing the latest status of the paper and assignments received. Chair announced that the contributions from all members have been received.
- c) The deadline for WPRC 2022 is missed, so we will target next year.
- d) Chair announced that he will be retired and cannot continue as the chair. Michael, Fred, Martin and Amin to discuss the next step. In the interim, Amin is willing to serve as chair.
- e) Stephen Miller offered to check if someone from his company will be willing to support as chair vice chair.
- f) Martin Best will share the presentation slides (ppt) from the January PSRC Main Meeting with Amin.
- g) It was discussed that POI is more common term than PCC, especially for transmission-connected DERs. Steve Miller suggested to use POI but add a footnote to describe the possibility of using PCC in literature.
- h) It was suggested to consider vector group in Figure 1 (to be shown in the figure).
- i) For grounding "...connected through a resistor or reactor to limit", this section to be revised per actual report. Martin Best will revise the statement per the original report.
- j) The sentence regarding the "WTGs frequency control capability" was revised.
- k) It was discussed to add "element" after 11F4-67P.

- l) Martin will check the discussion in the Grounding Transformer section against the section in the original report to ensure accuracy .
- m) It was suggested to consider a meeting in between now and September as Martin will not be attending next meeting probably.

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

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

Chair: Don Ware

Vice Chair: Matt Black

Secretary: Zach Zaitz

Output: Revised Guide

Established Date: January 2016

Expected Completion Date: December 2022; expected to extend PAR for finish December 2023

Draft: 5.25

Assignment: Revise C37.233-2008 Power System Protection Testing Guide

Don Ware started off the meeting by reviewing the scope of the working group.

Introductions were made but there was not a quorum with only nine members in attendance (in person or virtually).

Number in attendance 29, 14 in-person and fifteen virtually, nine members; therefore, quorum was not met.

Don went over copy write policy and the IEEE patent slides. Matt asked if there were any concerns, and none commented.

Matt also went over new IEEE slides on behavior and code of conduct.

Matt went over the PAR word usage rules that are to be followed.

Matt explained that after to address comments received from the balloting, five subgroups were created to address comments:

- Status word smiting subgroup
- Status of bibliography and normative
 - Work completes currently
 - Removed dates
- Status of section 1.6 and section 4 overhaul subgroup
 - Lack of continuity was commented on by reviewers – added clause to section 1.6 and referenced section 4
 - Don explained that there are three types of testing manufacturing, installation, and maintenance
- Status of graphics subgroup
 - Subgroup is still working on drawings and addressing the use of colors since they are note easily visible when printed in black and white
 - Font size is also an issue as are acronyms used in the power line carrier figures

The 61850 section is being reviewed by Rich Hunt and Jun Verzosa. Jun reviewed the section and suggested reducing the section to generalize it since the section is outdated for what is being done now and there is too much detail in the current section. Rich agreed and they will work on a rewrite. Don asked that the two also review the normative section at the same time.

Don commented that what is important is the timeline to complete the remaining work. Matt commented that there were 436 comments after balloting he worked through those that he could easily address and flagged those that needed further review by the group. Assignments were made to review comments and there are now fifty-seven comments that still need reviewing and many of these comments have to do with the 61850 sections. Biweekly Webex meetings will continue as will off cycle Webex meetings to address meetings to address bibliography and normative. Matt asked Vahid about abbreviations on figures that appeared in the original document and Vahid agreed to review participate in future meetings to help identify the meaning of the abbreviations. The group then started reviewing the remaining comments until time ran out. Don mentioned that the next PSRC meeting will be in person September 12-15 in Nashville TN. The meeting was adjourned. Next meeting: room for forty, avoid conflicts with D47, H45, H46, K31, and I45

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: 1.08

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 6-Voting Members, 1-Non-Voting Member and 6-Guests (13-Total) on Tuesday, May 10, 2022, 8:00-9:10 AM PDT.

Kevin welcomed all attendees. This was followed by introductions.

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

Kevin informed the meeting that he had added a new section to the D29 report – Power Swing Relay Settings and Testing Examples (PSB and OST). Kevin’s proposal is that C29 create test procedures in the C29 report corresponding to the examples in the D29 report.

On-going review and document cleanup:

Section 1: Ratan Das volunteered to reply to comments, accept changes and clean up this section. Ratan will complete this in August.

Section 2: Mohit cleaned up the following portions of Section-2 (Introduction of section 2, sub-section 2.1.1). Mohit will arrange a meeting to continue with the rest of section 2.

Section 3: Mohit added to the report the portions from Benton.

Uncompleted assignments for the May meeting to roll over to the September meeting. The action items for the May meeting were as follows:

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 – for September meeting, reply to comments, accept changes, clean up, add any additional content.
5. Deepak and Scott to work on dynamic test content using their RelaySimTest experience.

It was decided to wait for D29 (Power Swing Relay Settings and Testing Examples) before continuing with section 6.

Kevin will send out the latest version of the report – 1.08

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

C31: Guide for Protection System Redundancy for Power System Reliability

Chair: Solveig Ward

Vice Chair: Alla Deronja

Secretary: Alla Deronja

Output: Guide

Established Date: September 2017

Expected Completion Date: December 2021 (Completed)

Draft: 13.1

Assignment: Development of a guide for protection system redundancy

Working group C31 did not meet at this meeting and has disbanded.

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

Chair: Dean Ouellette

Vice Chair: Sakis Meliopoulos

Secretary: Aaron Findley

Output: Recommended Practice

Established Date: September 2018

Expected Completion Date: June 2022

Draft: D2

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

Hybrid Virtual and In Person, Reno NV, 11 May 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 18 attendees, 5 members, and 13 guests in attendance.

A quorum was achieved, minutes of the previous meeting were approved with a motion from Tony Johnson and seconded by Aaron Findley.

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

Dean Ouellette presided over the meeting and presented a summary of the writing assignments from the previous meeting. Several contributors to the writing assignments were absent; Aaron Findley will draft an email to reach out to the authors for a status update.

Armin Zamani and Aaron Findley's contributions were reviewed. It was decided that the following items should be added to the section on instrument transformers:

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

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

Dean and Ali re-iterated the need to identify an HVDC expert for contributions related to HVDC protection.

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

Action Items:

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

New writing assignments:

- Aaron to incorporate the provided comments to the instrument transformer section
- Aaron to add comments to section F.17.

Outstanding writing assignments:

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

New Business

Sakis motioned to adjourn, Tony seconded.
Meeting was adjourned at 8:50 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 2023

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 hybrid in-person/WebEx in a single session with 8-voting members and 48-guests (56-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, May 11, 2022 at 0920 PDT. The minutes from the May 11, 2022 WebEx meeting were reviewed and approved.

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

- C38 Guide for the Design of Microgrid Protection Systems - Mike Higginson: SA ballot initiated, no further report to CTF34 on an on-going basis.
- C45 Protection and short-circuit modeling of systems with high penetration of inverter-based Resources – Manish Patel: Subgroups formed, writing assignments made, presentations being made, RE current injection during faults, modeling Type III WT, new models in SC programs, in 2nd year.
- D38 Impact of High SIR on Distance Relaying - Christopher Walker: Still on draft 0.5 and are still working towards completion of their paper. They have included a section on how IBR affects SIR.
- J18 Investigate the effect sub-synchronous oscillations due to inverter based resources (IBR) on rotating machinery protection and control- Normann Fischer: Gary Kobet report on his behalf: WG finding RSCAD, EMTP-RV giving different results for same WT models, working on why. Jim van de Ligt noted requests for events with detailed high sampled event records so models can be validated.
- NERC – Rich Bauer
 - Recently published reports outlining four different events in summer 2021, still seeing same issues with IBR shutting down for normally cleared system faults.
 - Expressed serious concern that we still do not have adequate models for the IBR presently installed across the North American system.
 - Proposing SAR to make PRC-024 a full ride-through standard applicable to IBR. CAISO set new record >97% load served by renewable resources in a five-minute period; encouraged attendees to consider the implications on short circuit strength during this five minute period.
 - Kevin Jones shared his area set record for 92% wind area penetration in a one-hour period; have reached 77% over a 24-hour period, over 50% frequently.

- Stephen Miller challenged the penetration percentages in California due to imports over tie lines, not so much challenging Texas numbers with fewer imports over weaker tie lines. Encouraged footnotes to focus on the effect of these penetration percentages on short-circuit strength (available fault current).
- Jay Mearns making presentation at a university on the Odessa events to senior power engineering students. Noted lessons learned from Odessa event are not being taken seriously by planners in California. Modeled retirement of conventional generation and upcoming 30GW of solar installations, some concern over the direction of the California system.
- P2800 – Manish Patel: IEEE Std 2800-2022 published, took three years of work. Encouraged attendees to review the standard and considering adopting it in interconnection requirements. No further reports.

Manish Patel motioned to adjourn, Kamal Garg seconded.

Chair Kevin Jones adjourned the meeting at 0940 PST.

C36 Summary of Role of Protection Relaying in the Smart Grid

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”

Working group C36 did not meet at this meeting and has disbanded.

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

Chair: S. S. (Mani) Venkata

Vice Chair: Michael Higginson

Secretary: Geza Joos

Output: IEEE Guide, P2030.12

Draft: 1.0

Expected Completion Date: February 2022

PAR Expiration Date: December 2022

Assignment: To create P2030.12, Guide for the Design of Microgrid Protection Systems

Working group C38 did not meet at this meeting and is preparing to go to IEEE SA ballot.

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.

Working group C39 did not meet at this meeting. C39 is planning to meet in September.

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

Recent Meeting Date: 9/21/2021

Assignment: Develop a publication (transaction and/or conference), a tutorial and a presentation based on C37.247-2019: the standard for Phasor Data Concentrators for power systems.

Working group C40 did not meet at this meeting.

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, May 10, 2022 at 1:00 pm (PDT) with 14 participants in conjunction with the IEEE PSRC/PSCC meeting which included both in-person attendance and remote via WebEx. Ken Martin (Chair) welcomed participants and briefed the objective of the WG, which is described in the assignment above. He also reviewed the present state of the work.

Ken went through the current draft discussing what we are trying to accomplish and the state of the work. He asked for volunteers if anyone can contribute to the writing.

For section 1 Allen suggested contacting Farnoosh as he is familiar with some characteristics of distribution systems. Peiman works with Farnoosh, so Ken will follow up with them on contributing on transmission and distribution line characteristics. Much of section 1 will be the analysis of distribution system characteristics from recordings on those systems. We have recordings from Switzerland, Germany, Denmark, and the US already lined up. Prasad offered that he may be able to supply some POW data, so Ken will follow up with him.

Section 2 reviews the data requirements for applications and has some material from a recent report. There is a group that will review the current list and add more characteristics to consider. Nuwan offered to work with this group. Allen offered to review the material.

Section 3 is a summary and analysis of the first 2 sections. This will be drafted as these first 2 sections are completed. Section 4 makes recommendations on drafting a standard and will be completed at the end.

Ken asked for volunteers to provide some information on standard power quality analysis such as sag, swell, harmonics, and how to measure them. Jake and Nuwan volunteered to work on this.

Allen asked when we expected to be finished and Ken responded that it will likely be about 1 year from now.

Ken will set up our next meeting for early June.

The meeting was adjourned at about 1:50 PDT

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: May 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 9:20 am.

The WG attendance included 5 members and 6 guests.

The WG completed writing the summary paper for C37.250 and developed a presentation in August 2021. Mr. Henneberg presented the paper at the Western Protective Relay Conference (virtually) last October and (in person) at the Texas A&M Relay Conference on March 27. Manish Patel presented the paper at the Georgia Tech Relay Conference on May 3. Mr. Henneberg will present the paper at the PSRC Main Committee at the September 2022 meeting in Nashville. We have also submitted the paper to the PAC World Conference scheduled in August in North Carolina.

The chair suggests that we have completed the WG assignment.

Move to disband the WG, seconded and passed.

Meeting adjourned at 9:50.

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

Chair: Yi Hu

Vice Chair: Adi Mulawarman

Output: Report

Established Date: January 2021

Expected Completion Date: December 2022

Draft: 1.00

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 May 11, 2022 with 43 attendees (22 Are members). Majority attended remotely with thirteen (13) in-person. Yi Hu and Adi Mulawarman presided the meeting. Yi introduced the newly appointed secretary, Mr. Zheyuan Cheng, to attendees at the beginning of the first session. A round-the-table introduction of all attendees was taken for the first session, and for those who joined at the second session. Yi also reviewed the meeting agenda and WG C43 assignment at the beginning of both sessions.

Yi briefly reviewed the latest version of the draft report with the attendees and made the last call for contribution to fill remaining gaps in the current draft.

In order to meet the target to publish this report before the end of 2022, the following work plan was reviewed and discussed with the meeting attendees:

- 1 week – final collection of the contributions
- 3-4 weeks – finish completed draft
- 3-4 weeks – WG review and comments
- 3-4 weeks – finalize and submit for C subcommittee review and approval
- 4-weeks – receive C subcommittee comments
- 1-2 weeks – resubmit to C subcommittee for approval
- 2 weeks – PSRC officer approval

Yi went through section 6, 7 and 8 to show gaps in completing these sections with discussions what are needed for these gaps. A new subsection was reviewed that calls for those who currently or in the past work at utilities to share their thought on the criteria and processes that they would use in adopting the AI/ML technology based applications for field deployment.

WG will continue the regular weekly meetings (every Thursday 11 AM – 1 PM EDT) to work on the draft report according to the work plan. All interested are welcome to join the call and send request to Yi and Adi to be added to the meeting invite.

Meeting adjourned at 11:45 AM PDT.

Next meeting: Double session to be held in conjunction with PSRC September 2022 meeting.

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

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”

Working group C44 did not meet at this meeting. C44’s paper is being reviewed by IEEE Transactions editors.

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

A quorum was achieved with 30 out of 53 voting members attending the meeting. Sebastien Billaut made a motion to approve the minutes and Deepak Maragal seconded. There was some discussion on the assignments received for the different sections.

The first presentation was from Ali Hooshyar on “Fault Currents from IBRs that follow the K-Factor Diagram.”

- The K-factor diagram from the German VDE Grid Code was described
- Other requirements from German Code associated with prioritization and maximizing reactive current, active current, etc. was summarized
- Example study on IEEE 39-bus system with distributed IBRs added.
- Observation that using active current can sometimes help with the injected reactive current avoid the maximum current limits.

Q&A for first presentation:

- Sebastien: When considering the VDE grid code, what is the interpretation of the active current “can be reduced?”
- Rich: We can actually inject real power and reduce the phase current, that is huge. But we may be changing the angle of the phase current.
Ali: Angle plays a critical role, and we will cover some more of it next time.
- Rich: How come for the AG fault, the other phase currents were higher not A-phase.
Ali: The fault was at the POM and there are a few transformers in the middle.
- Aboutaleb: Adding active current may increase or reduce the magnitude of the phase current. In the example shown, it helped. But it could be the case that by adding active current, one may have to reduce reactive currents. Ali: Agreed.

Second presentation from Ilhan Kocar “Fault Current Characteristics of DFIG-based WTGs under Various FRT Requirements and Solutions”

- What sort of control solutions can DFIGs, with partially sized converters (e.g., 0.3 p.u.), provide to meet FRT requirements?
- Negative-sequence current may be controlled to reduce mechanical stress. Decoupled dual current control loops, one for positive-sequence and one for negative-sequence, may help.
- Framework to represent DFIGs in short-circuit programs working in the sequence-domain shown, which is often used by short-circuit programs. Iterations needed due to non-linearity.
- Different types of control types (Type-A, Type-B, Type-C, etc.) shown that achieve different objectives.
- Risk of crowbar operation exists and can be represented with a positive-sequence and negative-sequence equivalent impedance.

- Simulation results shown with agreement between EMTP and Short-circuit program results.

Third presentation for Sherman Chan on “Another Method to Simulate Converters”:

- Why another method? When earlier methods developed by Professor Kocar, it had a quirk that it gave different results depending on the fault type (AG vs BG or BC vs AB). The goal here was to obtain symmetrical results.
- The program internally runs in the phase-domain and not the sequence-domain.
- Results were sensitive to pre-fault voltage profile—Using flat-start won’t work. Has to be a KCL based solution, e.g., linear network solution or non-linear power flow.
- Assumption: Converter has nonzero slope for both positive and negative-sequence currents. Current limit, e.g., 1.2 pu.
- Method shown with different phases and calculations used by short-circuit program.
- The experience with this method results in unbalanced faults giving symmetric results, provides good convergence from the iterations, I2 leads V2 by approximately 90 degrees, etc.

Next meeting:

Double session. If in-person, a room for 60 and a projector.
Request no conflict with DTF50, J19, J20, JTF27, and I38.

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

Chair: Allen Goldstein

Vice Chair: Deepak Maragal

Secretary: N/A

Output: Summary Paper

PAR and PAR expiration: N/A

Established Date: May 2021

Expected Completion Date: Sept 2022

Draft: 0.1

Assignment: Draft a summary paper of C37.242

Meeting Date and Time: Web-Meeting, On May 10, 2022 at 09:20am PDT

Attendance: 9 of 14 members

6 guests

Call to order

Officer presiding: Allen Goldstein

Officer recording minutes: Allen Goldstein with help from Jeff Dagle and Erin Jessup

Quorum was reached.

Past Minutes: Previously approved via email

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

Summary of Activities and Discussions

Writing a paper to describe the guide, using overleaf.

Upcoming meetings: May 18, June 15 (4:00 Eastern).

Erin is reviewing the guide compared with the draft document and will present her findings during the May 18 meeting (will send her notes to Allen on May 13).

The WG will endeavor to prepare meeting notes in the future, and not rely on document comments to document the work of the group.

Sughosh Kuber and Peiman Dadkhah volunteered to contribute to the document (as a new contributing members), Allen will pick up their emails from the chat and add them to the distribution list for upcoming meetings.

Prasad recommended an additional section on maintenance/commissioning. Deepak volunteered to work with Prasad, envisions a diagram to lay out a high level conceptual framework. This will be necessary to add the appropriate content to make this a “practice paper”. This will be presented for consideration during the May 18 meeting.

When quorum was established, January 11, 2022 meeting minutes were approved.

Changing the date of the document completion to September 2022.

A decision will be made based on progress after the June meeting whether the meeting tempo will need to be adjusted to meet the September 2022 goal.

Action Items: (Thanks to Erin Jessup)

- Erin Jessup – send a bulleted list of opportunities to Allen for content by 5/13 (comparison of existing paper vs. published guide). Goal is to clearly identify opportunities, decide if we want to incorporate changes, then get volunteers to fill in the gaps.
- Prasad Shrawane – Write a summary subsection about the installation, commissioning and maintenance section. Consider including a diagram and then describing the key areas of consideration. A couple of PMUs, GNNS in different locations, PDCs, etc. Deepak Maragal volunteered to help Prasad. Will submit by 5/18 meeting.
- Deepak Maragal –Add/edit content to fit practice paper
- Allen adding two contributing members to our meetings.

To support forward progress:

- Erin will capture action items at each of our monthly meetings and distribute to the group.
- Erin will follow up between monthly meetings to check on progress on action items.

Next meetings: May 18th and June 15th.

TBD: Future Guidance

Meeting Adjourn at 10:15 am PDT

Next Meeting:

Same time slot, Room for 20 people (if in-person).

CTF47: Relay Modeling in Electromechanical Dynamic Simulations

Chair: Evangelos Farantatos

Vice Chair: Mohammad Zadeh

Secretary: N/A

Output: N/A

PAR and PAR expiration: N/A

Established Date: January 2022

Expected Completion Date: January 2024

Draft: 1.0

Assignment: Contribute to the report of the Power System Dynamic Performance (PSDP) committee TF “Integrating Relay Models with RMS Dynamic Simulations”.

CTF47 met on Tuesday May 10th 2022 at 13:00 PT with 24 attendees, virtually via Webex as well as in person.

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

The chair first reviewed the January 2022 meeting minutes. Then, he reviewed the task force scope and explained its main objective. Then PSDP member “Rodrigo Ramos” from University of Sao Paulo, Brazil presented the content of Chapter 3 of the latest PSDP task force draft report. This chapter presents motivational examples for the need of representing accurate models of protective devices and their operation within RMS dynamic simulations. Several questions and discussions were raised by attendees regarding the motivational examples and the chapter scope. As mentioned by Dr. Ramos, at this stage, the main objective of the PSDP report is to raise awareness within power system community on the need of Relay Modeling in Electromechanical Dynamic Simulations.

Before the meeting adjourned, the chair encouraged attendees to volunteer to contribute to the PSDP task force if they are interested.

The TF will need a room of 30 with a computer projector.

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

CTF48: Summary/conference paper development for C37.120 IEEE Guide for Protection System Redundancy for Power System Reliability

Chair: Alla Deronja

Vice Chair/Secretary: Melvin Moncey Joseph

Output: Conference paper

PAR and PAR expiration: N/A

Established Date: May 2022

Expected Completion May 2023

Draft: 0

Assignment: Write a conference paper for C37.120 IEEE Guide for Protection System Redundancy for Power System Reliability.

Task force CTF48 met on Tuesday, May 10, 2022, in a single session with 15 participants attending.

The task force was formed to investigate writing a summary paper to introduce the new guide to the industry, especially, because it was developed per the NERC request to PSRC.

The Chair introduced the assignment and presented the draft abstract and outline of the future conference paper.

There were no comments concerning the abstract and outline, and the writing assignments were distributed for the complete paper outline.

There were no objections among the participants to approach the Subcommittee C to approve elevating the task force to a working group with the assignments to write a conference paper for C37.120 IEEE Guide for Protection System Redundancy for Power System Reliability.

Melvin Moncey Joseph volunteered to fill the vacant vice-chair/secretary role.

The chair will distribute the outline and draft 0 of the paper to the writing contributors. The writing assignments are requested by August 15, 2022, so draft 1 of the paper can be created for WG review at the September 2022 meeting.

For the next meeting, we request a room for 20 people, single session, with a computer projector. Please avoid conflicts with D42, D47, K22, K31, and I2.

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

Chair: Bruce Mackie

Vice Chair: Meyer Kao

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

- The Subcommittee meeting met in person (Reno, NV) and virtually (via WebEX) on Wednesday, May 11, 2022, from 4:00 to 5:10 PM PDT.
- Officer presiding – Bruce Mackie
- Officer recording minutes – Meyer Kao
- The Subcommittee meeting was called to order by the Chair
- Introduction from in person
- New Line Protection Subcommittee members: Steve Klecker, Josh Lamb, Nuwan Perera
- The meeting was attended by 36 voting members (25 in person and 11 virtual) and 41 guests. Quorum was met.
- Minutes from the January 2022 meeting held in person and virtually were approved - motion made by Fred Friend and seconded by Jonathan Sykes.
- Agenda for the D Subcommittee May 2022 meeting was approved - motion made by Russ Patterson and seconded by Chris Walker.

The Chair reviewed items of interest from the Advisory Committee.

- WG Chairs: please send up to date minutes to Chair and VC by May 20th
- Reminders:
 - Please use template
 - WG officers to update meeting attendance - keep records of newcomers who are not in the system
 - Template for Technical Reports (including Tutorials)
- Standards WG Awards

- IEEE SA Working Group Awards has new Procedure to request certificates of appreciation for completed (Approved Standard) work.
- Must be requested by WG Chair or VC directly from the IEEE SA.
- <http://standards.ieee.org/develop/awards/wgchair/wgawards.html> [standards.ieee.org]
- Visit the IEEE SA Awards webpage after the Standard has been approved and published. You will need the IEEE Standard Number and year of publication: e.g. XXXX(Standard number)- XXXX (Year)
- <http://standards.ieee.org/develop/awards/wgchair/wgawards.html>
- The process is very simple and will require to list the names of the WG officers and members
- The awards can be shipped to the person who is filling out the form OR can all be sent to an event. If you want these awards to be handed at our next PSRC Awards Ceremony, then choose to have them be sent to an event and enter your name or the name of the awards Chair (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
- Began last Monday Night, 5/9/2022, Hugo Monterrubio did an amazing job leading the ceremony! We will continue to have the ceremony for in-person PSRC May and September meetings on Monday night. Welcome Reception will feature an Awards Ceremony. Please take this into consideration when making travel plans for future PSRC meetings. 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
 - Website will have publicity page and plans to develop a page to honor long-term PSRC members who passed away
- 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 voted on at the Main Committee Meeting, 5/12/2022
- For each project development (PAR related) meeting show: Copyright, Patent Policies & New Participant Behavior Slides
- New mandatory SA training for Working Group Officers is specified from SA (PAR related WG) Due December 31, 2022
- Training Session being planned for September to discuss new P&P
- Long Range Planning Committee desires to move to all in-person meetings in the future but will move slowly
- PSRC Officers working with PES on new attendance and email system (Member Planet). Probably not available until January 2023.
- Attendance 321 total people with 108 in person. First time attendees 26 people with 10 in person.
- Future Meetings (Subject to Change)
 - September 2022 – Nashville, TN (subject to change)

- January 2023 – JTCM – Jacksonville, FL
- May 2023 – Las Vegas, NV
- September 2023 – Myrtle Beach, SC

IEEE Standards Documents currently involved with WGs in D Subcommittee

| No. | Approval Date | Name |
|---------|---------------|---|
| C37.113 | 2015 | Guide for Protective Relay Applications to Transmission Lines |
| C37.114 | 2014 | Guide for Determining Fault Location on AC Transmission and Distribution Lines |
| C37.243 | 2015 | Guide for Application of Digital Line Current Differential Relays Using Digital Communication |
| C37.104 | 2022 | 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:

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: 1.08

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 (12-Voting Members, 3-Non Voting Members, 23-Guests)

- 1) Minutes from the January JTCM hybrid meeting were reviewed and approved.
- 2) Draft has been updated from 1.07 to 1.08 and was emailed prior to meeting.
- 3) D29 test system is still in work and more info (or system) should be available in fall.
- 4) Discussion of outline revision – specific examples had been lost along the way. They have been added back in the document. Section 7 is philosophy and new Section 8 examples will follow philosophy structure/flow. Added assignments for ASPEN, CAPE – Melvin, Kevin, respectively. More will follow as needed.
- 5) Section 3 had comments cleaned up by Kevin Jones. Looking for WG volunteers to review entire document.
- 6) Reviewed edited/new definitions.
- 7) Significant work on Section 3 intro paragraph and comments through Sec 3.1 were completed.

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

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

Chair: Karl Zimmerman

Vice Chair: Ted Warren

Output: Tutorial

Expected Completion Date: Sep 2022

Draft 8.0

Working Group Assignment: Write a tutorial on factors affecting the application and setting of ground mho and quadrilateral distance elements on transmission lines

Working Group D30 met in person in Reno NV and online at 5:00 PM PDT on May 10, 2022 with a total of 26 attendees, including 15 in person and 11 online. 14 of 19 voting members were in attendance, so a quorum was established.

The Chair reviewed the agenda and the January meeting minutes. In February, Draft 8.0 was distributed to WG voting members for ballot. The Chair showed the results of the ballot: 14 of 19 voting members responded with either approved or approved with comments.

The remainder of the meeting, the WG made edits and corrections to the tutorial based on comments from the one of our reviewers, Ted Warren of Southern Company. There were discussions on several items, including underreaching Zone 1 and overreaching Zone 2 setting considerations with mutual lines, mho expansion figures and quad resistive reach setting considerations.

Russ Patterson made a comment that IBR characteristics are more resistive, so when a mho characteristic expand to the source, it expands along the R axis instead of the X axis like with a conventional inductive source. This in turn, affects the resistive coverage of the distance elements.

There are still many comments to be reviewed. Therefore, we will not motion to go to subcommittee ballot yet, and instead, the WG will schedule an online meeting to continue resolution of comments of the WG voting members. We are looking at possible dates in early June.

Meeting was adjourned.

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

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

Chair: Normann Fischer

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

Did not meet and not expected to meet in September 2022

D35: Evaluation of Transmission Line Pilot Protection Schemes

Chair: Rick Gamble

Vice Chair: Brandon Lewey

Established: January 2017

Output: Technical report to the Line Protection Subcommittee

Expected Completion date: 01/2023

Draft: Final Draft 2

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, May 10, 2022 at 8:00am in person and remotely via WebEx with 22 members and 23 guests.

Introductions were made.

The WG discussed updated DCUB figure and reviewed comments provided by contributing members.

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

Final Draft 3 will be distributed to working group members for review.

Action Items:

- Brandon Lewey & Rick Gamble – revise various pilot scheme sections, per working group comments.

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

D37: Impact of Series Compensation on Transmission Lines

Chair: M. Kockott

Vice Chair: Nuwan Perera

Secretary: Melvin Moncey Joseph

Assignment: Prepare a report on the impact of fixed series compensation on transmission line protection.

D37 met on May 10th 2:20 PM PST with 12 members and 8 guests. Review and write assignments were reviewed.

New Assignments

- Update Section 1,2 and 3: Nuwan Perera
- Update Section 4 and 5: Mike Kockott
- Review Section 6: Melvin Moncey Joseph/Hardish

Current draft: 1.08

WG is planning to meet virtually before the September meeting. Meetings dates will be shared by the chair.

Chair announced that the vice chair was not able to participate for several meetings during last 2-3 years and Nuwan Perera will take over the vice chair position. Melvin Moncey Joseph has volunteered for the Secretary position.

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/Sign up sheet/roster
2. Review Working Group Membership and Membership Process
3. Approve previous meeting minutes: first - _Don Lukach_ second - _Ted Warren_
4. Discuss status and progress of report
5. Develop Report Summary Statements
6. Review writing assignments
7. Discussion of next steps
8. Adjourn

Minutes:

29 Attendance – 16 Voting Members, 8 Non-voting Members, 15 Guests

Chris opened the meeting at 10:40 with introductions. We did introductions in the room with attendees. Virtual attendees will be recorded via the attendance report.

Chris reviewed the PAR related activities attendance requirements and re-iterated that we are following those attendance requirements.

We voted and recorded approval of minutes from the January meeting.

Chris discussed the status of the report and the overall makeup of the report and what conclusion we will have with the report. We are looking to line-up the report into a cohesive document that does not contradict. Chris displayed the writing assignments that are outstanding with the working group and discussed all assignments with the working group. Line Differential, effect on electromechanical, Bogdan Kaztenny paper incorporated, Mike Thompson paper. We also have a list of volunteers to review sections. The outstanding assignments will be turned in prior to next meeting (August 1st) and then the reviewers will be asked to review those sections starting next meeting.

After reviewing the outstanding assignments Chris discussed with the working group that we want to develop summary statements that we are driving the paper a conclusion. These summary statements will be used to drive input into the Transmission Line Guide. We discussed the

summary statements and reviewed what Chris created and revised/approved those as follows. We discussed what the feedback to the Transmission Line Guide will be and Chris created several bullets for this purpose.

Summary Statements

- While SIR is not a valid way of determining line length, SIR does still provide valuable insight into the behavior and challenges of the line protection.
- High SIR is an issue because small variations/discrepancies in measurements can have impact of protection performance.
- Related to this paper IBR can affect the SIR, but causes no addition SIR related protection issues.

At the September meeting we will have a lead off discussion and vote by the working group on number definitions of SIR and put this issue to a vote to settle finally.

Ted proposed a development of a method to determine impact based on relay manufacture, CCVT/VT manufacturer specifications.

Next meeting request - single session for 50 attendees with computer projector. Avoid conflict with 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: Final (submitted to RevCom)

Assignment: Revise C37.104, IEEE Guide for Automatic Reclosing of Circuit Breakers for AC Distribution & Transmission Lines

The working group did not meet. The Guide is published and the assignment of the WG is completed.

D39 Chair Manish Patel motioned to disband WG D39. Karl Zimmerman seconded.

Members of D Subcommittee voted to disband D39.

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_draft_1_2.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 25 members
- f) Approval of Agenda (motion and second) – Don Lukach 1st, Alla Deronja 2nd.
- g) Approval of Minutes of previous meetings (motion and second) – Bruce Mackie 1st, Chris Walker 2nd.
- h) Brief summary of discussions and conclusions including any motions.
- i) Action item:
 - a. 5.10 – 5.13 Mike Kockott to review with Ilia Voloh to assist
 - b. 6.4 - Mike Kockott, Muhammad Hamid, Sudarshan Byreddy
 - c. 6.7.3 – 6.7.6 Arun Shrestha, Juan Pineros to review.
 - d. Discussed Figure 15 and section 5.6.3. Ted Warren to rework.
 - e. Discussed section 4.7. Don Lukach made a motion to reduce Section 4.7 to one or two paragraphs due to C37.104 covering reclosing. 2nd by Abu Zahid. Motion carries with 26 affirmative votes and none opposed. Gustavo Brunello noted Single phase reclosing from D48 may be applicable to C37.115. Don Lukach to edit Section 4.7 and look at the D48 Report to see if should be added.
 - f. Discussed 6.9.7 about single pole reclosing. Single pole tripping and reclosing may be covered by D48 and could be possibly removed or reduced to a summary.
 - g. Matt Black suggested that C37.104 should be removed from the Bibliography & placed in the Normative references
- j) Recesses and time of final adjournment: Adjourned by Jeff Barsch at 2:10 PM PDT. Josh Lamb 1stGustavo Brunello 2nd
- k) Next meeting date and location at: Online meetings to continue on Wednesday, June 8 and then the first Thursday of each month from 11:00-12:30 ET via Teams; next in-person meeting to be in September 2022 at the Nashville, TN PSRC meeting

WebEx Chat minutes:

from Power System Relaying and Control Committee to everyone: 12:59 PM

Phone number is Taylor

from Sudarshan to everyone: 1:15 PM

I can help with reviewing 6.4

from Arun Shrestha to everyone: 1:16 PM

Arun Shrestha - volunteer to review 6.7.3

from Juan Piñeros - XM to everyone: 1:16 PM

I can help with 6.7.6

from Juan Piñeros - XM to everyone: 1:41 PM

may be there is better-> is initiated by protection system and consist...

from Juan Piñeros - XM to everyone: 1:48 PM

I agree about minimum content about reclosing is useful with the proper reference to the guide of reclosing as well.

from Alla Deronja to everyone: 1:49 PM

Agree with you, Juan. Thank you

from Matt Black Sargent & Lundy to everyone: 1:52 PM

C37.104 should be removed from the Bibliography & placed in the Normative references from Matt Black Sargent & Lundy to everyone: 2:09 PM
comment rescinded

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

D43: Effect of Distribution Automation on Protective Relaying (Report)

Chair: Greg Ryan

Vice Chair: Amin Zamani

Secretary: Joshua Hughes

Output: Technical Report

Established Date: January 2021

Expected Completion Date: January 2023

Draft: 0.4

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 May 11, 2022 at 09:20-10:30AM PST. There were total of 14 attendees (5 online and 9 in-person) in the meeting, 7 members and 7 guests.

Meeting Agenda

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

Summary of Meeting Discussion

- a) Meeting started with the Chair, Vice Chair, and Secretary introducing themselves. In-person attendees also introduced themselves.
- b) The Chair explained the requirements for membership, which is attending 2 out of the last 4 meetings.
- c) The Chair provided an update on the status of the report. Chair and VChair to update the assignment list; WG members to provide their contribution by June 30, 2022 (latest).
- d) Chair and Vice-chair will send a reminder to the members and guests for their contribution.
- e) Colleen's and Mathew's comments on Section 3.7 and 4 were discussed.
- f) Juan discussed his points on Section 3.1 and the use of recloser (instead of sectionalizes) for DA. Also, he suggested the impact of resonance on relaying to be discussed.
- g) Chair explained that the group will now focus on addressing the comments. We will likely set up one or two virtual meetings between now and September meeting.

Next meeting request - single session for 30 attendees with computer projector. Avoid conflict with D38, I47, D45, & 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 May 10, 2022, at 3:30 PM PST, Face-to-face and virtual online with 33 attendees.

3 were new attendees.

14 voting members were present out of 20 current voting members, so the quorum was met.

3 attendees requested to become voting members.

The Chair, Sebastien Billaut presided over the meeting. He brought the meeting to order and showed the agenda, and the IEEE copyright guidelines slide for IEEE working group meetings.

Muhammad Hamid made a motion to approve the May 2022 meeting agenda, seconded by Karl Zimmerman 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 January 2022 meeting. Muhammad Hamid made a motion to approve the January 2022 meeting minute, seconded by Karl Zimmerman and approved.

The group had a discussion on incorporating the contribution on Section 6 by Robert James. Muhammad Hamid made a motion to incorporate the contribution to the guide draft, seconded by Karl Zimmerman and approved.

Steve Klecker discussed the idea to include the fault location identification method based on Multi-Kernel Extreme Learning Machine (MKELM). Working group chair Sebastien Billaut will get back with Steve Klecker regarding fault location identification on the microgrid.

The chair of the working group plans to have separate meetings with each of the assignment team between now and the September meeting.

Looja Tuladhar made a motion to adjourn the meeting, seconded by Muhammad Hamid, and 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 4th meeting of the D45 WG.

D45 WG met on 5/10/22 at 2:20pm (California Time)

Members = 39 listed

Attendance = 60 (31 guests, 29 members) – Quorum Established

The chair opened the meeting with approximately 30 people in the room. The agenda and other items

were discussed and the minutes from the last WG meeting was approved. A spread sheet was displayed

that tracked the progress of the various sections and the section leads were reminded about the expectations of their assignment. The scope of each section was also discussed. The chair and vice-chair

offered to help coordinate meetings.

The section leads provided an update on their progress. Volunteers were requested for each section

and several new volunteers came forward. Several Section Leads provided short discussion and/or

presentations and the WG provided observations and suggestions. Some of these topics included reclosing practices, mutual coupling, and fire ignition energy.

The section leads will hold meetings as needed to provide a 1st draft by the next meeting. The Chair and

vice chair took some action items to resend several documents to the members/attendees (section

scope, section members, tracking list, presentations, member lists, and more), including providing a

share point where contributions could be deposited.

Draft – no overall 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: 1.10

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 any D Subcommittee Non-Editorial Comments
3. Discuss Next Steps
 - a. Publishing Paper
 - b. Presenting Paper
 - c. Disbanding WG

Minutes:

- The working group met on Wednesday May 11, 2022 10:40 AM PST
- There were a total of 22 people in attendance with 10 members.
- Brian Boysen presented status of summary paper
- Brian Boysen shared the results of the subcommittee ballot – 100% Approval
- Reviewed comments made by subcommittee members
- Next Steps
 - o Paper to be submitted to Main Committee Officers
 - o Any comments to be reviewed and addressed at interim meeting if necessary
 - o Keep working group, but will not meet in September
 - o Summary Paper/Guide to be presented at Main Committee
 - o Present Paper at Conferences
 - Brian Boysen
 - Chris Walker
 - Muhammad Hamid
 - Mat Garver
 - Juan Gers

Leave WG open, sept meeting not needed.

Next meeting request - None

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: 0

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 26 voting members, 3 non-voting members, and 24 guests on Wednesday, May 11, 2022, at the IEEE PSRC and PSCCC 2022 meeting. 2 guests joined the WG as members.

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

The meeting agenda was approved. Motion: Ken Fodero, 2nd: Mat Garver. There were no objections.

The quorum was met, so the WG voted to approve the January 11, 2022; January 26, 2022; February 8, 2022, and April 18, 2022 WebEx meetings minutes. Motion: Mat Garver, 2nd: Matt Black.

This work is a joint project between the PSRC leading the project and PSCCC co-sponsoring it.

Venkat Mynam from SEL made a presentation on Traveling Wave protection method basics based on the paper entitled, "Traveling Wave Differential Scheme for Line Protection".

The planned second presentation could not be conducted due to the meeting time constraints. Therefore, a WebEx meeting will be scheduled for Joerg Blumschein to present traveling wave protection method technical aspects. After that the working group voting members will vote on whether to include traveling wave line protection in the guide.

Motion to adjourn: Abu Bapary, 2nd: Mat Garver.

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: May 11, 2022

Proposed assignment for WG: To prepare a report focusing on the considerations associated with

single-phase tripping and reclosing on transmission lines.

- 1) Second meeting of D48 working group PST in a single session with 41 attendees. 12 out of 19 members in attendance. Quorum achieved. 2 people requested for membership.
- 2) Mukesh presented on secondary Arc, successful reclose and BC Hydro application. Excellent discussion and good questions.
- 3) Ilia presented the phase selection. Alla and Joerg contributed to this section. Good discussion. Some comments about not to add too many details in this discussion. However, it was left for working groups members to decide the details in this section.
- 4) Presented the progress on this guide and various sections in progress. Discussed briefly secondary Arc section and various methods to extinguish the arc and successful reclose. Reviewed briefly material from CIGRE on this topic also.
- 5) Dean miller – important to include inductive coupling. To be discussed further.

- 6) Meyer Kao and Gustavo discussed the D42 guide referencing the D48 work for single phase trip and reclose. Further discussion needed with Bruce Mackie.
- 7) Draft will be available later this week for members to review and provide comments.
- 8) Adjourn 11.50 AM PST.

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

DTF50: Investigate the need to create a summary paper for C37.104 IEEE Guide for Automatic Reclosing on AC Distribution and Transmission Lines

Chair: Manish Patel

Vice Chair: N/A

Secretary: N/A

Output: N/A

Established Date: January 2021

Expected Completion Date: May 2022

Draft: N/A

Assignment: *Make a recommendation to the D subcommittee whether to form a working group to develop a summary paper on IEEE Std C37.104 and if the recommendation is to proceed, to develop a recommended assignment for the D subcommittee to consider.*

The task force met in a hybrid format on May 10th, 2022, at 9:20 am PT with 18 members. All in attendance were considered members of this task force

Officers presiding – Manish Patel

Officer recording minutes- Manish Patel

Chair's remarks – The revised C37.104 guide was published in April 2022. Many thanks to D39 WG members and guests for their contribution and support through the revision of this guide.

The task force discussed pros and cons of developing a summary paper. It was noted that a summary paper along with a presentation at various conferences presents a great opportunity to inform industry of this guide and work done by the IEEE PSRC.

Manish Patel mentioned that summary paper for 2012 version was not developed. Hence, the scope of this summary paper should not focus on “what is new in C37.104?” and instead should be a general summary of the guide.

Everyone in attendance agreed to recommend the D subcommittee to form a working group to develop a summary paper with following assignment.

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

Contingent upon approval by the D subcommittee:

Manish Patel, Joshua Lamb and Miguel Rios volunteered to serve as a chair, vice-chair and secretary respectively for the new WG.

Timeline:

- March 2023: Complete first draft

- March – September 2023: review and approval process
- Q4 2023 – Submit to 2024 conferences

Summary paper outline

- Abstract
- I. Introduction (**Manish, Genariel**)
- II. Fundamentals and Applications (**Josh Lamb**)
 - a. General (Clauses 4.1 through 4.5, possibly 4.9, 4.10)
 - b. Autoreclosing supervision (Clause 4.6)
 - c. Autoreclose blocking (Clause 4.7)
 - d. Application considerations (Clause 4.8)
- III. Autoreclosing on Distribution Lines (**Mat Garver, Bruce Mackie**)
 - a. Overview (Clause 5.1)
 - b. Autoreclosing practices (Clause 5.2)
 - c. Coordination practices (Clause 5.3)
 - d. Application considerations (Clause 5.4)
- IV. Autoreclosing on Transmission Lines (**Rafael Graciaa, Matt Black, Brandon Lewey**)
 - a. Overview (Clause 6.1)
 - b. Autoreclosing methods (Clause 6.2)
 - c. Application considerations (Clause 6.3)
- V. New Technologies & Special applications (**Jim O'Brien, Qun Qui, Kamal Garg**)
 - a. Ethernet, point-on-wave and pulse closing technologies for autoreclosing (Clauses 7.1, 7.3, 7.5)
 - b. Special applications (Clauses 7.2 & 7.4)
- VI. Conclusion (**Manish**)

DTF50 Chair Manish Patel motioned to the D Subcommittee to create Working Group D50, Create Summary Paper on C37.104 IEEE Guide for Automatic Reclosing on AC Distribution and Transmission Lines. The Assignment of WG D50 is: Create a summary paper for C37.104 IEEE Guide for Automatic Reclosing on AC Distribution and Transmission Lines.

This was seconded by Brian Boysen,

Members of D Subcommittee voted to create Working Group D50

For the next WG meeting, D50 will need a room for 20 and a computer projector. Avoid conflict with B10, C45, CTF34.

Liaison Reports

T&D Committee / Distribution Subcommittee

None

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

Old Business

None

New Business

There was a discussion on creating a technical report on single phase tripping and reclosing and of distribution lines. There were interests on this subject in the subcommittee meeting.

Brian Boysen motioned to the D Subcommittee to create Task Force DTR51, Investigate the need to Create a technical report "Protection Consideration for Single Phase Tripping and Reclosing of Distribution Lines". The assignment of DTF51 is: 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.

This was seconded by Greg Ryan

Members of D Subcommittee voted to create DTF51

General Discussion

None

Line protection operations of interest

None

Adjournment

H: Relaying Communications Subcommittee

Chair: Aaron Martin

Vice Chair: Hugo Monterrubio

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

SC H met on May 11, 2022 via WebEx and in person with 34 members and 36 guests present comprising a quorum.

A vote was taken electronically in advance to this meeting and completed during the meeting to approve the January minutes.

Announcements:

- a. New items from September 2020 AdCom Meeting
 - i. Awards page and section to honor long-term PSRC members who passed away to be added to PES-PSRC website.
 - ii. WG PSRC P&P and W&G P&P have been submitted to Main Committee members for review and approval. Vote to occur during May PSRC meeting.
 - iii. WG training sessions to be available once PSRC P&P and WG P&P are approved. It may be available at September meeting
- b. New items from Awards and Recognition Meeting:

- i. Please save the date for our next Awards Ceremony. It will take place on Monday September 12, 2022, in Nashville TN
 - ii. Reminder that WG awards for Standards must be requested directly by the WG officers (Chair or VC) in the IEEE SA Awards website. These awards can be shipped directly to you or to the hotel where we will meet next
- c. New from Standards Coordination Meeting:
- i. New mandatory training for Subcommittee Officers, and Working Group Officers leading standards work specified by SA. Training includes 15 modules total 8-12 hours. SA will be responsible for tracking the training.
 - ii. WG Chairs that they are required to show the Copyright, Patent, and the Participant Slides required from SA
- d. New items from SC and reminders carried from prior meetings:
- i. WG officers to attend Stds Coordination meeting
 - ii. SC Members are required to Vote on Reports
 - iii. WG officers are required to submit meeting minutes within two weeks of PSRC meetings.
 - iv. iMeet space available for Non-PAR WGs. PSRC Officers have organized documents depository for non-PAR WGs
 - v. WG presentations to be reviewed by SC Officers
 - vi. Upon work completion, prepare a presentation to the MC

WG business:

Charlie Sufana made the motions and Mark Admiak seconded the motions to allow WGs H27, H40, H44, and H45 to request 1-2 year extensions. The four motions were carried electronically proceeding the meeting. All four motions were approved electronically with 23 votes to approve and zero votes reject.

Motion: Working Group H27 motions to extend the PAR for IEEE Standard PC37.251 Standard for Common Protection and Control Settings or Configuration Data Format (COMSET), for 1 year.

Reason: A one year extension is needed to permit time for the entire balloting process.

Motion: Working Group H40 motions to extend the PAR for IEEE Guide PC37.1.2 entitled Guide for Databases Used in Utility Automation Systems., for 2 years.

Reason: The group is finishing the edits and expects to be in balloting by October 2022. However, the complete process will not be completed by the PAR expiration of December 2022.

Motion: Working Group H44 motions to extend the PAR for IEEE Guide P2030.100.1 Guide for Monitoring and Diagnostics of IEC 61850 GOOSE and Sampled Values Based Systems., for 2 years.

Reason: H44 has produced 70 pages of content and is hosting monthly virtual meetings to produce a completed draft to circulate among the voting members of the group. A two year extension will allow H44 a year to resolve issues identified by working group members and a year to submit for ballot.

Motion: Working Group H45 motions to extend the PAR for IEEE Guide PC37.300, Guide for Centralized Substation Protection and Control (CPC) Systems within a Substation, for 2 years until December 31, 2024

Reason: This new guide is currently in Draft 5.0 which has received about 700 comments from working group members that are being resolved expeditiously by working group members. Working group expect to ballot Draft 6.0 among WG members in Q3 of 2022 after resolving all comments. The working group plans to have an IEEE balloting body and MEC editorial review by Q4 of 2022. The group intends to begin the IEEE balloting by Q4 of 2022 or early 2023. The group needs an extension for 2 years (until December 31, 2024) to complete the IEEE balloting, resolve balloter comments on this new guide, possible recirculation and complete the approval process. The working group is conducting regular virtual and in-person meetings and will continue to follow the practice, accommodating the impact of pandemic that slowed down the work temporarily. The working group has so far met 24 times including the first meeting in May of 2018.

WORKING GROUP MEETING REPORTS

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 PES-TR84.

Agenda H6 IEC-61850 Application Testing:

Tuesday May. 10, 2022 Hybrid/Virtual Meeting Room: Reno Sorrento 3

10:40 AM – 11:50 PM PST (70 Minutes)

11:40 AM – 12:50 PM MST

12:40 PM – 1:50 PM CST

1:40 PM – 2:50 PM EST

17:40 – 18:50 UTC

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

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

Voting members:

Charles Sufana, Benton Vandiver, Jay Anderson, Christoph Brunner, Jason Buneo, Herbert Falk, Dinesh Gurusinghe, Chris Huntley, Sughosh Kuber, Aaron Martin, Tim Mathias, Daniel

Reckerd, Antonio Riccardo, Mickey Schultz, Harsh Vardhan, Marcos Velazquez, Quintin Verzosa, Emmoji Vundekari, Austin Wade

Non-voting members

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

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

Main emphasis of the session will be to decide if the latest summary paper draft should go for full working group approval and then H subcommittee approval.

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

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

There was considerable discussion on having several of summary sections get enhanced. Alex Apostolov suggested several changes and as a result Figures 9 and 10 will be added in along with some additional wording. Clause 2.3.3 will also be added in.

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

Charlie Sufana
H6 Chair

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

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

H17: Establishing links between COMTRADE, IEC 61850 and CIM

Chair: C. Brunner

Vice Chair: A. Apostolov

Output: Report

Established: 2010

Expected completion date:

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

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

Chair: Amir Makki

Vice Chair: Cesar Calix

Secretary: Hugo Monterrubio

I-Meet Administrator: T.W. Cease

Output: Guide - PC37.249

Established: January 2014

Expected Completion Date: December 2022

Expected Final Draft: 8.20

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

May 2022, Meeting Minutes:

The WG met on time with 20 colleagues in attendance. Quorum was established (10 out of 12 voting members attended). The Chair informed the WG of the balloting results:

75% of the balloters casted their votes (the draft passed the required threshold)

90% voted to approve (with 20 comments to resolve)

10% voted to disapprove (with 110 comments to resolve)

The comments were divided based on page numbers and assigned to the members of comment resolution group (CRG) with the objective of addressing the comments and re-balloting before the next meeting. The WG plans to meet again during the September meeting. A room for 20 people is requested.

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.

MEETING MINUTES – 2022 MAY 11

MEETING LOCATION AND TIME

Date and Time: Monday, 2022 May 11 (8:00 to 9:10 AM Pacific Time)

Meeting Location: Peppermill Hotel in Reno, Nevada with Remote Attendees via WebEx

Chair: Mario Capuozzo

Vice Chair: Benton Vandiver

Secretary: Daniel Sabin

The meeting was chaired by Mario Capuozzo. Minutes were recorded by Dan Sabin.

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.

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. A second PAR extension will be requested by in September 2022 as submission to IEEE SA RevCom would likely not happen until second quarter of 2023.

The chair established quorum because 10 of the 11 working group members were in attendance.

MEETING DISCUSSION

The chair showed the slides required by IEEE Standards association for patent policy, copyright policy, and working group participation. No essential patents were declared when the chair asked for a call for essential patents.

The agenda for the May 11 meeting was approved.

Minutes from the November 2021 and January 2022 meetings were approved.

The bulk of the meeting was focused on a review of the latest draft. Topics discussed including use of unsigned integers and whether there should be a new bType to support 64-bit. The chair recorded numerous action items to complete related to changes suggested by meeting attendees.

The chair reported that that IEEE and IEC had agreed to the framework of how to distribute the latest draft of IEEE PC37.251 to IEC Technical Committee 57, Working Group 10. The latest PC37.251 draft will be sent to the chair of IEC TC57 WG10 with the request that the draft be distributed to the WG10 members and that feedback would be provided to the IEEE H27 working group by 2022 August 1. Feedback from WG10 would be reviewed and resolved by the chair in August 2022.

The working group attendees were in agreement that it would be a goal to have the H27 working group approve a PC37.251 draft for MEC review and balloting no later than the September 2022 meeting.

The H Subcommittee chair, Aaron Martin, was in attendance and he brought up the topic of a PAR extension for PC37.251. It was agreed that a one-year extension would likely be needed in order to allow balloting of PC37.251 to complete in 2023. Aaron said he would put the PC37.251 PAR extension on the agenda for the H Subcommittee meeting in September 2022.

ACTION ITEMS

Dan Sabin will reformat text as needed to allow the table of contents to build.

Alex Apostolov will provide an example of a COMSET file for non-61850 equipment for Annex A or B.

Mario Capuozzo will add Andres Ovalle (aovalle@epri.com) to the H27 workspace in iMeet Central

Mario Capuozzo will provide the latest draft of PC37.251 to the chair of IEC TC57 WG10, who will be asked to distribute the draft to the WG10 members. Feedback from WG10 will be requested to be returned to the IEEE PES PSRC H27 working group by August 1.

Mario Capuozzo will review and resolve feedback from WG 10 in August 2022.

Mario Capuozzo will complete the following tasks:

- Provide XSD fragments where necessary to support changes.
- Provide a transitional namespace.
- Clarify that settings with fc=SP are global and fc=SG belong to one or more groups.
- Update references/bibliography.
- Review comments/feedback.
- Add a note that <Communications> is okay for IEC 61850 devices, as it is settings.
- As well, just talk a little more about XML overall structure for a non-61850 application.
- Clarify that secondaryVal may be in percent, per-unit, or just raw secondary.

NEXT MEETING

The next meeting of the IEEE PES Power System Relaying & Control Committee will be during the week of September 12, 2022 in conjunction with the IEEE PES PSRC/PSCC Technical Committee Meetings. For more information, see <https://www.pes-psrc.org/meetings.html>

H30: IEC 61850 User Feedback

Chair: D. Maragal

Vice Chair: A. Martin

Secretary: D. Tessier

Output: User Feedback to IEC 61850 TFUF, UCA, TISSUE Task Force & Vendors

Established: September 2014

Estimated Completion Date: Ongoing

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

Agenda

IEC 61850 User Feedback

- SCL Interoperability & Error handling: Presentation from EDF
- Documentation/Drawings with IEC 61850 Design Parameters

General Updates

- Update on H30 items submitted to IEC 61850 TFUF & TISSUE
- IEEE H30 & IEC 61850 TFUF Feedback Process

Other IEEE H30 Activities

- Develop IEEE H30 Profile
- Webex for Google user feedback on Redmine Issue 5335(<https://redmine.ucaiug.org/issues/5335>) to discuss June 28 @ 11:00AM-12:30 EST

27 attendees attended the meeting.

Deepak briefly described purpose of H30 forum. IEEE SA board is allowing H30 not to approve minutes.

It was brought to the attention of H subcommittee officers and Chair of H30 that IEC and UCAIUG required to have feedback approved by H30 members before it is presented as feedback. It was also made clear that anyone can provide the feedback at independent capacity but an organizational feedback needs to be vetted through all its members.

H30 can discuss feedback and help collect utility feedback for different entities.

Alex Apostolov sees the H30 forum purpose to capture feedback from non-participants of UCA and IEC from North America.

Sebasien Latraverse and Aurelie Dehouck from EDF and HydroQuebec presented "SCL files validation tool conforming to IEC standards and based on machine processable rules in OCL to achieve SCL Interoperability & error handling."

OCL Tool supports the testing and validation for every 61850 file and its configurations. Answering to the questions from audience, the presenters cleared the following:

- Vendor SCL validation can occur as per the desired profile beyond those ascertained by UCA or other testing agencies for base IEC 61850.
- CIM files can also be validated with the tool. It is to be noted that there is no validation or harmonization between CIM files and 61850 files as they use different namespace.
- Andre Melo asked if OCL rules will be documented? OCL rules will be joined to dedicated part of 61850. Document will explain how 61850 author should write rules for their part.

Deepak brought the development of a profile in North America. A lot of syntax and semantics are already being discussed in H27 and H31 respectively. H31 to produce a report to describe potential profile. Outcome could be a BAP. More discussion to follow.

H31: Common Protection & Control parameters for COMSET

Chair: D. Maragal

Vice Chair: A. Apostolov

Output: Report

Established: September 2015
Estimated Completion Date: September 2022
Draft: 6

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

Meeting conducted with 11 attendees

The chair presented discussed the duplicate parameters with:

- PhStop vs StrVal
- GndOp vs GndStr
- StrDITmms vs OpDITmms

The excel worksheet was reviewed. Due to lack of participation from vendors, Chair discussed the plan of developing interim report with the Excel sheet and IEEE pdf document, which could still act as good reference and training tool to many users and community to use.

Chair also discussed about the need and extension of this work towards developing North American profile. Alex Apostolov and others mentioned about BAP.

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

H40 met on Tuesday May 10 at 11:08 ET.

There were 2 members out of 7, and 4 guests in attendance.

The members in attendance were Galina Antonova and Theo Laughner.

The guests in attendance were Allen Goldstein, Bailey Caruthers, Jack Wilson, and Malia Zaman (IEEE SA).

Since quorum was not achieved, this was an informational meeting. The chair reviewed draft 3 of the document.

The document is approximately 90% complete. The PAR expires in 12/22. The chair plans to have the document ready for ballot in late August. In addition, the chair plans to request a PAR extension in October.

Allen Goldstein requested to be the C23 Working group liaison.

The H40 TF plans to meet in September. We need a meeting room for 10 people and need to avoid conflicts with PSCCC S9 and PSCCC S0.

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

The WG met on Tuesday, May 10, 2022, with eleven members and three guests in attendance - a quorum was present. Attendees introduced themselves and their affiliations.

The chair presented IEEE's call for patents, copyrights, and code of ethics – no response.

Craig Preuss motioned to approve the proposed agenda, second by Mal Swanson. Without change, members approved the agenda.

All past minutes are approved.

Those attending focused on the following topics:

Dennis opened the discussion with a short presentation on how best to accelerate H41's work.

The idea is to focus each meeting on a specific topic and a concrete proposal. Members offering the subject will lead the discussion.

P1646:2004 cites IEEE Std C37.115:2003 specifying testing to verify performance. C37.115 has expired. H41 will request guidance from PSCC P0 to determine if P1646 should continue to reference C37.115 or do they recommend another standard.

Given the acceptance of the reference latency model, the performance tables will specify the maximum latency measured from leaving the source to arriving at the receiver.

Members agreed to delete the application specification for critical message class, priority class, and rate in draft 6.

David Dolezilek and Tom Dahlin are the leads for discussing maximum latency and skew specifications at the next meeting.

Dennis will send out a Doodle poll to determine the best Monday date in June 2022 for the next regular virtual meeting. H41 plans to conduct virtual meetings every month to complete the work.

For the September 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
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 10 members, 6 attendees in person, and 25 attendees online.

Dave Dolezilek moved to open meeting, second made by Jun Verzosa.

Aaron Martin brought the meeting to order and discussed January 12, 2022 meeting minutes.

Karen Wyszczelski moved to approve the minutes, Dave Dolezilek seconded the motion to approve the minutes.

Old business – reviewed H44 Assignment Scope

WG reviewed patent slides with no questions

WG reviewed copyright policy with no comments

WG reviewed the participant slides with no comments.

Dave Dolezilek presented the revision of his contribution.

Herb Falk recommend adding a security channel to the Programmable Electronic Device Data and Model Organization diagram.

Herb Falk, Jun Verzosa provided applicable information and detailed information on logical nodes including setting group status and configuration are in the standard.

Herb Falk, asks that the WG check 62351-7 for MIBS.

Dave Dolezilek agreed to remove channel status acronyms and section on Ethernet channel status related to station bus port attributes needed for engineering access.

There was a lengthy discussion on

Motion to adjourn Dave Dolezilek with second by Karen Wyszczelski

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 # 23 (May 11, 2022) Hybrid Meeting Minutes

The working group met on May 11, 2022 with 44 attendees - 22 of them are voting members (out of 26) and 4 are non-voting members (out of 16). The names and affiliation of attendees are enclosed.

Chair presided over the meeting and Vice-Chair checked quorum and recorded the minutes of the meeting in the absence of the Secretary. IEEE patent, copyright and participant behavior policy and other guidelines for working group meetings were reviewed. Quorum was achieved and the proposed agenda was approved (Motion – Jose, Second – Rich, Dissented - none) and discussion started based on the proposed agenda.

Chair mentioned that “Centralized Protection and Control (CPC) Systems within a Substation” topic was covered in the May 2022 issue of the IEEE PES Trending Technologies – Vice-Chair provided the link in the meeting chat for interested attendees. The information can be accessed by visiting the related PES website.

Chair provided the overview of the guide for the benefit of one new attendee and many guests.

Chair provided a brief summary of the approvals/comments received from the working group voting members after the last working group meeting (#22) on April 29, 2022 – (i) Meeting (#22) minutes and (iii) Approvals of resolutions for comment IDs 5-4-27, 5-4-44 thru 5-4-68 and 5-4-70 thru 5-4-73. Few typos in the circulated minutes were identified by members and minutes were approved after the corrections. All the above mentioned comment resolution IDs were approved by the voting members without comments except for 5-4-27, 5-4-45, 5-4-46, 5-4-48 thru 5-4-51, 5-4-53, 5-4-57, 5-4-66, 5-4-68, 5-4-72 and 5-4-73 - members provided suggested changes to the proposed resolution by WG officers. Suggested changes for 5-4-45, 5-4-46 and 5-4-48 were discussed, modified (as applicable) and approved during the meeting. Sakis and Vahid will update proposed resolution by WG for comment ID 5-4-27, based on the discussion, before the next WG meeting on May 27, 2022. Remaining eleven comment resolutions, for which alternate suggestions were made, will be discussed during the next WG meeting along with the finalization of proposed changes in Option 1 related to resolution of comment ID 5-4-2.

Chair mentioned that those voting members not returning ballots on a consistent basis may notice a change in their membership status to non-voting member to facilitate the progress of the working group as mentioned during the meeting on April 14, 2022. Also, non-voting members who have not contributed significantly to the WG activities and are not attending meetings, as required by IEEE SA rules to retain their membership status, will notice a change in their membership status.

Chair also mentioned during the meeting that two-year extension of the WG PAR will be proposed during the H-subcommittee meeting, as discussed and agreed during the meeting on April 1, 2022 – present WG PAR expires in December 2022. No one dissented with the proposal.

Working group will continue to meet every two weeks on Fridays from 10:00 AM EDT to 11:30 AM EDT till all the comments are resolved. Working group officers will continue to meet every two weeks to explore the proposed resolution for comments to be discussed during the next working group meeting on the following Friday and share the proposals with the members after their meeting.

Next working group meeting will be held on May 27, 2022 (Friday) from 10:00 AM to 11:30 AM EDT Meeting was adjourned (Motion – Joe, Second – Vahid, Dissented - None).

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

Chair: Matt Black

Vice Chair: Craig Preuss

Secretary: Shane Haveron

Output: Recommended Practice for Human-Interfaces (HMI) used with Electric Utility Automation Systems (PC37.1.3)

Established: September 2018

Expected Completion Date: January 2023

Draft: v0.53

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

The chair called the virtual meeting to order on Wednesday 5/11/22 at 9:20 PDT. There were 15 attendees: 13 out of 23 voting members and 2 guests, achieving a quorum. Minutes from the meeting in January '21 were approved with Charlie Sufana making the motion to approve and Eric Thibodeau seconding the motion. After initially not having enough members to approve the minutes, we eventually achieved quorum and approved minutes from the January '22 & September '21 PSRC Meetings.

After limited introductions, the agenda, patent, copyright, and participant slides were reviewed with no comments received. There were no presentations or old business items for this meeting and new business to discuss lack of progress. The PAR which expires end of year 2023 with a planned initial ballot mid 2022 does not seem like a realistic goal given the present status of the draft.

Working group leadership have discussed a potential descope to remove some of the breadth and depth of the initial purpose/assignment. This would inevitably result in a PAR revision to adhere to the content of the completed recommended practice.

The following items were discussed as to the role that the recommended practice might play at the conclusion of its composition. Items discussed were those of role, input, output, ownership of HMI philosophy, style guide, and toolkit. The philosophy section's intent is for 10-30% of the Recommended Practice to be based on design. Approximately 50% to be the style guide. The remainder will be the toolkit (nuts & bolts).

The definition of an HMI toolkit is being drafted and will likely be submitted to I2 shortly.

Intent of descope will be to retain as much of the material that has been produced so far as possible, with a possible restructuring of the Recommended Practice.

Due to difficulty(ies) achieving quorum, attendees that have not attended any of the past 4 WG meetings are being contact to question their continued status as a working group member/objection to being made a non-voting member.

Charlie Sufana made a motion to adjourn and was seconded by Eric Thibodeau. The motion was approved, and the meeting adjourned at approximately 10:30 PDT.

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

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.

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

Chair: Acting - Galina Antonova
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.

The WG H49 met on Monday 5/9/2022 in in-person and WebEx virtual meeting, with 23 attendees (6 members, including 3 new members, 1 corresponding member and 16 guests).

This was the first WG meeting after September 2021, as the WG Chair changed affiliation and stopped attending PSRC.

Attendees were introduced. Attendance list was determined from WebEx attendance records and from an in-person sign-up sheet .

Galina Antonova and Steve Klecker asked the attendees to consider becoming new members of WG H49. Three people have agreed to be new members: Adrian Zvarych, Carolina Arbona, and Brittany Chapman.

Galina also solicited volunteers for WG Officers, as WG Chair, Gary Stoedter, Vice-Chair Ilia Voloh and Secretary Luke Erichsen, could not continue serving the group.

Slides covering IEEE Copyright and Patent Policy were presented.

May 2021 and September 2021 WG meeting minutes were shown and will be approved electronically, once WG Membership is re-established.

Galina Antonova reminded the participants that the Scope of this work includes utilities experiences with, and lessons learned from using packet-switched networks for protection applications.

Eric Udren gave a presentation on experiences and applications of San Diego Gas and Electric (SDG&E) entitled, "Teleprotection with MPLS Ethernet Communications-Development and Testing of Practical Installations". Several questions and comments were discussed. Eric will provide copies of the presentation to the meeting attendees. Steve Klecker will share these with the working group.

An initial draft outline of the report was started by Galina based on performance matrix (latency, asymmetry, failover and availability) and special considerations such as network engineering, as presented by Eric. It was suggested to seek updates on the 100 protection services currently operated by SDG&E over Multi-Protocol Label Switching (MPLS) network and reach out to other utilities which are running protection services over packet-switched networks.

For the next meeting: Single session, a room for 25 people with a projector, a Webex meeting.

Meeting Room Requirements: Avoid A1, B2 and P14. The same time slot on Monday 3:40pm is preferred, if A1 can be moved out.

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: 12/31/2021

Draft: 1.4

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

Meeting 10 May 2022, 14:20 – 15:30 PDT. All working group officers were present. The chair presided over the meeting and Jay Anderson recorded minutes.

The meeting was called to order with 25 in attendance of which 9 were members, 1 non-voting member, and 15 guests. Quorum was achieved.

A motion was made by N. Kraemer to approve the agenda; seconded by Jeff Dagle. The agenda was approved.

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

A motion was made by R. Byun to approve the January 2022 meeting minutes; seconded by S. Klecker. The Minutes were approved.

Presentations:

Jeff Dagle presented a summary of the work of the Energy Sector Use Case task force for the P1952 Standard for Resilient Positioning, Navigation, and Timing (PNT) User Equipment. The P1952 WG is working on technical requirements and expected behaviors for resilient Positioning, Navigation, and Timing (PNT) User Equipment (UE). The scope is limited to the reception, ingestion, processing, handling, and output of PNT data, information, and signals.

The presentation sparked conversation. The Electric Sector use case centers on precision time sources and performance requirements for different applications such as Synchrophasors, line differential, and sampled values (among others). The presentation will be posted to the H50 iMeet site.

Old Business

The Scope and Assignment were reviewed.

New Business

The group reviewed submissions from Nicholas Kraemer and Bruce Muschlitz on Section 3: Inputs (the submissions are in iMeet). Comments that Bruce raised will spur clarification of the role of terrestrial-based time signals (such as WWVB); Ya-Shian will reach out to colleagues at NIST. Bruce also questions whether we need a section on base clock features vs potential additional options. The format of such a section will need to be carefully handled to avoid suggesting "requirements" or "recommendations" since this document is a Report.

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

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

A Doodle Pole will be sent out to try to plan a June WG meeting.

Meeting was adjourned at 15:32 PDT.

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

<https://iee-SA.imeetcentral.com/psrcc-h50/folder/WzlwLDEyNTQ5NTk4XQ>

Avoid Conflicts: P1, S15, C33

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

Chair: Mark Adamiak

Vice Chair: Pierre Martin

Secretary: Zach Makki

Output: Standard Revision

Completion Date:

Current Revision: 2010

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

Meeting Proceedings:

The meeting was held on May 10, 2022 with 10 Members (quorum met) and 2 guests. Prior to the meeting, Draft 2 of the revised standard was reviewed by the WG. The result of the review was:

Approve: 12

Disapprove: 1

Abstain: 1

No vote: 2

Additionally, 3 sets of comments were received. The working group resolved 2 of the comments sets and started resolution on the third. A virtual meeting will be held in the next month to finish comment resolution which will be followed up by re-vote on the changed items. It is anticipated that Draft 3 of the revised standard will be submitted to H Subcommittee for review and recommendation to ballot before submittal to Standard voting.

Meeting adjourned.

A meeting room is not anticipated next time as the WG plans to resolve the remaining issues via an on-line meeting.

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

May 2022, Meeting Minutes:

The WG met on time with 10 colleagues in attendance. Quorum was established (7 out of 8 voting members attended). The patent slides were presented, and the minutes of the last meeting were approved. This was the third meeting of the WG.

The WG discussions focused on the initial round of submitted assignment by Shane and Ellery:
Using the 7th character to automatically identify the delimiter
Naming folder structures and scripts for changing delimiters

The WG accepted the submissions and requested descriptions of current use cases of the folder structures (assigned to Amir). Two new items were raised by Dan and Charlie:
Addressing the time code field differences between Comname and Comtrade
Using 4 instead of the current 2 characters for specifying the year

The WG then proceeded to the business of officer nominations:
Ellery Blood was nominated for WG Chairman and approved without objection
Shane Haveron was nominated for WG Vice Chairman and approved without objection
Amir Makki was nominated for WG Secretary and approved without objection

The WG plans to meet again at the next PSRC meeting with up to 20 in attendance.

H53 Working Group –Use Guide for Smart Distribution Applications P1854

Chair: Xiangyu Ding

Vice Chair: J. Lombardo

Output: Guide

Established Date: 09/2021

Completion Date: 12/2022

Current Revision: D001

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

The WG met on Wednesday, with 3 members and 3 guests in attendance. A quorum was not presented. This was the third official meeting. Attendees introduced themselves and affiliation. The call for patents was presented – no response. The call for copyright slides was presented – no response. The agenda was reviewed and approved without change. Those attending focused on the following topics:

- Reviewed the updates to P1854 – Recommend we change “Master Station” to “Controlling Station” in the guide.
- Discussed posting the latest version of the document to iMeet, so everyone has access to it going forward.
- Discussed getting the document back to SDWG by end of May with the goal of getting this updated by end of the year.
- Will ask for some help with editorial/grammar within the guide once the final changes are done

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

Chair: Mark Adamiak

Vice Chair: Zach Makki

Secretary: N/A

Output: Standard Revision

The TF did not meet, however, the PAR for the proposed COMTRADE revision has been approved by the Main Committee and is in the process of being submitted to NESCOM for final approval.

It is anticipated that the WG will form at the next meeting so a room for 40 and a speaker phone is requested with conflict avoidance for S9, S14, S5, S7, S15, and the IEC 61850-9-3 revision.

Respectively submitted

Mark Adamiak

HTF55: Distributed Cyber Physical Assessment for Grid Resilience

Chair: Jeff Pack

Vice Chair:

Secretary:
Output: Report
Established Date: 05/2022
Expected Completion Date: 2024
Current Revision: 1.0

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

aJeff Pack, Chair, presided and took the minutes

This is the first meeting of the Task Force, so no quorum was defined as we have no TF members yet.

The agenda was reviewed, and Martin suggested rearranging the agenda to address the assignment, scope, and assignment amendment. The chair agreed.

Assignment Discussion:

Preuss and Mix questioned if the first two paragraphs of the assignment were already established. The chair agreed to review and determine if any revisions are required

The five major scope tasks (as distributed to the H subcommittee) were discussed. In addressing the assignment amendment that was approved, a major part of the tasks will be focused on reviewing existing work from IEEE Analytic Methods for Power Systems (AMPS), research universities such as Georgia Tech and University of Illinois, Iowa State University and the University of Idaho, and the DOE National Laboratories such as Pacific Northwest National Laboratory and Idaho National Laboratory.

The architecture task should include PSCCC P subcommittee for input since architecture is in the P subcommittee scope.

Martin discussed including Holstein's input for applicable CIGRE publications.

Martin said that PSRC does not have specific guidance for technical reports.

The Vice-Chair position is open – volunteers were requested – please notify the Chair or Martin if there is interest.

The Chair will send out e-mail to the attendees regarding membership and next steps.

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

--End of WG Reports--

OLD BUSINESS

- Standards nearing expiration
 - C37.232 – IEEE Standard for Common Format for Naming Time
 - Sequence Data Files (COMNAME) (2021) –TF formation (A. Makki)

NEW BUSINESS

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

ADJOURN

I: Relaying Practices “I” Subcommittee Report on WG progress of note

Chair: Jim Niemira

Vice Chair: Ritwik Chowdhury

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

WG updates of note:

- I30 - *IEEE C37.235-2021 - IEEE Approved Draft Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes*
 - Document is published.
 - WG has disbanded.
 - Chair Robert Frye is working on presentation for next MC meeting.
 - Congratulations Chair Robert Frye, VC 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 rebalot this year.
- I31, I36, I37, I40, I41 - C37.90.x and 1613
 - 1613, C37.90.2, C37.90.3 are working through the balloting process.
 - C37.90 is close to final draft for WG ballot. Expect email ballot of I SC to approve for SA before Sept 2022 PSRC meeting.

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*.
 - Will request PAR approval by I SC by email ballot prior to Sept 2022 PSRC meeting.
- I29 – C37.110 - CT application guide
 - Initial ballot comments resolved and WG approved for recirculation ballot.
- I32 – Survey relay test practices
 - Andre Uribe working with IEEE PES Marketing to distribute survey and sort responses
 - Expect survey distribution should occur in the next few weeks.
- 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; nearing completion of ballot process.
- I26 Report on Mathematical Models of Instrument Transformers
 - Nearing completion for WG Ballot
- ITF42 revised Name and Scope for I-SC.
 - Chair Brian Mugalian led a group to discuss scope of the I Subcommittee and recommend a revised Name and Scope statement for consideration by the I SC and PSRC MC to align with revised PSRC Scope from PES Reorganization several years ago.
 - Proposed Name and Scope were accepted unanimously by I SC.
 - Motion for PSRC MC follows after existing / new comparison....

EXISTING NAME AND SCOPE:

I-SC Relaying Practices

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

PROPOSED REVISED NAME AND SCOPE:

I-SC Protection and Control Practices

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

MOTION

- Revise the name and Scope of I SC to better reflect the SC's role and responsibilities in the PSRC after PES reorganization in 2016.
- New Proposed Name and Scope for I SC:

I SC Protection and Control Practices

Scope: Evaluate and report on all matters related to protection and control practices for compatibility with the physical and electrical environment (including but not limited to equipment withstand capabilities to electromagnetic interference), characteristics and performance of instrument transformers and sensors, equipment and system testing procedures, protection and control performance criteria and applications, event/transient recording, and definitions of

protection and control systems. Develop, recommend, establish, and maintain standards on protective relaying and control equipment and practices. Evaluate, report on, and develop standards on other pertinent aspects of protective relaying and control systems not addressed by other PSRC Subcommittees.

Motion by Jim Niemira, second by Craig Pruess, following substantial discussion: approve= 46, no=6, abstain=7, motion passes

HYBRID MEETING – RENO, NV, AND ONLINE

Wednesday May 11, 2022, 2:30 PM PDT

1. Welcome and guidelines for meeting
2. Thank guests for attending
3. Many thanks to former members of the I-SC:
 - a. Jeff Pond
4. Welcome to new members of the I-SC:
 - a. (no new members)
5. Determine a Quorum (**38 members** total in I SC)
 - a. Attendance: 27 (min 20 for quorum; YES X or NO ___)
6. Approval of Minutes of the January 12, 2022, meeting
 - a. Motion entered by: Makki
 - b. Motion seconded by: Udren
 - c. Motion carried unanimously.
7. Coordination & Advisory Committee Meetings Items of Interest
 - a. Subcommittee Members' status and incoming Officers for September 2022
 - b. Attendee information (approximate)
 - 338 Registered for PSRC and PSCCC including 26 newcomers
 - Roughly 230 on-line, 108 in person
 - c. *Future Meetings – See “Future Meetings” page on PSRC website all plans subject to change:*
 - *Trying to get back to In Person meetings.*
 - *Sept 12-15, 2022 – Nashville, TN – (still tentative) – probably with on-line option*
 - *Jan 8-12, 2023 – JTCM Jacksonville, FL*
 - *May 8-11, 2023 – Las Vegas, NV – hotel contract executed*
 - *Sept 18-21, 2023 – Myrtle Beach, SC – (still tentative)*
 - d. Policies and Procedures for: Power System Relaying and Control Committee Working Group – recent updates to be approved in MC meeting; 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.
 - j. New “Awards” page on PSRC website – with pictures of recent awards ceremonies
8. Administrative Items
- a. From IEEE-SA: WG/TF Agendas and Minutes: “**The 14-calendar-day rule” – the Standards Association requirement in O&P**”
 - b. Procedure for PARs:
 - All PAR related activities must be approved by the PSRC Main Committee members, although certain activities are now delegated to the Subcommittee
 - See examples provided of how to request at the Main Committee – a Working Group Chair makes a motion at the Subcommittee meeting for the SC Chair to create a slide and then send it to the Main Committee Officers for inclusion on the slide set at the Main Committee meeting. The SC Chair reads the motion (s)



PAR Committee
motion_2020-6-18.p

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

- c. Review Draft 1 of the PSRC meeting agenda as soon as the meeting notice arrives in your inbox – to avoid meeting conflicts and multiple agenda revisions. Contact Ritwik Chowdhury and Jim Niemira for your requested changes – we will consolidate them and forward to Michael Thompson.
- d. **Make sure that on the Meeting Room Request (MRR) form for the [Sept. 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

9. Working Group Reports – 2 minutes each, MAX.

What is your status? Are you on track? Do you need help?

| WG/TF # | Name | Spokesperson |
|---------|--|----------------------------------|
| I2 | Terminology Review | Mal Swanson |
| I4 | International Standards Development | Eric Udren |
| I26 | Review and Expand Transaction Paper on Mathematical Models of Current, Voltage, and Coupling Capacitive Voltage Transformers | Mike Meisinger |
| I29 | PC37.110 - IEEE Draft Guide for the Application of Current Transformers Used for Protective Relaying Purposes -- Revision of C37.110-2007 | Jim Niemira – 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 | Chase Lockhart – 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 | Andre Uribe – No meeting held |
| I33 | Review of Relay Testing Terms | Jim Niemira – No meeting held |
| I35 | PC37.2 - Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations - - Revision of C37.2-2008 | Mike Dood – No meeting held |
| 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 |
| ITF42 | Revise Name and Scope of I-SC | Brian Mugalian |
| 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. | Jim Niemira |

I2: Terminology Review

Chair: Mal Swanson

Vice Chair/Secretary: Fred Friend

Output: Terminology recommendations to working groups

Established Date: circa 1995

Expected Completion Date: on-going

Draft: N/A

Assignment: Review drafts of PSRC publications for proper terminology, abbreviations and symbols; and to recommend additions and changes to the PSRC Terminology database as appropriate

The virtual meeting was called to order by Mal Swanson, Chair at 10:40 am (Pacific Time) on May 11, 2021 with Fred Friend, Vice-Chair recording minutes with 7 members and 3 guests in attendance. Quorum was achieved. The minutes from the January 2022 meeting were reviewed with no corrections provided, Addis Kifle motioned for approval and was seconded by Roger Whitaker, and unanimous approval was given. Matt Black motioned for approval of the

agenda and was seconded by Addis Kifle, and unanimous approval was given. The copyright policy was reviewed without comment.

Updates were given on each of the assignments. New words were discussed for C37.92, C37.239, and 2030.12. New assignments 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 11:35 am (Pacific Time)

I4: International Standards Development Working Group

Chair: Eric A. Udren

Vice Chair: Normann Fischer

Output: IEC TC 95 USNC standards votes and PSRC status reports

Established Date: 1990

Expected Completion Date: Meetings are continuing.

Assignment: Develop comments and votes for USNC of IEC on TC 95 (Measuring Relays and Protection Systems) standards projects and drafts. Report to PSRC on IEC Standards development.

- Chair Eric Udren called the hybrid meeting to order at 5:00 PM PST/8:00 PM EST on Tuesday May 10, 2022, using PSRC WebEx platform, attended by 10 members and 1 guest, 6 on site and 5 remote.
- The January 2022 minutes had been circulated – no meeting review – please e-mail any changes.
- TC 95 chair Dr. Murty Yalla gave the following update:
 - 60225-1 Ed 2, General Requirements analogous to IEEE C37.90, passed from CDV status to FDIS. Comments from the US national teams were submitted and addressed by the drafting team.
 - 60255-26 Ed 4, EMC requirements, passed from CDV status to FDIS. Comments from the US national team were submitted and addressed by the drafting team.
 - 60255-27 Ed 3, Safety Requirements, is in CDV status and awaits voting results publication to advance to FDIS. Comments from the US national team have been submitted.
- Part 216-3 Digital Interface-Requirements for protection data exchange interfaces, we discussed this and reaffirmed that this working group was required and that their scope was better defined than before and therefore we support the formation of this WG in TC 95 and that they move forward.

- 95/487/Q Enquiry on interest in Collaborative Safety
 - The USNC agreed that coexistence safety is good enough and no requirement for collaborative safety is required for the technical committee. The technical committee is covered by 60255-27 with respect to collaborative safety.
- 95/486/DC – Horizontal standards relationship with TC for basic standards – USNC agreed. As stated, TC 95 has an existing collaborative working relationship with TC 8.
- TC 95 wants to start JWG for 60244-24/C37.111 dual logo COMTRADE revision – status from Murty. Mark Adamiak from the IEEE will lead this effort. IEC members interested in this work will join the IEEE working group and work jointly on the standard. IEC membership countries will be allowed to review and comment on the proposed draft document.
- TC 95 WG for 60255-216-1 – *Guideline for requirements and test for protective functions with digital inputs and outputs*– proposed JWG with PSRC H47 – status from H47 chair Mital Kanabar and Liaison Joerg Blumschein. Eric will talk to Mital Kanabar and determine what is the scope for H47 and how does the scope of H47 overlap or coincide with the scope of WG2. The emphasis is that H47 should not duplicate the work done by WG2.
- Functional standard updates are as follows:
 - 95/410/RVC 60255-187-1 Functional requirements for differential protection – Restrained and unrestrained differential protection of motors, generators, and transformers– published (US inputs on prior versions). This standard is complete and will remove this from the agenda for the September meeting.
 - 60255-187-2 – *Functional standard for busbar differential relays* – work on this standard has restarted very slowly. Work on this standard will begin in earnest once the major work on 187-3 has been completed since the same persons are working on both standards.
 - 60255-187-3 – *Functional standard for line differential relays* – still headed for CD with PSRC inputs in early 2023. Many meetings have been held and work done. PSRC will reconvene D34 to review the CD when issued.
 - 167 - CD may be ready to be circulated by the end of 2022. A tentative scope decision is that 167 will focus on directional sensing and not duplicate the overcurrent functional specifics in Part 151.
 - 132 – may get 2022 CD as with 167.
- TC 95 plenary meeting tentatively proposed for 2nd October 2022 in Florida. This is presently proposed to be an in-person meeting but may be hybrid or virtual - this will be decided closer to the time of the proposed date.
- New projects on TWFL/FP and on HVDC protection reported in September have begun work slowly. There is not much interest with in the PSRC in these working groups, but there are US delegate attending these meetings. To date Dr. Dong, Convenor of the TWFL/FP WG, has called only one meeting. The HVDC working group chaired by Dr. Geraint Chaffey from KU Leuven has met a few times.

Reno Attendees:

Eric Udren
 Murty Yalla
 Jeff Dagle
 Benton Vandiver
 Bill Morse
 Gustavo Brunello

On-line Attendees:

Normann Fischer
 Veselin Skendzic
 Allen Goldstein
 Dan Nordell
 Jim Niemira

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

Chair: Mike Meisinger

Vice Chair: Steve Turner

Secretary: Amir Makki

Output: Report

Established Date: ???

Expected Completion Date: ???

Draft: ???

Assignment: Recommendation to update and expand mathematical models of instrument transformers and transducers, including interface electronics such as merging units, for use in both off-line and real time transient simulation. There are now new transducer types such as optical, Hall Effect and Rogowski coils in addition to improved models for conventional CTs, VTs and CVTs.

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

Writing assignments have been tasked. 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.

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 Guide is completed and has been published by IEEE SA. Motion to disband the WG in I-SC New Business.

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: May 10, 2022

Expected Completion Date: 31-Dec-2022 (PAR extension approved October 2020)

Draft: 2.9

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: 12 members in attendance for quorum
- f) Approval of Agenda: Fred Friend motion, Mike Meisinger, second. No objections. Motion passed.
- g) Approval of Minutes of previous meetings: January 10, 2022 motion Fred Friend, second Mike Meisinger. No objections. Motion passed.
- h) Patent slides were shown, no claims were made.
- i) Copyright slides were shown.
- j) Ballot pool was reviewed and the ballot pool is ready
- k) MEC comments were reviewed and updates were made to create a draft 2.9.
- 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:

| <u>Name</u> | <u>Affiliation</u> | <u>Voting Status</u> (voting member, non-voting member, guest) |
|--------------------|------------------------|---|
| Brian Mugalian | S&C Electric Company | Chair |
| Craig Preuss | Black & Veatch | Secretary |
| Fred Friend | Self | Voting Member |
| Travis Mooney | SEL | Guest |
| Bill Morse | SEL | Guest |
| Malia Zaman | IEEE | Guest |
| Jay Herman | EPRI | Guest |
| Michael Cunningham | Power Grid Engineering | Guest |
| Dervis Tekin | Hubbell | Guest |
| Peiman Dadkhah | NuGrid Power | Guest |
| Dave McGuire | Hubbell Power Systems | Voting Member |
| Jay Anderson | SEL | Voting Member |
| Hani Al-Yousef | Eaton Corporation | Voting Member |
| Michael Meisinger | S&C Electric | Voting Member |

| <u>Name</u> | <u>Affiliation</u> | <u>Voting Status</u> (voting member, non-voting member, guest) |
|--------------------|---------------------------|---|
| Louis Garavaglia | G&W Electric Co. | Guest |
| Deryk Yuill | Is5 | Guest |
| Thomas Rudolph | Schneider Electric GmbH | Voting Member |
| Claire Patti | Portland General Electric | Voting Member |
| Jim Niemira | S&C Electric Company | Guest |
| Mike Dood | SEL | Voting Member |
| Zitao Wang | S&C Electric Company | Voting Member |
| Gerald Ramie | ARC Technical Resources | Vice-Chair |

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. Andre working with IEEE PES Marketing Dept to distribute the survey.

I33: Review of Relaying Testing Terms

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.

The working group did not meet.

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

Chair: Mike Dood

Vice Chair: Marc Lacroix

Output: Standard

Established Date: January 2016

Expected Completion Date: September 2022

Draft: 0.7

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

The working group did not meet. Document is in recirculation ballot.

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

Chair: Chase Lockhart

Vice Chair: Mat Garver

Output: Standard

Established Date: September 2017

Expected Completion Date: December 2022

Draft: 5.0

Assignment: Revision of - Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – Radiated Electromagnetic Interference Withstand Capability Requirements and Tests

Meeting Participants:

| <u>Name</u> | <u>Affiliation</u> | <u>Voting Status</u> (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 |
| Galina Antonova | Hitachi? | 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 |
| James Niemira | S&C Electric Company | Guest |
| Louis Garavaglia | G&W Electric Co. | 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.

IEEE Policy Reminders (patents and copyrights): These were reviewed, and no objections were made.

Confirm that call for Patent issues was made and record any responses: These were reviewed, and no objections were made.

Topics discussed:

- Comment resolution from balloting body
- Additional Webex scheduled for June 7th, 2022, to further discuss comment resolution

Times of any recesses and time of final adjournment: Motion to adjourn at 2:10pm first by Tony Bell, 2nd by Jerry Ramie. Approved by all, meeting adjourned.

Date, time, and location of next meeting: September 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:

| <u>Name</u> | <u>Affiliation</u> | <u>Voting Status</u> |
|------------------|-----------------------|-----------------------------|
| Andre Uribe | Qualus Power Services | Non-Voting Member Presiding |
| Galina Antonova | Hitachi Energy | Guest |
| Hani Al-Yousef | Eaton | Voting Member |
| Travis Mooney | SEL | Voting Member |
| William Morse | SEL | Guest |
| Roger Ray | PowerComm Solutions | Guest |
| Raymond Phillips | Westinghouse | Guest |
| Roger Whittaker | | Guest |
| Lou Garavaglia | G&W Electric | Guest |
| Todd Martin | Basler | Voting Member |
| Tony Bell | Ametek | Voting Member |
| Jim Niemira | S&C Electric | Guest |

- Officer presiding: Andre Uribe filling for Marilyn Ramirez in her absence
- Officer recording minutes: Andre Uribe
- Call to order, approximately 9:20 am Pacific Time
- General welcome
- The meeting had 4 members (out of 9) and 8 guests in attendance. Quorum was not met.
 - January 2022 Meeting Minutes will be sent via email for members approval.
- Patent slides were shown, no claims were made. Copyright slides were shown.
- Action Items:

- Bill and Travis will fix some typos, review the temperature adjustment for 2000m based on Jim's input and send it to Hani for review.
- Marilyn will request a PAR extension after the updates/changes to the latest draft are reviewed and approved by the members.
- Final adjournment, approximately 10:02 am Pacific Time.

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

Chair: Ritwik Chowdhury

Vice Chair: Eric A. Udren

Output: Standard

Established Date: January 2019

Expected Completion Date: January 2023

Draft: 4.7

Assignment: To revise and update C37.92

WG I38 met on May 11, 2022, at 8 AM PDT, live and by PSRC WebEx virtual platform. With 13 total attendees, 8 members comprised a quorum. The Chair reviewed IEEE standard patent slides, meeting participation rules, and copyright slide. Ritwik moved to approve the January minutes, Hugo seconded, and the January minutes were unanimously approved. Ritwik began a review of Draft 4.7 in consideration of assignments. Specific review highlights:

- The group reviewed the revision of Annex A2 by Hani Al-Yousef, coordinating details with the new Connectors section 5.10.
- Eric is to validate 10 meter physical wiring limit in 5.9.
- The group reviewed the application of the applications of valid-data and squelching functions in practical protection applications. Veselin and Eric are to restate the TTL valid-data signal requirement and determine if there are any standards that talk about the actual pickup and dropout limits that we can reference. Ritwik is to merge 5.7 and 5.8 on squelching and valid-data signal.
- The group reviewed the language on polarity reversal ability and symmetric reference to ground in light of specified polarity of pins in connectors as given in 5.10. Reversing polarity of wiring is no longer supported in the standard but is recognized as not technically prevented when needed in rare applications. Consuming IEDs should provide polarity selection or reversal as required for applications by configuration settings.
- Eric and Ritwik to look at Clause 6 on interconnection wiring options and see if there are any items that need to be kept in the standard. This guidance has been superseded by the new connector specifications in Clause 5, and this interconnection guidance is to be removed.
- Malia Zaman of IEEE SA reviewed PAR status and completion schedule with the Chair. Ritwik to connect with Malia and address any copyright claims before recirculation ballot. A one-year PAR extension may be required.

WG I38 will schedule a June 10 on-line meeting to continue development progress.

Attendees:

Ritwik Chowdhury

Eric Udren (L)

Veselin Skendzic

Hugo Monterrubio (L)

Hani Al-Yousef

Mat Garver (L)

Kevin Donahoe

Charles Henville

Peiman Dadkhah

Thai Li

Rich Hunt

Zitao Wang

Malia Zaman (L)

(L) – Live attendee in Reno

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

Chair: Roger Whittaker

Vice Chair: Todd Martin

Output: Review for revision IEEE C37.90.1

Established Date: September 2018

Expected Completion date: Dec 31, 2024

Draft: 3

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

Task Force I40 met on Wednesday, May 11 at 8:am pacific daylight time in a single session. This was a hybrid meeting with 12 people attending. Of those, 2 were in person in the conference room. A quorum was achieved with 7 of 13 voting members present.

There was some technical difficulties resulting from someone other than the host accidentally give host access. After introductions, the IEEE patent slides were reviewed. No patent concerns were identified. There were no copyright issues identified. SA code were also presented.

The agenda was reviewed. The motion was made Jerry Ramie to approve agenda. The motion was seconded by Mike Meisinger. Agenda was approved.

Minutes from the January 2022 meeting were reviewed. The motion was made Jerry Ramie to approve agenda. The motion was seconded by Mike Meisinger. Meeting minutes were approved.

Annex C and D was discussed with regards to if it needs to be kept. General consensus was that it should remain. Travis Mooney, Bill Morse, and Jerry Ramie have offered to review C and D prior to next meeting.

Clause 10 was discussed. Presently there are differences between IEEE and IEC with regards to what is required in the report. The general thought was that these change to include any of the IEC requirements unless there is specific reason not to. Travis did the initial review and will consolidate the list of report requirements with this agreed upon direction and should have recommended changes to clause 10 for next meeting.

It was identified that there are no normative references in the document. There was some opinion that there should be some. Possibly the IEC standard that describes the test equipment. This will be discussed more in next meeting.

Definitions were reviewed. Two definitions (surge withstand capability (SWC) test, electrical fast transient (EFT) test) are not used in the document and will be removed.

Motion as made to adjourn by Jerry Ramie and seconded by Jim Niemira. Meeting was adjourned at 9:10AM.

I41: Draft Standard for Electrostatic Discharge Tests for Protective Relays

Chair: Steve Turner

Vice Chair: Dan Ransom

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 10:43 a.m., Pacific Standard Time, on May 10, 2022.

4. Chair's remarks

Chair Turner welcomed all to the hybrid (in-person and virtual) meeting. He stated that he and Vice-Chair Ransom have been working with IEEE staff on preparing for ballot.

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

Eric Udren raised a question about IEC standards coordination. Jerry Ramie responded that this WG standard is completely aligned with the IEC standard.

Chair Turner reported on the work to prepare for ballot. Vice-Chair Ransom sent copyright permission letters for borrowed content from IEC 61000-4-2 (Figure 1 and Table 1). Once the IEC grants permission, Vice-Chair Ransom will work with IEEE staff (Malia Zaman) to submit the document for MEC (Mandatory Editorial Coordination) review.

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 11:10 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 September 2022 at the PSRCC meeting in Nashville, TN.

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 PDT on Tuesday, May 10, 2022 in a Hybrid format.

1. Introductions

The chair introduced himself and the other working group officers. The meeting opened with 12 members and 16 guests.

2. Quorum verification

A quorum was obtained since less than 12 members attended the meeting (over 50%).

3. Approved January meeting minutes. Approved by: Robin Byun and Art Buanno seconded.

4. Discussed delays on report contributions due to unforeseen circumstances and authors agreed to provide most of the report for review by early fall.

5. Approved request to move completion date from 2023 to 2024. Approved by: Jim O'Brien and Art Buanno seconded.

6. Adjourn by Qun Qiu and Robin Byun seconded.

The meeting was adjourned at 17:34 PDT.

Our next meeting will be Nashville, TN in September 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

Output: Report

Established: 01/2020

Expected Completion Date: 01/2023

Draft: Ver 5.0

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) We had 13 members and guest attend
- e) Agenda Items:
 - a. Chair's remarks The title on the I-subcommittee agenda has been updated to **"Skills Required to Program, Commission, Test, and Maintain Ethernet Based PAC Systems"**.
 - b. Reviewed edits from our contributors. Of the 12 sections, 5 sections were reviewed. The remainder contribution will be reviewed in September's meeting. Although we did agree to meet virtually sometime in July/August time frame.
 - c. January sessions volunteers to contribute.
 - i. Section 1: Karen Leggett assigned to peer review.
 - ii. Section 2: Will Knapek, Marcos Velazquez assigned to contribute.
 - iii. Section 3: David Dolezilek assigned to contribute.
 - iv. Section 4: Karen Leggett, Wyszczelski, Peiman Dadkhah assigned to peer review.
 - v. Section 5: Yujie Yin assigned to peer review.
 - 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.
- f) Need to provide members with a share file to access the report.
- g) Recessed and time of final adjournment: 4:20 pm Pacific.
- h) Next meeting date and location: Nashville, TN (tentative).

I45: Grounding and Bonding Issues Associated with Substation Wiring Practices & Instrumentation

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 9:40 AM Pacific
- Check for quorum – 8 Voting Members in Attendance
- For Reference:

- IEEE Patent Policy: Call for Patents: <https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.pdf>
 - IEEE Copyright Policy: <https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/copyright-policy-WG-meetings.potx>
 - Approve past minutes 1st DJ 2nd Mike
 - Approve Agenda 1st DJ 2nd JW
 - Unfinished Business (**Action Items**)
 - a. **Z to speak with Don Lukach on central file storage site.**
 - i. I45 has a IEEE ShareFile location, but access is still fairly tightly restricted: <https://psrc.sharefile.com/Authentication/Login#Credentials>
 - b. **Z to check through the document and ensure acronym protocol is followed**
 - c. **Z to strengthen Glossary area (ongoing)**
 - d. **I45 WG – review each Report Section, decide whether to:**
 - i. **“Refine the Content”**
 - ii. **“Keep”**
 - iii. **“Move to Reference Only”**
 - iv. **“Delete”**
- 1) **During this meeting**, the Voting Members will be voting on the status of each Section in the Report based on the above decision criteria. Thanks in advance for doing a little homework.

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

- Other business
 - a. At this Quarterly IEEE PSRC/PSCCC meeting, with new guests in play, the Chair reviewed an overview of the document, and progress made to date, including recent content additions in the HEMP section, and some minor shifting of sections
 - b. Guests and Members brought up the following comments, questions, and suggestions:
 - i. Ground grid maintenance and testing. Seems to not occur unless an issue occurs in the US or perhaps where a legacy substation is being expanded. It's unknown if other countries have testing programs in place, even though ground grid test wells are installed. The US telecom industry has a better practice of somewhat routine ground grid testing. Should we recommend routine testing as a good practice? The ability of the bonding and grounding system to effectively drain transients away from equipment is largely dependent on a low impedance (at all relevant frequencies) path to earth ground.

- ii. In the Report section on Single and Double grounding topics. Should we consider adding commentaries that ‘if a utility chooses to bond both ends of a shielded cable to local earth ground, a low impedance grounding conductor should be installed along the length of the control cable path, and bonding to the substation grid as often as possible.’ Also, should other supporting recommendations be made (if single-point shield grounding is applied, these are the considerations, if double-ended grounding is applied, then these are the considerations. etc)
 - iii. In the Gap Analysis document, avoid referring to specific manufacturers, even if they produced guidance documents that are widely accepted and used in the industry. Examples: Motorola R56, Ericsson Telecom Grounding and Bonding standards.
 - iv. Provide examples of where grounding and bonding deficiencies led to damage or reliability concerns.
 - v. Some European organizations may have standards or guidance documents that may provide guidance and solid references for the content.
 - vi. We picked up a couple people that have interest in contributing to our content.
- Future Meeting
 Wednesday 10 May 2022
 11:30 AM – 12:30 PM Eastern Time
 Teams

Adjourn: Time ran out @ 11:50 AM Pacific

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 – Bruce Magruder, 2:30 PM PDT
- b) Chair’s greeting & remarks, 15 attendees were present, 5 voting members
- c) Agenda was presented and reviewed
- d) Quorum was not reached, so minutes of the September 2021 and January 2022 meeting could not be approved
- e) Patent slides were reviewed. The attendees did not present any patents requiring further action.
- f) Copyright slides were presented. No comments from the attendees.
- g) We held a Teams meeting in early April 1, 2022, @3pm EDT with the voting members to see whether the Scope and/or Purpose needs revision. We decided it did not need revision.

- h) At this meeting, we decided to 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.
- i) Sudarshan volunteered to be vice-chair of the working group. Bruce will meet with him next week.
- j) Meeting adjourned at 2:48 PM PDT

| <u>Name</u> | <u>Affiliation</u> | <u>Voting Status</u> <u>(voting members)</u> |
|----------------|---------------------------------|---|
| 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: TBD

Output: Revision of an Existing Standard

Established: September 2021

Expected Completion Date: December 2025

Draft: N/A

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

The WG met for 50 minutes due to hosting issues with 9 members and guests in attendance. Quorum was established (7 out of 12 voting members). This was the third meeting of the WG.

The WG continued to work on preparing for the PAR submission. The scope section was finalized:

This standard identifies the requirements for and test of the defined exchange of information between manufacturers and users of protection and control related equipment with respect to (1) firmware content (software bill of material) (2) changes in device firmware related to applications and cyber security and (3) the examination of the technical and operational impact of those changes.

The WG then proceeded to the business of officer nominations:

Don Burkart was nominated for WG Chairman and approved without objection

Nicholas Kraemer was nominated for WG Vice Chairman and approved without objection
Amir Makki was nominated for WG Secretary and approved without objection

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

Attendance List:

Amir Makki (Softstuf Philadelphia) (Member)
Craig Preuss (BV) (Member)
Don Burkart (ConEdison) (Member)
Don Ware (Power Grid Engineering)
Gayle Nelms (SEL) (Member)
Hani Al-Yousef (Eaton) (Member)
Laurel Brandt (TVA)
Nicholas Kraemer (NugridPower) (Member)
Swagata Das (SEL) (Member)

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

ITF 48 Task Force met in a hybrid format with 1 attendee in-person and 5 virtual attendees on Tuesday, May 10th, 2022, at 2:20 PM Pacific Time.

Chair was not able to attend the meeting. Jim Niemira led the meeting this time. He started the meeting with the review of patent and copyright policies. There was no potential claim raised. After discussions, everyone agreed to the fact that there is big interest in revising the document. Gary Kobet (TVA) is especially interested in promoting this standard. He worked on the last revision.

Meeting adjourned at 3:04 PM PDT.

For the meeting in September 2022, we request a room for 15-20 people with projector.

Liaison Reports

- a. Instrument Transformer Subcommittee – Will Knapek – See meeting minutes on website

Old Business

- b. No email ballots since January 2022 meeting.
- c. I33 WG Report – “Review of Relay Testing Terms” is still under revision. WG is addressing comments received on SC ballot and will revise and resubmit the report for approval by I-SC.

New Business

a. Revise name and Scope of I-SC

Motion 1 Revise name and Scope of I-SC

Task Force ITF42 moves to revise the name and Scope of I-SC to better reflect the SC's role and responsibilities in the PSRC after PES reorganization in 2016.

EXISTING NAME AND SCOPE:

I-SC Relaying Practices

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

PROPOSED REVISED NAME AND SCOPE:

I-SC Protection and Control Practices

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

Motion by: Brian Mugalian; Second by: Craig Preuss

MOTION 1 APPROVED

b. Motion to disband WG I30

WG I30 Moves to disband. WG I30 PC37.235 - IEEE Draft Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes -- Revision of C37.235-2007 has completed its assignment and new edition has been published.

Motion by: Robert Frye; Second by: Makki

MOTION 2 APPROVED

c. Other new business?

Motion to sponsor a joint task force with the PSCCC P21 Task Force to create a PES technical report based upon the output of the PSCCC P21 SG and the CIGRE B5.60 technical brochure that recommends a roadmap for developing new or updating existing IEEE standards:

- Recommend a new standard (e.g., PC37.300.1) that explicitly addresses, for in-scope H45 PC37.300 applications, the specific performance requirements and tests for a CPC system that are unrelated to communications
- Recommend a new guide (e.g., PC37.300.2) for CPC system architectures supporting the virtualization of substation protection, control, monitoring, communication, and asset management functions
- Recommend updates to existing standards P1613, PC37.90 series, PC37.2, P1646, C37.115, P1686, PC37.240, PC37.231, and P2808) to address the impacts of CPC-based systems and CPC systems as described in PC37.300

Motion by Craig Preuss Second by N/A
THIS MOTION WAS NOT DISCUSSED DUE TO LACK OF TIME.

Other announcements?

- d. 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.

Motion to Adjourn, by Chowdhury, second by Uribe

Adjourn time: 3:47 PM

Next meeting will be likely in Nashville, TN, September 2022, but not final yet.
Planned as in-person meeting with possible hybrid format. In any case, hope you stay well and look to meeting with you soon!

Respectfully Submitted: Ritwik Chowdhury, I SC Vice Chair, 6/14/2022

Reference Material:

WG and TF Minute Format Template: **Please use the template provided by PSRC Secretary Mike Thompson to simplify compilation of the Minutes from all the groups! Refer to PSRC P&P for Working Groups, Section 6.4 for the minimum information to be included in the Minutes.**

L##: Title of Working Group

Chair: ???

Vice Chair: ???

Secretary: ???

Output: ??? (Paper, Report, Tutorial, Guide, Recommended Practice, Standard, etc.)

Established Date: ??? (Month, Year)

Expected Completion Date: ??? (Month, Year)

Draft: ???

Assignment: ???

The following information should be included in your minutes as appropriate. The working group is free to use whatever form they choose to cover the items from the below list that apply to the meeting.

- o) Officer presiding
- p) Officer recording minutes
- q) Call to order
- r) Chair's remarks
- s) Results of call for quorum
- t) Approval of Agenda (motion and second)
- u) Approval of Minutes of previous meetings (motion and second)
- v) Brief summary of discussions and conclusions including any motions.
- w) Action items
- x) Items reported out of executive session (if such sessions have occurred)
- y) Recesses and time of final adjournment (if different from our published face-to-face meeting agenda)
- z) Next meeting date and location (if different from our published face-to-face meeting schedule)

Additional notes:

- a) Be diligent to keep the standard header information up to date.

- b) Expected completion date gives anyone a reasonable idea of where you stand in your work – without having to seek out another document such as the excel spreadsheet listing what rev you are on.
- c) **Do not include meeting room requests and conflict avoidance requests in your minutes.**
- d) Do not use significant paragraph indents.
- e) Keep multilevel numbered lists to no more than two levels if possible.
- f) If this is PAR related activity, include the SA document number in the Title of the Working Group.

Proposal for New TF or WG

Date:

Definition of the Problem

What is happening?

What should be happening?

Proposal for Task Force

Submitted by:

Rotating Machinery “J” Subcommittee Report on WG progress of note

Chair: Gary Kobet

Vice Chair:

J SC met Wednesday May 11, 2022 at 1:00 PM PDT with 18 out of 33 members and 21 guests, reaching quorum.

A motion to approve the January 2022 J SC meeting minutes was made by Jason Eruneo and seconded by Steve Conrad. The minutes were approved unanimously.

Working Group Reports:

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 did not meet.

In the J Subcommittee meeting the following motion was made by Juan Gers, and seconded by Steve Conrad. The motion was approved unanimously.

Motion: Working Group J13 motions to disband the J13 working group.

J15: Investigation of the Criteria for the Transfer of Motor Buses

Chair: Wayne Hartmann

Secretary / Vice Chair: Doug Weisz

Established 2015 (1/15)

Output: Report (Draft 10-B)

Status: 22nd Meeting (5-10-22)

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 May 10, 2022, with 17 members and 7 guests. Quorum was met.
2. The WG assignment was reviewed as well as a brief history of WG activities.
3. The Meeting Minutes from September 2021 were approved (B. Kazimier-Motion; R. Chowdhury-2nd)
4. The Meeting Minutes from January 2022 were approved (B. Kazimier-Motion; R. Chowdhury-2nd)
5. The WG reviewed Draft Report 10-B where several comments, edits, and additions in Sections 3, 5, 6, 7, 8, 9, 10.
6. Most edits and open items were resolved, and future resolution work is shown in the Assignments.

Assignments:

1. W. Hartmann: Section 3, Page 14. Replace entire clause starting with "Large cyclic torques (peak-to-peak) can cause mechanical vibration...." with same Clause in Rev. 9-A
2. T. Beckwith: Section 3, Entire Section. Add references where indicated at the rear of this section.
3. Dr. M. Yalla: Section 7, Page 53. Provide an additional equation if delta VTs are used. Presently equation in draft is for line-to-ground VTs

4. T. Beckwith: Section 7, Entire Section. Add references where indicated at the rear of this section.
5. Dr. M. Yalla: Section 8, Page 65. Provide a reference for dq Model Equivalent Circuits of an Induction Motor.
6. W. Hartmann: Section 8, Page 70. Contact motor manufacturers (TMEIC, GE) and industrial switchgear manufacturer (Powell) to check on a possible reference for guideline of motor SCT $\leq 6x$ rated torque. Will strike if no reference can be found.
7. T. Beckwith: Section 8, Entire Section. Add references where indicated at the rear of this section.
8. D. Finney: Section 9: Entire section. Dale had added tables with corrected data. Many of the figures in the section are now obsolete. There is text in the section that references obsolescent graphs. Dale to inspect section, ensure data tables are correct, remove any obsoleted graphs and edit reference made to any obsoleted graphs.
9. T. Beckwith: Section 10. Add language to conclusion about the failure of the 1.33 V/Hz criterion correlating with resultant transfer torque levels and the 1.33 V/Hz criteria inefficacy.
10. T. Beckwith, Dr. M Yalla: Annex B. Add annex on correlation equation for torque ratio and angle difference.
11. T. Beckwith: Section 10: Add conclusion bullet that references Annex B

Other Business and Adjournment:

1. Tom Beckwith discussed reticence from NEMA MG-1 to make any changes to their motor bus transfer criteria.
2. Meeting was adjourned

Next Meeting:

In Person: Single session, projector, room for 30 people for in-person meeting

Virtual: WebEx or similar from PSRC. The WG also requests no conflict with all J particularly J16 (C37.101) and J17 (C37.102)

J16: Revision of C37.101, Guide for Generator Ground Protection

Chair: Ryan Carlson

Vice Chair: Doug Weisz

Established: 2016

Output: Guide

Status: 14th Meeting (5-10-22)

PAR Expiration: Dec 2024 (extension approved)

Assignment: Revise C37.101 Guide for Generator Ground Protection

WG Report

The WG met with 14 out of the 25 voting members present. Todd Martin has been added as a Voting Member. A total of 20 participants joined the Hybrid (in-person/Webex) meeting. As quorum was achieved, Ryan asked if someone would like to make a motion to accept the September 2021 and the January 2022 meeting minutes. Jason made a motion to accept both meeting minutes and Ritwik seconded so both previous meeting minutes were accepted.

Ryan will set up an interim meeting in July to address more of the comments that have thus far been submitted. Ryan reviewed the remaining open assignments: overview section (Ryan), section 4 review (Zeeky), section 6.3 review of hybrid section (Ryan, Steve, Zeeky) and we will

discuss with Wayne any additional information or clarity on the genesis of Figure 36 which is a facility based hybrid scheme example.

Ryan reviewed the patent slides required for IEEE PAR WGs and he mentioned that the PAR has been extended until 12-31-2024 with projected schedule of the following: 2022/2023 review/edit technical body of guide, 2023 review/edit annexes, and 2024 balloting.

Ryan mentioned he will post the latest working draft copy of C37.101 in the “Drafts in Progress” folder on imeetcentral this week. If any members need access to this workspace, please let us know and we will ensure you get access.

The new, overhauled C37.101 format change was briefly reviewed again and the TOC of the latest draft for the guide was reviewed. The working group then proceeded to discuss several topics in more depth:

- Discussed figure 36 which is a hybrid grounding scheme with a low impedance path which has a vacuum switch or breaker in series and a parallel high impedance path with a 59G protection on the secondary of an NGT across an NGR. This figure shows a non-GSU, facility transformer that is grounded on the generator side. The discussion centered around if the 59G protection is necessary. And it was mentioned that it may be used for startup/shutdown, bus protection, and for alarming purposes when the hybrid scheme is healthy. Some of the comments were that the figure needs some clarification to be more useful.
- Next, discussion ensued on the fusing needs and practices on the secondary of an NGT. Ryan pointed out that whether the fusing is used or not, it should not be placed between the NGT secondary winding and the NGR as then if the fuse blew the NGR would be taken out of the picture resulting in much higher available fault current. Dale shared some practices at TVA where there was some different designs – some single fused, some double fused, some not fused. Ryan raised some questions on the NGT secondary grounding practices where some of the figures in the guide have it center tap grounded. Consensus may be a bit too strong of a word to use, but some folks in the meeting agreed that fusing should not be used and that maybe the guide should figure out some way to state that fusing is not such a good idea as it would be preferable to burn up the relay rather than the generator itself. Ritwik mentioned that a third harmonic relay such as an undervoltage third harmonic relay would be able to detect a blown fuse to either alarm or trip except of course when it is blocked possibly when off-line and in the pre-synchronizing period along with some possible loading regions as well where the third harmonic voltage signature may dip.
- Next, we discussed Ritwik’s writeup on the multiple gens on a bus schemes. In general, some of the points were that this type of plant design may not be optimal due to the circulating third harmonics; however, it was also noted that these schemes do exist so we should address them in the guide. Ritwik reviewed a possible method to consider using when sizing the NGR/NGT when considering the total capacitive reactance vs the capacitive reactance per unit.
- Some additional sections were reviewed with less discussion: Raju’s comments on the acceleration schemes, Ritwik summary of the J12 paragraph or lead in paragraph where the ensuing sections should be subsections under that lead in paragraph rather than new sections in and of themselves.

Motion to adjourn was made by Jason and seconded by Ritwik.

Next Meeting:

Single session, room for 30 people and a projector. Provision for 50 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: 5.9****Established: May 2017****Status: 19th meeting, May 2022 (hybrid)****Expected completion date: -****PAR Expiration: Dec 2022****Assignment:** Revise C37.102 Guide for AC Generator Protection**WG Report**

WG met on May 9, 2022 for a double session with attendance recorded from 7 members and 7 guests in person, and 13 members and 20 guests virtually, for a total of 20 members and 27 guests. Quorum had not met at checking so the Jan 2022 minutes will be approved via email.

Patent slides were presented, no claims were made. Copyright and Participant slides were shared.

Chaired shared progress on the WG ballot comment resolution.

Editorial assignments from draft 5.9 (due 5/27/2022) were made as follows:

- Check all existing figure references in the body are hyperlinked to correct figures, add the hyperlinks if missing. Figure numbers will be re-sequenced/re-numbered later [Phil Tatro](#), [Matchyaraju Alla](#)
- Check that all subclause references within the body are hyperlinked to the correct subclauses and have consistent format ("subclause x.x.x" vs "clause x.x.x", vs just "x.x.x") – [Dale Finney](#)
- Check that all existing bibliography references in the body are hyperlinked to the correct B# at the end. and that text for the references in the body and Bibliography section are written in a correct/consistent format. (For now, no need to remove any old references, just verify all existing ones called in the body match with the list at end, and vice versa). – [Jason Eruneo](#), [Phil Tatro](#)
- Check Table 2, in 6.2.1 for completeness of all protective elements covered in this guide, and verify subclause # and hyperlinks link to the correct item – [Rahim Jafari](#)
- Check that all IEEE device numbers used for the different protection functions are consistent [Wayne Hartmann](#)
- Check for consistent usage of terminology throughout the document per ballot comment # 241 (e.g. MGPS vs digital multifunction relay in 4.5.1.3) [Manish Das](#)
- Review new Introduction (added per IEEE Style Manual) and newly added Abstract & Keywords [Gary Kobet](#)

Additional ballot comments were reviewed or resolved as follows:

- Comment 6: Subclause 4.3.3 Accepted. Wayne will provide some RGF verbiage as it might apply to a generator.

- Comment 33: Subclause 4.3.3.1.1 Accepted. Will revise Fig 34, 35, 36 to show digital relay implementation.
- Comment 39 & 116: Subclause 4.3.3.2.1 Accepted. Will revise Fig 40, 41, 42 and text for digital relay implementation.
- Comment 51: Subclause 5.1.2 Accepted. Dale will propose changes to 4.3.2.2 and 5.1.2 on Proximity effects, review with Mike and share with WG.
- Comment 73: Subclause 3.2.1.2 Accepted. Added an explanation for 'reactor coil constant' provided by Phil.
- Comment 53: Subclause 5.2 Accepted. Agreed to add verbiage on PT connections from reference B17 or J12 report.
- Comment 142: Subclause 4.5.3.3. Ritwik and Raju will propose changes to address possible inconsistency between fig and text.
- Comment 119: Subclause 4.3.3.4.1 Accepted. WG agreed with commenter's observation.
- Comment 162: Subclause 4.6.4 Accepted. Added discussion to clarify 51TG1 is time coordinated with system.
- Comment 254: Subclause 3.3.4 Mike Basler will provide more discussion to add for Figure 5 static Exciter.
- Comment 286: Subclause 4.3.3.1.1: Changes proposed re 50/51G IOC unit. Still under discussion.
- Comment 224 & 294: Subclause 4.3.3.2.1: Russ shared purpose of the 2nd coil in Fig 42. Still under discussion.

Latest **Draft 5.9** and comment resolution spreadsheet are available in iMeetCentral. Chair will set up additional meetings on 5/19 and 6/9 as needed to discuss and resolve the remaining technical comments.

Goal is to recirculate from WG ballot by June, and initiate SA ballot in July 2022. Potential need for additional PAR extension was brought up. Malia Zaman from IEEE-SA suggested proceeding with the above plans for now and, if required, extension request to RevCom could be made in Sep or October, prior to the PAR expiration in Dec 2022.

Next Meeting:

Request a double session with space for 40 people and a computer projector. The WG also requests no conflict with all J especially J16 (C37.101)

J18: 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 May 10, 2022

Assignment:

Write a report that describe the different types of sub-synchronous phenomena, their causes, and effects on the power system. Investigate the potential Impact on existing rotating machinery protection. Investigate how to detect these events and what mitigation techniques can be applied.

WG Report

Attendance:

Total 38 (30 attendees on line and 8 in person)

Overview:

1. Dr. Romulo Bainy gave a presentation on the effect of the grid side converter (GSC) during a switching operation or a transient phenomenon on the power system. Dr Bainy showed by means of a frequency scan and transient behaviors that the GSC has a very minor impact on the performance of type 3 WTG during power system switching conditions or transients.
2. Dr. Sukumar Kamalasan and Dr. Amin Banaie drafted section 3 of the report and presented it to the working group. Section three will be added to the document in share point
3. The validity of the aggregate models in EMTP-RV and RTDS for transient and switching conditions was discussed during the meeting. A separate meeting for interested members will be held to discuss this issue. No comments provided on September 2021 meeting minutes

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: Revision of C37.106, Guide for Abnormal Frequency Protection for Power Generating Units

Chair: Ritwik Chowdhury

Vice Chair: Jason Eruneo

Output: Guide

Draft: 11.0

Established: January 2019

Status: WG meeting, Hybrid (Reno, NV and virtual) – May 10, 2022

Expected Completion Date: September 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

- 4 members in attendance in-person and 5 members in attendance virtually. Quorum was not met; meeting minutes will be approved electronically.
- Chair communicated IEEE SA comment resolutions and recommendation for J25 WG to coordinate with IEEE 2800 and Jens Boemer
- Chair updated WG on status of the guide approval—we expect publication by September
- Chair gave the WG an update on the JTF27 meeting and plans for a summary conference paper
- WG discussed FRCC event from 2008 where turbines initiated plant trips due to frequency df/dt and lean blowout
 - WG believes this is more of a turbine control system protection function and not a relaying function
 - WG decided we did not need to consider any changes for a future revision of the guide to address this

- We will keep the WG active until the guide is published. Once published, we plan to make a motion to the J-subcommittee to disband the WG.

J20: Report on Practices for Generator Synchronizing Systems

CHAIR: Jason Eruneo

VICE-CHAIR: Ritwik Chowdhury

Output: Report (Draft 5.4)

Established: January 2019

Status: 9th WG Meeting, Reno, NV Hybrid May 10, 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 10 in-person attendees and 16 virtual attendees in attendance
- The chair will send out an email for approval of the meeting minutes from January
 - **Action Item:** Jason Eruneo will send WG email requesting approval of previous meeting minutes
- The chair announced a leadership change for the WG. Ritwik Chowdhury has been appointed as the new vice-chair of the WG
- There have been challenges communicating with the entire WG due to the loss of 123signup. WG members to reach out to Jason if they do not have the latest draft of the report.
- The chair discussed the outstanding action items with the WG
 - **Action Item: Jay Mearns** will be able to review section 1.2.2 and 1.2.4 by June 1st
 - Tom Beckwith reported on section 2.1.3 excessive frequency difference. He submitted some good reference papers on loss-of-life due to fault synchronization. **Action Item: Zeeky** may be able to help with some of this
 - There have been a lot of revisions to section 2.3.8 based on Mike Thompson feedback. **Action Item: Zeeky and Randy H.** to provide a review and feedback
 - **Action Item: Jay Mearns and Zeeky** will provide feedback for section 8
 - **Action Item: JC Theron and Dale** will review section 7 and provide feedback. A lot of material has been added to this section since the previous meeting.
 - Ryan C. was not in attendance during the beginning of the meeting. Ryan C. will provide the WG with an update on breaker manufacturer material/discussion
- The chair discussed the different Appendix subsections which mimic the different system configurations from C37.102
 - Jay indicated that HP/LP (cross compound) figure is unusual, and it is odd that the HP and LP units don't have individual breakers. Mike T. indicated that the HP and LP are on two different shafts for cross compound configuration, whereas tandem generators are HP and LP on the same shaft. Dale indicated that there are configurations that look like the figure shown.

- Mike indicated that there are different types of synchronization design classifications. One for a low-side breaker, one for a high-side breaker, ring bus, etc. Ritwik suggested grouping the different configurations together to address specific challenges.
- Feedback on Appendix subclauses:
 - The WG agreed to keep the current example for A.1. **Action Item: Ritwik** to provide figures for two unit connected generator examples for A.1
 - A.2 seemed like an unusual configuration. We plan to remove one half of the figure
 - Jay suggested keeping A.3 example since it is fairly different and may help a reader. Mike suggested that the problem would be the same regardless of the number of stators. Jason wondered whether there would be any concerns regarding controls. Ritwik suggested moving the figure to A.1 and, if there are any minor differences, list it in a paragraph. Bracy indicated that there are other cross-compound units that have their own breakers. Some of the bigger ones such as Mt. Stone has been retired. **Action Item: Gary** volunteered to check with someone in TVA to see what he can find on the cross-compound units. He will report back with what he finds and that may drive whether we want to have another subsection or merge it in with A.1.
 - For generators sharing a GSU in A.4, Jay mentioned that G1 synchronizes to the line VT, then the other generators synchronize with each other. WG decided to move this figure to A.2 to represent the low-side breaker example. The reason the synchronization is performed this way is because the line VT (at 500kV e.g. Army Corps) has limited thermal rating and cannot be left connected for too long.
 - The WG agreed is appropriate to have an example without a GSU, where the generator is connected directly to a distribution system.
 - **Action Item: Mike T.** will add some material on synchronizing systems using digital secondary solutions. JC Theron asked about whether synchrophasors could be used. Jay looked back in 1996 based on this technology, it was ultimately not workable, but it would be interesting to see how the technology has matured.
- The WG agreed to proceed with the following examples for the Appendix:
 - A.1 unit-connected generators with two configurations **Action Item: Steven Mueller and Jason**
 - A.2 multiple generators with LV synchronization **Action Item: Jay Mearns and Ritwik**
 - A.3 generator connected to distribution system **Action Item: David Reese and Jason**
 - A.4 cross-compound based on Gary's feedback; WG will decide on this example at a later date
- Any tool (Mathcad, excel, matlab, etc.) is fine since the calculations are expected to be minimal
- For post-synchronization analysis, Ritwik indicated that an example might be helpful in the Clause 8. **Action Item: Ritwik** to add example in clause 8

Next meeting:

Single session. With room for 30 and a projector. Request no conflict with C45, I38, J17, J19, J25, J27 and K31.

J21: Motor Protection Tutorial

CHAIR: Kelvin Barner

VICE-CHAIR: Derrick Haas

Assignment – Develop a practical motor protection tutorial based around IEEE C37.96. The intent is to aid the reader to develop effective relay settings.

Output: Report

Established: September 2019

Status: WG (5th meeting 20220112)

WG report

- Working group discussed coordination with J22
- Kelvin shared he will be stepping down as chair
- New working group chair to be appointed pending approval
- Future combined web meeting with J22 before September meeting
- J22 Chair (Zeeky B.) to coordinate with J21 chair on assignments.
- WG discussed T. Beckwith's suggested approach of developing PPT first
- G. Kobet pointed out and asked if any WG members had access to the old visio figures from the previous version of C37.96
- G. Kobet also reminded WG that the Example in Annex A would also be a great starting point to consider.

Next meeting:

A single session is requested with room for 30 and a projector. 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 5

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 fifth meeting on Wednesday, May 11th, 2022. There were 22 attendees with 13 members.

- I. Welcome/Introduction
 - a. The Chair kicked off the meeting at 9:22am PT and welcomed members and guests to the working group's fifth meeting.
- II. Quorum check
 - a. Quorum was met with 13 of 23 members in attendance.
- III. Approval of Meeting Minutes
 - a. September 2021 minutes were approved (motion moved by Derrick Hass and seconded by Jason Buneo).

- b. November 2021 minutes were approved (motion moved by Jason Buneo and seconded by Derrick Hass).
 - c. January 2022 minutes were approved (motion moved by Derrick Hass and seconded by JC Theron).
- IV. Patent Slides
- a. Patent Slides were shared, and no issues were raised.
- V. Assignments
- a. C37.96 D1 has been uploaded to iMeet and is to be used for all comments going forward. Chair will transfer comments from other completed assignments to this new draft. Members having trouble accessing iMeet were asked to contact Chair for assistance.
 - b. Chair received assignments from Jason Buneo, Tom Beckwith, and Gary Kobet. Reviewed the following contributions
 - i. Section 7, Setting and Adjustment of Protective Devices. Jason Buneo
 - Jason shared his comments incorporated Gary's. Jason's comments were made on the previously available D11 from the 2012 revision.
 - Reviewed comments up to (and including) The section "Device 50G— instantaneous ground-current relay".
 - Additional Section 7 assignments:
 - Phase Balance Relay. JC Theron, Andy Kunze & Derrick Haas to review recommended setpoints
 - Device 46—negative-sequence current relay. JC Theron, Andy Kunze & Derrick Haas to review recommended setpoints
 - Device 47—phase-sequence or phase-balance voltage relay. Derrick Haas and Nabil El Halabi Fares to add a discussion on applications of these relays. Applications will drive protective actions and settings.
 - c. 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
- VI. Next Steps.
- a. February 28th, 2022. Chair reminded working group that assignments had been due February 28th but acknowledged that D1 was not available in iMeet until January

2022. Chair asked for assignments to be completed and incorporated in C37.96 D1 in iMeet as soon possible.

b. July TBD, 2022. Chair will schedule a virtual meeting for July.

VII. Adjournment. Meeting Adjourned at 10:20am 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: Report on Generator Condition Monitoring

Chair: Steve Turner

Vice Chair: Open

Secretary: Open

Output: Report

Established Date: May 2021

Status: (5-11-22)

Expected Completion Date: Open

Draft:

Assignment:

Develop a report that covers the following aspects of condition-based monitoring for synchronous machines:

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

WG report

Minutes from previous meeting were approved.

Presentation was given by Steven Turner on using signal profile monitoring to optimize settings for stator ground fault protection.

Writing assignment was given to Jay Mearns of PGE (Hydro division), will provide results from a study on partial discharge conducted on 107 machines.

Other existing writing assignments are as follows:

1. actual fault develops and schedule maintenance.

Bracy Nesbit – LCRA

Dale Finney - SEL

2. Describe and develop guidelines for online condition monitoring of large synchronous generators, including salient-pole rotors as well as cylindrical rotors.
Bracey Nesbit – LCRA
Rob Messel – Siemens Energy
3. Provides information on online condition monitoring techniques as well as recommending thresholds to trigger alarms and initiate remedial or compensating action.
Steve Turner – APS
Jay Mearns
Abel Gonzales - Megger
4. Demonstrate how to use specific the protection functions to monitor generators.
Steve Turner – APS
Sungsoo Kim – TRC Engineering
JC Theron - GE
5. Describe mechanisms of degradation and applicable monitoring devices.
Ellery Blood – SEL, Inc.
6. Pilot projects to explore this technology.
Steve Turner – APS
Dale Finney - SEL

Chairman will contact members to monitor progress on writing assignments.

Next meeting:

Single session with accommodations for 25 people is requested.

J24: Report on Generator Disturbance Recording

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 05/10/2022 at 3:40 pm PST with 6 people in attendance, all in person. 3 out of 4 members present, achieving quorum.

Proposed agenda and minutes from January meeting were reviewed and approved, moved by Gary Kobet and seconded by JC Theron. Many thanks to Derrick Haas for volunteering as a new member and William English as new corresponding member. WG assignment was reviewed with no comments.

Reviewed NERC PRC-002-02 Disturbance Monitoring and Reporting Requirements focusing on minimum recording specifications and placement for generation owners. There was a lively discussion on Attachment 1 - Methodology for Selecting Buses for Capturing Sequence of Events Recording (SER) and Fault Recording (FR) Data. It was pointed out that the NERC

requirements for recording sample rates and durations were set low and could possibly be increased in future. Recent Major Event Analysis Reports published by NERC noted that higher resolution data is needed for proper analysis.

The outline document showing report structure and flow was reviewed. William English volunteered to begin writing the section on NERC PRC-002-02 requirements, the Chair will add content on DFR basics, and Derrick Haas will contribute as needed from IED perspective. The C5 report on Considerations for Use of Disturbance Recorders available in the PSRCC Knowledge Base is an excellent reference document. The goal is to publish the report within 4 years.

WG files and resources uploaded to ShareFile folder (<https://psrc.sharefile.com/home/shared/fo6be30c-453a-4e15-a84c-500b1c1cf436>). Meeting adjourned, motioned by Gary Kobet and seconded by Derrick Haas.

Next meeting:

Single session with accommodations for 20 people is requested. Please avoid conflicts with H46, H52, PSCC S15 and all J.

J25: Report on Synchronous Condenser Protection

Chair: Jason Eruneo

Vice Chair: Dale Finney

Secretary: open

Output: Report

Established Date: September 23, 2021

Status: 2nd WG Meeting, Reno, NV Hybrid May 10, 2022

Expected Completion Date:

Draft: -

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

WG Report

- WG met with 6 in-person attendees and 12 virtual attendees
- The chair will send out an email for approval of the meeting minutes from January
 - **Action Item:** Jason Eruneo will send WG email requesting approval of previous meeting minutes
- Rob Messel from Siemens provided a presentation on synchronous condensers
 - Synchronous condensers can be considered as pseudo-motors
 - Terminal voltage is driven by grid standard. Terminal current and VARs driven by nameplate. Stator current is typically ½ the design current (stator rating)
 - When converting from legacy generators sometimes flywheels are used (this provides additional inertia)
 - Synchronous condensers may be air cooled or hydrogen cooled. Synchronous condensers never reach their stator winding current capabilities so you typically see hydrogen cooled machine in legacy generator conversions
 - WG discussed reverse power scheme for a synchronous condenser used in a wind turbine application

- When the windfarm is isolated from the system, the real power output from the wind turbine will be dumped into the synchronous condenser. The synchronous condenser is forced to motor and there will be overspeed on the rotor. The rotor has a mechanical overspeed limitation and an over frequency scheme may be used to protect against damage to the rotor. Rotor limit on overspeed is 20% above nominal (100%).
- GE states that a pole slip can occur for an extended fault followed by a reconnection but is not an issue for a condenser, however, is it for a synchronous generator
- Condenser will slip poles but will recover
- Gary Kobet stated that there is no stress on the shaft since there isn't a turbine. Gary asked if there is any disagreement from the attendees that 78 scheme is not required; no one spoke up
- John (GE) expressed that entities should check with the manufacturer on whether a 78 is needed for a synchronous condenser
- Negative excitation is possible for a static exciter. Brushless can only have positive excitation
- John Skilautas from GE provided a presentation on synchronous condensers
 - Some reasons a utility may install a synchronous condenser are:
 - Reduced short circuit on the system
 - Lower inertia
 - Power System Stabilizer
 - Short term overload – much higher than C50.13 requires
 - Dynamic reactive power support
 - 90% of GE synchronous condensers are brushless
 - 4 poles and 6 poles units are available. Six pole has lower windage losses. Air cooled <350 MVars Pony motor starting is most common. Asynchronous is possible (similar to a CGT)
 - Start up time: 3-5 minutes to start and 10-20 minutes for units with a flywheel
 - Flywheel applications
 - Inertia constant (H) is up to 8.65 with a flywheel
 - Inertia constant (H) is 7.8 for Muskrat Falls (NFLD) synchronous condenser
 - Special Protection issues include
 - Self-excitation
 - Harmonics
- The WG discussed the use of a flywheel on the rotor. In order to go out of step, the rotor has to have energy behind it. The WG concluded that if a synchronous condenser does not have a flywheel than out of step protection is not needed. However, if the synchronous condenser has a flywheel than out of step protection may be needed.
- Machine type can go \pm 10% of nominal voltage. Therefore, OLTC are not needed. Generator conversions may have an OLTC

Next meeting:

Single session. With room for 30 and a projector.

Request no conflict with J17, J19, J20 and K31.

J26: Summary Paper - Modeling of Generator Controls for Coordinating Generator Relays

Chair: Juan Gers

Vice Chair: Phil Tatro

Output: Summary Paper

Established Date: January 12, 2022
Status: 1st WG Meeting May 9, 2022
Expected Completion Date:
Draft: -

Assignment: Write a summary paper of the J13 report, Modeling of Generator Controls for Coordinating Generator Relays.

WG Report

The working group met for the first time in one session with 5 members (2 in-person and 3 virtual) and 7 guests (3 in-person and 4 virtual).

The group discussed the assignment to prepare a summary paper of the J13 working group report and the advantages and disadvantages of submitting the summary paper as a transactions paper versus a conference paper. A decision was deferred to the next meeting.

The working group will condense each chapter of the J13 report into a section of the summary paper. Members volunteered for writing assignments. Draft sections are due June 30. A draft of the summary paper will be distributed prior to the September meeting.

The requirements for the next meeting are a single session, a meeting room for 40 people, and a computer projector.

Next meeting:

Single session with accommodations for 40 people and a computer projector is requested. Please avoid conflicts with J17 & J20.

JTF27: Investigate the Need for J19 (C37.106) Summary Paper

Chair: Ritwik Chowdhury

Vice Chair: Jason Eruneo

Output: Proposed assignment of working group under J-SC

Established Date: January 12, 2022

Status: 1st Meeting May 10, 2022

Expected Completion Date:

Assignment: Investigate the need to write a summary paper of IEEE Standard PC37.106 Guide for Abnormal Frequency Protection for Power Generating Units.

WG Report

- TF discussed if it is standard practice to create a summary paper for IEEE Guide work
 - It was communicated that it is optional and up to the WG to determine if they want to write a summary paper
- Ritwik went over the changes the WG made to the C37.106 revision
- It was discussed that a lot of folks in the industry do not know about C37.106 or do not use the previous version
- Motion to prepare a summary paper for IEEE C37.106 Guideline was made by Will English
 - Seconded by Derrick Haas
- TF agreed that we should create a conference paper
- TF discussed whether we should add additional topics that are outside the guide. TF agreed that we would try to stick to the topics within the guide

- TF discussed tentative timeline for the paper
 - Discussed the various conferences deadlines for paper submittals
 - TF agreed to commit to late August 2023 as a deadline for the paper completion and to target Texas A&M 2024 as the first venue for the presentation
- Action Items on the draft outline
 - Jason Eruneo: scenarios for excessive V/Hz
 - Ritwik: third bullet in section 2
 - Jay: third bullet in section 3
 - Raju: Annex A
 - Derrick: Annex B
 - Will E.: V/Hz protection section first two bullet items
- J Subcommittee Assignment Submission: Prepare summary paper for IEEE Std C37.106-2022 Guide for Abnormal Frequency Protection for Power Generating Plants

In the J Subcommittee meeting the following motion was made by Ritwik Chowdhury, and seconded by Mike Thompson. The motion was approved unanimously.

Motion: Working Group JTF27 motions to establish a Working Group with the following Working Group assignment.

- **Proposed WG Assignment:** Prepare summary paper for IEEE C37.106-2022 Guide for Abnormal Frequency Protection for Power Generating Plants. This paper will highlight the revisions and improvements that were made to the guide.

The Working Group will be designated J27.

Next meeting (J27):

Single session. With room for 25 and a projector. Request no conflict with C45, I38, J17, J19, J20, J25 and K31.

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 – Nothing to report.

Old Business:

J6 and J14 reports – J6 Protection Issues Related to Pumped Storage Hydro (PSH) Units and J14 Plant Protection Issues Associated with Generator Black Start reports have not yet been published. The following motion was made by Jason Eruneo, and seconded by Steve Turner. The motion was approved unanimously.

Motion: Create a task force to prepare J6 and J14 reports for publication. The Task Force will be designated JTF28.

New Business:

Participant Behavior Slides – All WG Chairs must display the Participant Slides at each meeting.

Mandatory SA Training – There is new mandatory SA training for all PSRC Officers, Subcommittee Officers, and Working Group Officers. This is scheduled to begin Jun 1, 2022 and will be due by December 31, 2022. Required training includes:

- IEEE SA Standards Group Chair Fundamentals Training
- Understanding IEEE SA's Antitrust, Competition, and Commercial Terms Policies

Adjournment:

Motion to adjourn was made by Russ Patterson and seconded by Jason Eruneo. Meeting was adjourned at 2:12 PM PDT.

K Substation Protection Subcommittee Meeting Notes – Adi Mulawarman

Chair: Adi Mulawarman

Vice-Chair: Brandon Davies

Scope: Evaluate and report on methods used in protective relaying of substations and the consumer or independent power producer, associated equipment and performance of these protective systems. Develop and maintain relaying standards that relate to this equipment and the utility-consumer interface.

Meeting Notes, May 11, 2022, 4:00 – 5:15 PST - Hybrid

- Introductions
- Check for quorum (18 out of 34 members, need 18 for quorum)
- Approval of agenda (Abu Bapary motioned, Ben Kazimier seconded, approved unanimously)
- Approval of previous meeting minutes (Paul Elkin motioned, Dean Miller seconded, approved unanimously)
- Advisory Committee items of interest
 - 108 in person, 321 total registrants
 - 10 in person 1st time attendees, 26 total
 - Future meetings September 2022 in Nashville, TN (Tentative) and Virtual
 - IEEE SA Standards Group Chair Fundamentals Training. (in June 2022, due by Dec 31, 2022). All working group officers need to be registered in MyProject as it impacts this mandatory training.
 - Requirement to show Participant slide (in addition to copyright and patent slides)
 - IEEE SA WG award certificates of appreciation must be requested by WG Chair or VC from IEEE SA site. <http://standards.ieee.org/develop/awards/wgchair/wgawards.html>
 - New Monday Night PSRC Welcome Reception and Awards Ceremony. (plan to arrive by dinner time). May and September meeting only.
 - PAR WG – use IEEE Central Desktop
 - Non PAR WG – use PSRC Share file. Check <https://www.pes-psrc.org/psrcsharefile.html>
 - Completed WG work, please inform Cathy Dalton for Publicity
 - WG chair require PES and IEEE SA membership
 - Reminder to apply for Senior membership if eligible
 - P&P Manual being voted at the Main Comm meeting, training to follow up in September
 - Long Range planning comm desires to move to all in person meetings in the future but slowly
 - New attendance and email/directory/membership tracking in the works.

Working Group Reports:

K10 SCC21 Distributed Resources Standard Coordination

Chair: R. Benjamin Kazimier

Vice Chair: Wayne Stec

Secretary : Matt Garver

Established, 1999

Output: Standard through the SCC 21

Expected Completion Date: 20xx

Assignment: To interface with SCC21/P1547 in order to reduce unnecessary delays by getting PSRC input into the process without having to wait for after-the-fact coordination.

K10 met Monday from 1pm to 2:10pm by web meeting. There were 22 attendees present.

Benjamin Kazimier chaired and presided over the meeting.

The following updates were given:

1547 (main standard):

- The revision of 1547-2018 was unanimously approved at the April NESCOM meeting
- SCC21 will be naming officers within the coming weeks
- PSRC and PSCC are both cosponsors of IEEE 1547

1547.2:

- Document is ~304 pages
- Initial ballot closed April 20th and is now in Ballot Resolution
 - Approval rate is 90% with 563 comments
 - Recirculation ballot is expected in early summer

1547.3:

- The ballot closed May 8th
- Has a 92% approval rate with 416 comments

1547.9:

- P1547.9 balloting is complete and is currently working through a copyright issue on one figure. After this is resolved, the standard can proceed along the publication process

P2030:

- Monthly plenary meetings are being held, work is in progress

SCC21:

- SCC21 continues their transition into a full committee as the IEEE has phased out the SCC's
- SCC21 is in the process of:
 - Reviewing and revising the P&P
 - Creating subgroups and officer roles

The SCC21 grid-forming inverter subgroup is writing an application white paper on the subject that is very close to completion. It will likely be published by the next PSRC meeting. The chair will consider the possibility of having a presentation given at the next K10 meeting.

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 9 voting members, 1 non-voting members and 5 guests. Quorum was not achieved. Therefore, the January 2022 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 Jim O'Brien and seconded by Ian Tualla.

The guide revision was published by the IEEE-SA in February of 2022.

The WG is working on developing a Power Point presentation for the PSRCC Main Committee. The target is January 2023 at JTCM.

Technical topics:

- 1.) An outline discussing significant revisions in the guide was developed and presented at the meeting for comments.
- 2.) Assignments to develop the slides for the future presentation were made. More volunteers are still needed and a call will be made when the meeting minutes are sent out.
- 3.) The plan is to have the presentation slides developed around August 1 and review them at the September 2022 PSRC WG meeting.

Recesses and time of final adjournment: 12:40 pm 05/10/2022

Next meeting: We plan to have a meeting at the PSRC September 2022 meeting. Please avoid conflicts with C48, D47, K31, and I2.

K25: PC37.99 IEEE Guide for the Protection of Shunt Capacitor Banks

Chair: Meyer Kao

Vice Chair: Rick Gamble

Secretary: NA

Output: Guide

Established Date: January 2019

Expected Completion Date: 2023

Draft: 1.6

Assignment: Revise and Update C37.99, IEEE Guide for the Protection of Shunt Capacitors

Formalities:

- The WG met via a Virtual/Face-to-Face Meeting on 5/11/2022 from 8:00 to 9:10 AM PST.
- Officer presiding – Meyer Kao
- Officer recording minutes – Rick Gamble
- The meeting was called to order by the Chair
- Introductions were made
- The meeting was attended by 16 members (8 in person, 8 online) out of 24, and several guests. Quorum was met.
- Steve Conrad moved to approve the agenda, Hillmon Ladner seconds
- Taylor Raffield moved to approve the 1/12 minutes, Andrew Nguyen seconds
- The Chair reviewed the patent copyright slides

The Chair discussed the overall intent of this WG, being more in terms of format than content.

Comments were reviewed in regards to neutral overcurrent relays in the unbalance protection scheme. These comments were resolved as addressed in section 8.3.9.

The Chair discussed the need to get the guide in the latest IEEE format to update both the equations and figures. The guide will be updated by IEEE-SA. A request for volunteers to update the figures was made. The equations and calculation tables can be converted to landscape for better clarity. However, editorial conversions must be carefully reviewed for technical consistency. Muhammad Hamid, Claire Patti, and Russ Patterson to work on formatting tables after receiving updated template.

Off-cycle meetings will be held July 12 and August 16 via WebEx or Teams prior to the September meeting to review the converted template document.

Information in the guide on unfused capacitor banks will be removed. A single paragraph will remain that indicates unfused banks are no longer used. It was noted that since this is a guide, we can't make recommendations. However, we can add information on why this configuration is no longer used. Pratap Mysore, Dean Sorensen, Russ Patterson to get with Jeff Nelson to discuss unfused capacitor banks.

A future discussion on the 46 directional element needs to be had at the next meeting. Proposals include changes to sections 7.1.5 and 8.3.4.

The Chair humbly recommends that all voting members in the WG join IEEE-SA for ease of access and balloting. It's not too expensive.

Russ Patterson moves to adjourn, Steve Conrad seconds.

Assignments:

- Taylor Raffield to add information to Section 10 regarding references to sizing reactors. Pratap Mysore to review.

- Claire Patti and Rick Gamble to work on formatting and updating the tables in Section 8 and Table C.1 for consistency. Andrew Nguyen to work with Claire and Rick on working up Visio Diagrams with corresponding variables.
- Meyer Kao to work on adding numerical examples to the annex. Rick Gamble to review.
- Muhammad Hamid, Claire Patti and Russ Patterson to work on formatting tables after receiving updated template.
- Pratap Mysore, Dean Sorensen, Russ Patterson to get with Jeff Nelson to discuss unfused capacitor banks.

Next Meeting:

- The next meeting will be in September 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: Iliia Voloh

Output: Guide

Established Date: Aug 2019

Expected Completion Date: 2023

Draft: V 3.20, May 2022

Assignment: Revise and update the C37.109 Guide

Meeting Notes

1. Introduction and agenda (33 participants and 13 members). Reached quorum. Minutes approved for March 17, 2022 meeting. Motion by David Caverly and second by Steve Conrad.
2. Patent and copyright slides were presented.
3. Kamal gave progress update and comments from voting members. More than 90% WG provided comments and feedback. Annex B and Annex F is ready for review.
4. Iliia Voloh and David Caverly presented Annex F and Dry type reactors. Good discussion and comments on EHV dry type reactors and protection.
5. Brief discussion on some of the comments and proposal. Draft V 3.20 will be available later this week for members to review. All the changes are in track changes. One or two meetings are proposed to discuss comments before September 2022 meeting.
6. Discussion of updates on Turn to Turn - split phase and tertiary reactor transformer protection.
7. CT polarity will be added to the figures.
8. David Caverly will present on Dry type reactors in future meetings.
9. Comment from Ratan and some other members about Offshore applications, harmonics and reactor guide scope. Will have further discussion with members to see if anything additional is needed. Guide already discusses brief mention of offshore applications, reactors and protection.
10. Adjourn 4.50 PM PST.

K27: C37.95 IEEE Guide for Protective Relaying of Utility-Consumer Interconnections

Chair: Paul Elkin

Vice Chair: Hillmon Ladner

Secretary: NA

Output: Guide

Established Date: January 2020

Expected Completion Date: December 2024

Draft: 0

Assignment: Review and update C37.95 IEEE Guide for Protective Relaying of Utility-Consumer Interconnections

8th WG Meeting

1. Welcome
2. Patent Slides - <https://mentor.ieee.org/myproject/Public/mytools/mob/slideset.pdf>
3. Quorum
 - No Quorum – 10/27 members
4. Approve Agenda
 - Motion – Jeff B.
 - Second – Steve C.
5. Approve Minutes
 - September 2021 PSRC Meeting
 - May 2022 PSRC Meeting
6. Follow up on Assignments Received
 - 4.3.11 - Dean Miller
 - Section 9 - Lubo (follow-up)
 - Section 8 Repeats
 - Figures – Steve Conrad and Steve Klecker
 - Section 7 – Gopal Gajjar
 - Section 8.4.3 Anti-Islanding Ted Warren and Juan Pineros
7. Continue Guide Editing
8. Motion to Adjourn
 - Motion – Jeff B.
 - Second – Steve K.

Minutes:

- WG officers will review membership due to lack of quorum for last two meetings. We will attempt approval of minutes by email after reviewing membership.
- WG continued review of Dean Miller's assignment on section 4.3.11
 - Most consumers with generation are served with D-Yg transformers. This is desirable when the transformer is tapped in a line to maintain the sensitivity of transmission line ground protection.
 - When the line is split and an interconnection station is built for the consumer, it may be desirable to reconsider the transformer winding configuration so the transformer can be a ground source. This may aid in coordination of ground overcurrent relays.
 - The transformer choice would be chosen to balance the utility system needs and the consumer's reliability requirements. We need to add more context in the guide to aid in decision making.
 - Dean Miller will propose additions to Section 4.3.11 to expand on this topic.
 - WG may also explore if Section 9 should be expanded to discuss a situation with HS ground source.
- Review of Section 9 was postponed to the next meeting.

- WG discussed figure updates. It was decided to postpone any detailed review of figures until the text is fully updated. Steve K. and Steve C. have converted all figures to Visio format and have made cosmetic updates to get us a good starting point.
- The WG then started review on Section 7, which will be continued on the next meeting.
- We will need a room for 30 and a projector for our next meeting.

K29: Write PES technical report based on K3 report entitled ‘Reducing outage durations through improved protection and autorestitution in distribution substations’.

Chair: Sebastien Billaut

Vice Chair: Mohamed Zedeh

Secretary: Lalitha Devarakonda

Established: 2019

Output: Revised technical report to the K Subcommittee

Expected Completion Date: December 2023

Assignment: Create a PES technical report based on the K3 report entitled ‘Reducing outage durations through improved protection and auto restoration in distribution substations’.

Meeting Notes

K29 met Wednesday May 11th at 9:20 PST with total 12 attendees, 8 via Webex and 4 in person.

Chair, Sebastien Billaut presided over the meeting. He brought the meeting to order and showed the agenda. The Chair and K Subcommittee Vice Chair and Host of the session, recorded the minutes. The host moderated the Chat window.

Quorum was not reached and we will obtain last two minutes’ approval electronically.

Several contributions have been received since last meeting.

- Hillmon presented his contribution regarding the station auto restoration, i.e. New Topic 9.
- Mohammad Zadeh and Jack Wilson presented the FCI contributions, i.e. New Topic 3. Chair will reach out to PSRC officers about FCI contributions to decide if this needs coordination outside PSRC.
- Chair and vice chair will convert the latest report draft into IEEE report format.
- Since some of the volunteers missed last two meetings, decided to look for new volunteers.
- Bryan Boyson offered to review Appendix B.

Meeting adjourned 1st Hillmon, and 2nd Jack Wilson.

K31 : Revision to C37.119 IEEE Guide for Breaker Failure Protection of Power Circuit Breakers.

Chair : Vahid Madani

Vice Chair : Brandon Davies

Secretary: Jason Euren

Established: 2022

Output: Guide

Expected Completion Date: 2026

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:

- 10 WG members were in attendance - Quorum was achieved
- 7 new members have joined and have volunteered for writing assignments
 - New WG volunteers will be provided access to iMeet Central.
- Next meeting: Single Session, Room for 30, Projector and A/V

Details:

- Agenda was presented and reviewed - No updates or suggestions were made to the agenda
- Patent Slides were presented, no patents were identified
- Copyright and Attendee Ethics slides were presented reviewed
- Chair discussed the requirements to be a voting member and associated IEEE SA requirements in terms of attendance and participation by volunteering to support a writing assignment
- Chair updated the WG that meeting minutes from previous April 19 Web meeting were previously approved.
- Jason Eruneo discussed iMeet setup for the WG participation, and access to the editable version of the guide. All WG members must create an account on iMeet Central to gain access to the guide and other working group material.
- A question was raised whether the WG has established a process for contributions to be submitted - WG discussed two options:
 - Option 1: The WG leadership keeps a master document and the WG members work off a copy of the master document. Contributors submit copies to the WG leadership and the leadership incorporates in the master document
 - Option 2: All members of the WG have access to the master document
 - Chair stated there are two major categories of contributions – There are existing sections that may need minor updates. The second category are several new topics as a result of changes in the power system. For the existing sections, it is preferred to use “revision tracking” if possible.
 - Various WG members supported option 1
 - WG leadership will follow up with the WG members on a decision
- Attendees reviewed topics under consideration for revision, and also several topics for addition to the guide. Several new assignments were made.
- Don Ware asked about logic equations in Section 8
 - Roger Whittaker provided clarification that logic equations are essentially logic diagrams
 - Adi Mulawarman stated that there are no logic diagrams in section 8, Logic diagrams are in section 6 of the guideline. Section 8 is primarily a general description section.
 - If any member wants to add logic diagrams to the guideline please submit as a contribution to the WG leadership
 - **Action Item: Don Ware** to consider adding language in the guide for low gas trips in BF schemes (see figure 17)
- Adi stated that some BF schemes may not be initiated by current or voltage; it would be good to discuss these schemes in the guide

Action Items:

- Adi Mulawarman will work on New topic “Should we discuss a common practice regarding if a BF occurs during SIPS operation (also look into C37.250)
- Alla Deronja will work on new topic “Discuss low SF6 no-trip protection scheme whether to bypass BF timer or not (two methods)”

- Steve Klecker and Ian Tualla will work on new topic “Zone 3 impedance relaying in use of BF protection”
- Kamal Garg will work on new topics “IBR – options to consider – fault detector method may not be adequate”
- Josh Lamb / Don L Lukach will provide a write up for new topic “Where the stand-alone BF relay to be located. Some entity reported an issue when independent BF in series with the 87L relay. While the 87L was tested, the BF relay tripped”
- Chris Walker will review sections 6.1 & 6.2
- Jeff Barsch will review sections 6.3 & 6.4
- Jason Eruneo will review section 6.15
- Claire Patti will review section 6.7
- Josh Watson will review section 6.13
- Josh Watson will review section 5
- Muhammad Hamid will review sections 3.1 & 4

Liaison Reports:

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

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

- Pratap was not in attendance, no report was given.

Old Business

None

New Business

None

Items of General Interest

Adi reviewed the K subcommittee list as several K subcommittee members have retired or have not participated for several meetings. Brandon and Adi to reach out to these members to see if they plan to continue involvement in this subcommittee.

Adjourn

Ratan Das motion to adjourn; Ben Kazimier seconded.