



**POWER SYSTEM RELAYING AND CONTROL COMMITTEE
OF THE IEEE POWER AND ENERGY SOCIETY
MINUTES OF THE MEETING
September 20-23, 2021, WebEx Virtual Meeting, DRAFT**

I. Call to order / Introductions: Murty Yalla

Chair Murty Yalla, called the meeting to order at 1:10 pm on Thursday, September 23, 2021.

Due to the meeting being virtual via WebEx, the tradition of all attendees introducing themselves was skipped. Similarly, the tradition of having all first time attendees reintroduce themselves was also skipped. A quorum check was conducted and verified. Attendance was recorded via a WebEx report. Attending this Main Committee meeting were 81 voting members (60% of 134 Main Committee voting members, quorum achieved), 3 non-voting members, and 100 guests for a total attendance of 192.

Meeting registration statistics for both PSCCC and PSRC:

Committee	Returning	New Attendees	Total
Both	138	16	154
PSCC	13	3	16
PSRC	249	37	285
Total	400	56	456

Meeting registrants came from the following 20 countries:

Australia, Canada, Chile, China, Colombia, Denmark, Finland, France, Germany, Greece, India, Japan, New Zealand, Portugal, Republic of Korea, Saudi Arabia, Spain, Switzerland, UK, USA

II. Sponsors

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

III. Approval of Minutes / Financial Report: Gene Henneberg

A motion to approve the minutes of the May 2021 virtual meeting of the PSRC Committee was made and seconded (_____ and Tony Johnson). The motion was approved unanimously.

The PSRC committee financial status is healthy. Registration set a record for the May virtual meeting, as has the September meeting, and expenses have been low.

IV. 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.*

- **GM 2021 (Virtual Meeting July 25 to 29)**
 - **2 Panel sessions**

Protection challenges with high penetration of Inverter Based Resources (IBRs)

- Part 1: Transmission System, Moderator Michael Thompson

Panelists: S Brahma, M Patel, N Fischer, M Nagpal

- Part 2: Distribution System, Moderator Murty Yalla

Panelists: M Higgenson, A Vukojević

- **T&D Conference and Exposition 2022 (New Orleans, LA April 25 to 28)**
 - **5 papers submitted, Reviews due today**
- **GM 2022**
 - **½ Day Tutorial Proposed,**
 - **PSRC WG C40, Applying PDC standard (C37.247-2019) for a large-scale WAMS**

THANK YOU! To our 14 Paper Reviewers –

Mark Adamiak	Fred Friend	Rene Midence	Philip Winston
Abu Bapary	Michael Higginson	Dean Miller	
Oscar Bolado	Rich Hunt	Deepak Maragal	Manish Patel
Jason Eruneo	Scott Mason	Eric Udren	

PSRC / PSCCC Membership Management System

- Ongoing needs of all PES Committees
 - GDPR compliant listserv function
 - GDPR compliant roster management
 - Attendance and participation records
- 123Signup Extension
 - The portal is still open and functional
 - Many committees are still using it
 - PES is in talks with getting a commitment to not shut down the portal until 12/31/2021 (successfully completed)
- PES AdHoc Committee
 - Mike Thompson and Gene Henneberg represent PSRC, James Formea represents PSCCC

- Mandatory requirement is import of existing records
- Thus, need for this meeting to be recorded in 123signup to facilitate not losing data
- Entertaining proposals
 - Demos over the next month
 - Goal contract by end of the year

B. Future Meetings: Murty Yalla

- January 2022 Meeting; Garden Grove, CA; January 9-12, 2022 (JTCM)
(in person with virtual option)
- May 2022 Meeting, Reno, NV; May 9-12, 2022.
- Sept 2022, Orlando, Florida is under consideration (not firm)
- May 2023, Las Vegas, Nevada is under consideration (not firm)

Details for the January 2022 and May 2022 meetings are posted on the PSRC website.

C. CIGRE B5 Activities Report: Rich Hunt

- International Body
- Membership in Study Committees, Working Groups is by Country
- Publishes Technical Brochures, webinars, hosts conferences
 - IEC is the parallel organization responsible for Standardsfb

New Working Groups

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

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

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

New Publications

Technical Brochures

- Technical Brochure 843 Life Cycle Testing of Synchrophasor Based Systems used for Protection, Monitoring and Control. Available on e-cigre. Free download for CIGRE members.

Webinars

- Webinar WBN024 Cybersecurity requirements for PACS and the resilience of PAC architectures
- Webinar WBN027 Protection and automation issues of islanded systems during system restoration/black start
- Webinar WBN029 IEC 61850 based substation automation systems – Users expectations and stakeholders interactions

- Webinar WBN035 Network Protection Performance Audits
- Available on e-cigre. Free download for all.

2021 CIGRE Centennial Session, Paris, France, August 2021

The CIGRE 2021 Centennial Session was held as a hybrid session, both virtual, and in person in Paris, from 21 to 25 August 2021.

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

The 2021 CIGRE Grid of the Future Conference will be held in Providence, RI, October 17-20, 2021 as a hybrid in-person/online event. The GOTF presents papers over 6 CIGRE Study Committees (A2, A3, B1, B4, B5, C1), and includes a NGN (next generation engineer) paper contest.

For complete details on the CIGRE Grid of the Future, visit the website at <https://cigre-usnc.org/grid-of-the-future-2021/>.

2022 CIGRE General Session

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

The B5 preferential subjects for the 2022 CIGRE General Session will be:

- PS1: Addressing Protection Related Challenges In Networks With Low-Inertia And Low Fault-Current Levels
 - Asset protection challenges and system protection challenges
 - Protection schemes: Best practices, role of grid codes and impact of inverter characteristics and specifications
 - New asset protection principles, advancements in inverter technologies, system monitoring and state estimation for aiding asset and system protection
- PS2: Applications Of Emerging Technology For Protection, Automation And Control
 - Virtualization; digital twins, Protection Automation and Control functions independent of hardware, centralized protection systems
 - New protection principles and monitoring principles for AC and DC grids including use of new sensors and better use of today's sensors and process interfaces
- PS 3: Integration of Intelligence on Substations (Common PS with B3)
 - Data analytics, remote supervising & monitoring and autonomy application
 - IoT and Machine learning applications based on Protection Automation and Control data including asset management, monitoring and data analysis
 - Expectations and benefits from digital substation and IEC 61850 principles and applications to substations

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)

- Technical Council Officers
 - Vijay Vittal, Chair
 - Hong Chen, Vice Chair
 - Diane Watkins, Secretary
 - Farnoosh Rahmatian, Past Chair
- PES Program Manager:
 - Shana Pepin
- IEEE PES Technical Council Meeting, July 23, 2021 summary of items reviewed
- Make updates to the IEEE PES Technical Committee Meeting Calendar via [Smartsheet](#)
- PES GM Brochure of Technical Committees will remain the same as 2020 digital version
- Vijay Vittal presenting to the IEEE SASB on May 6 to review the motion that was approved by IEEE PES Tech Council & the IEEE PES Gov. Board for the specific naming and differentiation between entity & individual standards. More info to come on this topic.
- PES GM '21 Session Planning was reviewed by Hong Chen – [advanced program now live](#)
 - 163 Panel sessions planned – 95 live – 68 pre-recorded
 - 366 conference papers accepted 52% acceptance rate. 32 best papers grouped into 2 best paper sessions; 96 paper forum papers grouped into 6 sessions; rest 238 in poster sessions.
 - 116 transaction papers are grouped into 11 transaction paper sessions.
- Discussion among Technical Committees and the new IEEE PES Entity Proposal Management (EPM) Committee chaired by Farnoosh Rahmatian & Dan Sabin.
 - Learn more and see upcoming meeting dates on [the IEEE PES EPM webpage linked here](#) or contact Shana Pepin for more details (s.pepin@ieee.org)

Summary of Action Items related to Murty Yalla (PSRC)

- Action: M. Zaman to send information to M. Yalla about this iMeet Central update
- Action: YC Zhang (RSICC) to connect w/ M. Yalla related to off-shore wind topic
- Action: PSRC & PSCC liaisons to attend next EPM Committee Meeting (July 22, 2021)

Technical & Coordinating Committee Meetings Promotions

	Month	Event Name	Event Start	Event End	Location (Venue, City, State, Country)	Web Meeting Details (please provide dial-in info)	Meeting Type (i.e. committee, etc.)
	2021						
	- January						
		Nuclear Power Engineering Committee (NPEC) 21-01 meeting	01/14/21	01/14/21	Virtual (WebEx)		full-committee
		winter 2021 IEEE PES Energy Storage and Stationary Battery Co	01/25/21	01/26/21	virtual (web-mtg)		full-committee
		2021-ITGM	01/10/21	01/14/21	Virtual (WebEx)		
	- February						
	- March						
	- April						
		2021 IEEE PES Switchgear Spring Meeting	04/18/19	04/23/19	PENDING CANCELLATION OF IN-PERSON BUT SWITCHING TO VIRTUAL MEETING Hilton Charlotte University Place, Charlotte, NC, USA		
		2021 IEEE PES Insulated Conductors Committee Spring Meeting (ICC)	04/18/21	04/21/21	CANCELLED - PENDING VIRTUAL INFO		
		2021 IEEE PES Transformers Committee Spring Meeting	04/20/21	04/29/21	Virtual (WebEx)		Full Committee
	- May						
		2021 IEEE PES Surge Protective Devices Committee Spring Meeting (SPDC)			Virtual (WebEx)		Full Committee

For any of the IEEE PES Technical Committee meetings, whether they are part of the GM or outside of it during some other time this Spring or Summer, as long as the committees enter their meeting information into my Smartsheet [here](#) then I get alerted and put the meeting info onto our PES website calendar [here](#) and I work with PES Marketing to get them listed in the PES E-bulletins.

Technical Activities Flyer & Brochure

TECHNICAL COUNCIL
COMMITTEES ▼
Resources
MEMORANDUMS OF UNDERSTANDING (MOUS)
STANDARDS >
TRENDING TECHNOLOGIES >

Upcoming Events

Sort By ▼

TECHNICAL COMMITTEES

Thu. 14 Jan, 2021
"WEB MEETING" 2021 IEEE PES Nuclear Power Engineering Committee Meeting (NPEC)

TECHNICAL COMMITTEES

Mon. 25 Jan, 2021
2021 IEEE PES Energy Storage and Stationary Battery (ESSB) Committee - Winter Meeting

SPONSORED

Mon. 15 Feb. 2021 - Thu. 18 Feb. 2021

Committees of the Technical Council

There is a PES technical committee for most aspects of the electric power industry. These committees play an integral role in the development of IEEE Standards and have a major impact within the industry. The PES Committee structure was reorganized in 2016 - you can view information regarding this change by reviewing the [PES Technical Committee Reorganization summary page](#).

Follow the links below to learn more about a specific committee. To see annual reports for a committee, click on the Annual Report link.

To find more resources and tools related to Technical Committee work, please view the "Resources" page [linked here](#).



Technical Committees, Subcommittees, & Coordinating Committees Brochure

Updated for 2020! Learn more about each of these committees in our updated brochure.

[Download the Brochure \(PDF\)](#)

Technical Committees & Subcommittees

1. [Analytic Methods for Power Systems \(AMPS\)](#)
2. [Electric Machinery \(EMC\)](#)
3. [Energy Development & Power Generation \(EDPG\)](#)
4. [Energy Storage & Stationary Battery \(ESSB\)](#)
5. [Insulated Conductors \(ICC\)](#)
6. [Nuclear Power Engineering \(NPEC\)](#)
7. [Power System Communications & Cybersecurity \(PSCC\)](#)
8. [Power System Dynamic Performance \(PSDP\)](#)

https://www.ieee-pes.org/images/files/Technical_Activities/pes-committee-brochure.pdf

Technical & Coordinating Committee Information on PES Technical Activities Tab

Technical Committees & Subcommittees

1. Analytic Methods for Power Systems (AMPS)

- Visit the Analytic Methods for Power Systems website
- Download the Analytic Methods for Power Systems Committee flyer (PDF)
- Download the Analytic Methods for Power Systems Committee O&P Manual (PDF)

- Link to committee website
- Download committee flyer
- Download committee O&P*

* PSDP Committee requested a link to their website instead where they keep their latest O&P manual

Scope

Investigate modeling, analysis and solution methodologies, computational tools and techniques, and the effective application of computing and intelligent systems to the various operational, planning, economic, risk, and uncertainty assessment, management and decision making problems in bulk power and distribution systems. Initiate and coordinate studies, symposia, panel discussions and tutorials related to the subjects of this area. Coordinate activities, where possible, with other groups on analytical models which are used in the study of system dynamic performance, system planning, system operations and distribution system analysis. activities.

Subcommittees

- Big Data Analytics Subcommittee (BDAS)
- Computing and Analytical Methods Subcommittee (CAMS)
- Distribution System Analysis Subcommittee (DSAS)
- Intelligent Systems Applications Subcommittee (ISS)
- Reliability, Risk and Probability Applications Subcommittee (RRPAS)
- Transient Analysis and Simulation Subcommittee (TASS)

Annual Reports

2020	2019	2018	2017	2016
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2020 Annual Reports have been added*

* Missing: SPDC, PSIM, IGETCC

E. IEC Report for September 2021: 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, TA to US Natl. Cmte. of IEC & Chair of host PSRC I4
- 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 Labs (PNNL)
- Jeff Dagle, PNNL, TAG Administrator

Standards Projects

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

- 60255-1 Ed 2 - *Common Requirements* – Committee Draft (CD) being revised per June comments.
- 60255-27 Ed 3 - *Safety requirements* – CD revised per June comments.
- 60255-26 Ed 4 - *EMC requirements* – CD revised per June comments.

Functional and product performance standards:

- 60255-187-1:2021 – *Measuring relays and protection equipment - Part 187-1: Functional requirements for differential protection - Restrained and unrestrained differential protection of motors, generators and transformers* – published on July 28, 2021.
- 60255-187-2 – *Functional standard for busbar differential relays* – early.
- 60255-187-3 – *Functional standard for line differential relays* – still working on CD with PSRC inputs – pandemic delays; splitting out channel issues for a separate project below.
- 60255-216-1 – *Digital Interface - Requirements for relays with digital I/O* (e.g., MUs) – Draft in revision. TC 95 wants JWG with PSRC H47 – we have collaboration with liaison J. Blumschein and shared document section.
- **New** -60255-216-3: *Digital Interface - Requirements for protection data exchange interfaces* [intended to categorize performance of data communications for line differential relay terminals] – NP vote did not get enough nations to commit participants. With restatement of scope, US and Canada can fill the gap. Shared with PSCC.
- New TC 95 AHWG for HVDC protection topics – 4 US participants.
- New TC 95 AHWG for traveling wave protection & fault location – 4 US participants.
- TC 95 wants to start JWG for 60255-24/C37.111 dual logo COMTRADE revision – now can proceed with PSRC H35 report input (presentation later this AM).
- **New** - SC 8A/89/CD, IEC TR 63401-4 ED1: *Behaviour of Inverter-Based Resources in Response to Bulk Grid Faults*. Chinese secretariat.
- SC 8A US membership in WG unknown and TBD from SC 8A USNC TA.
- Detailed, elaborate, informed document may need more North American input and review.
- USNC TC 95 comments on first CD submitted with help of Manish Patel of IEEE P2800 WG.
- We need broader review and will have more opportunities for input.

TC 95-PSRC Standards Collaboration

- New TC 95 *functional* standards help developers create & demonstrate relays that reliably meet application needs.

Substantial US contributions to international writing teams.

PSRC WGs formed to specifically contribute to selected projects.

- Revisions to TC 95 *product design and type testing* standards improve robustness and safety of products.

US contributions and comments to international writing teams.

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

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

F. Standards Coordinators Report: Don Lukach

- “Standards” include Guides, Recommended Practices, and Standards
- New P&Ps under PSRC Officer review. O&P next.
- Word Usage (Must, Shall, Should, etc.) continues to be very good.
- About 40 active PAR projects that also include the Joint Committee work.
- 2021 PARs: 3 to RevCom (Good Job!), 3 to NesCom for extensions, 4 more expected to see SC Motions to extend.

- Summary information on our PARs can be found in the Main Committee Minutes and in the IEEE SA myProject system.

Don Lukach moved (Adi Mulawarman second) to revise the PSRC O&P, Section 7.2.1.2 to add guidance on Joint Subcommittee work per the following (new parts a and b, as amended during discussion):

- 7.2.1.2 WG reports must then be approved by at least three-quarters (3/4) of the members of the sponsoring Subcommittee. Objections may be taken by voice or in writing. However, objections should be documented and included in the SC minutes.
- If a topic within the report substantially discusses material which is outside the scope of the sponsoring (lead) Subcommittee, then a liaison shall be appointed from the non-lead Subcommittee whose scope encompasses the material which is outside the scope of the sponsoring Subcommittee. The liaison's role is to provide updates to the liaison's Subcommittee regarding the work being done in the report relative to their Subcommittee.
 - The WG report must be approved by at least three-quarters (3/4) of the members of the liaison's Subcommittee and the sponsoring Subcommittee.

The ensuing lively discussion included questions and concerns on when and by whom a determination would be made regarding the need for a liaison between Subcommittees. When a WG is formed it is often not clear exactly what may be included in a report. It is the duty of the SC that is hosting a WG to ensure the chairs stay within the scope of the SC or seek out the other SC(s) that may have interest/influence in the material considered for inclusion. It does need to be considered at the formation of the WG, but also still tracked by the SC even if the work initially appears to not be of interest to another SC.

The motion as amended was approved.

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

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

Main Committee PAR Submissions:

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

Published PAR projects in 2021:

C37.108	Guide for the Protection of Secondary Network Systems
C37.230	Guide for Protective Relay Applications to Distribution Lines
C37.91	Guide for Protecting Power Transformers
C37.242	Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control

PAR projects in Pre-Publication SA Editorial Review:

None

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

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

PAR Expiration dates and their Status:

Project Number	Project Title	Expiration PAR Date	Project Status
PC37.102	Guide for AC Generator Protection	31 Dec 2021	Draft Development
P1646	Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation	31 Dec 2021	Draft Development
PC37.1.2	Guide for Databases Used in Utility Automation Systems	31 Dec 2022	Draft Development
P1613	Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus	31 Dec 2022	Draft Development
PC37.90	Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – General Requirements and Tests	31 Dec 2022	Draft Development
PC37.251	Standard for Common Protection and Control Settings or Configuration Data Format (COMSET)	31 Dec 2022	Draft Development
PC37.300	Guide for Centralized Protection and Control (CPC) Systems within a Substation	31 Dec 2022	Draft Development
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
PC37.106	Guide for Abnormal Frequency Protection for Power Generating Plants	31 Dec 2022	Draft Development
P2030.12	Guide for the Design of Microgrid Protection Systems	31 Dec 2022	Draft Development
PC37.252	Guide for Testing Automatic Voltage Control Systems in Regional Power Grids	31 Dec 2023	Draft Development
PC37.1.3	Recommended Practice for Human Machine Interfaces (HMIs) used with Electric Utility Automation Systems	31 Dec 2023	Draft Development
PC37.109	Guide for the Protection of Shunt Reactors	31 Dec 2023	Draft Development

PC37.99	Guide for the Protection of Shunt Capacitor Banks	31 Dec 2023	Draft Development
PC37.90.3	Standard Electrostatic Discharge Tests for Protective Relays	31 Dec 2024	Draft Development
PC37.114	Guide for Determining Fault Location on AC Transmission and Distribution Lines	31 Dec 2024	Draft Development
PC37.90.1	Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus-Surge Withstand Capability (SWC) and Electrical Fast Transient (EFT) Requirements and Tests	31 Dec 2024	Draft Development
PC37.113	Guide for Protective Relay Applications to Transmission Lines	31 Dec 2024	Draft Development
PC37.95	Guide for Protective Relaying of Utility-Consumer Interconnections	31 Dec 2024	Draft Development
PC37.101	Guide for Generator Ground Protection	31 Dec 2024	Draft Development
PC37.239	Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems	31 Dec 2025	Draft Development
PC37.235	Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes	31 Dec 2021	RevCom Agenda(22 Oct 2021)
PC37.234	Guide for Protective Relay Applications to Power System Buses	31 Dec 2021	RevCom Agenda(22 Oct 2021)
PC37.120	Protection System Redundancy for Power System Reliability	31 Dec 2021	RevCom Agenda(22 Oct 2021)
PC37.110	Guide for the Application of Current Transformers Used for Protective Relaying Purposes	31 Dec 2021	SA Ballot: Comment Resolution
PC37.233	Guide for Power System Protection Testing	31 Dec 2021	SA Ballot: Comment Resolution
PC37.2	Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations	31 Dec 2022	SA Ballot: Comment Resolution
PC37.104	Guide for Automatic Reclosing on AC Distribution and Transmission Lines	31 Dec 2022	SA Ballot: Comment Resolution
PC37.92	Standard for Analog Inputs to Protective Relays From Electronic Voltage and Current Transducers	31 Dec 2022	SA Ballot: Comment Resolution
PC37.90.2	Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – Radiated Electromagnetic	31 Dec 2021	SA Ballot: Invitation

	Interference Withstand Capability Requirements and Tests		
PC37.249	Guide for Categorizing Security Needs for Protection and Automation Related Data Files	31 Dec 2021	SA Ballot: Pre-Ballot

All PSRC Lead Committee PAR Projects:

Project	Title	Status
1613.1	Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Transmission and Distribution Facilities	Completed
2030.100	Recommended Practice for Implementing an IEC 61850 Based Substation Communications, Protection, Monitoring and Control System	Completed
2030.101	Guide for Designing a Time Synchronization System for Power Substations	Completed
60255-118-1	Measuring Relays and Protection Equipment - Part 118-1: Synchrophasor for Power System - Measurements	Completed
C37.101	Guide for Generator Ground Protection	Completed
C37.101-2006/Cor 1	Guide for Generator Ground Protection - Corrigendum 1: Annex A.2 Phasor Analysis (Informative)	Completed
C37.102	Guide for AC Generator Protection	Completed
C37.103	Guide for Differential and Polarizing Relay Circuit Testing	Completed
C37.104	Guide for Automatic Reclosing of Circuit Breakers for AC Distribution and Transmission Lines	Completed
C37.108	Guide for the Protection of Secondary Network Systems	Completed
C37.109	Guide for the Protection of Shunt Reactors	Completed
C37.111	Standard for Common Format for Transient Data Exchange (COMTRADE) for Power Systems	Completed
C37.112	Standard Inverse-Time Characteristic Equations for Overcurrent Relays	Completed
C37.113	Guide for Protective Relay Applications to Transmission Lines	Completed
C37.114	Guide for Determining Fault Location on AC Transmission and Distribution Lines	Completed
C37.116	Guide for Protective Relay Application to Transmission-Line Series Capacitor Banks	Completed
C37.119	Guide for Breaker Failure Protection of Power Circuit Breakers	Completed
C37.230	Guide for Protective Relay Applications to Distribution Lines	Completed
C37.231	Recommended Practice for Microprocessor-based Protection Equipment Firmware Control	Completed
C37.232	Standard for Common Format for Naming Time Sequence Data Files (COMNAME)	Completed
C37.237	Standard Requirements for Time Tags Created by Intelligent Electronic Devices - COMTAG(TM)	Completed
C37.241	Guide for Application of Optical Instrument Transformers for Protective Relaying	Completed

C37.242	Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control	Completed
C37.243	Guide for Application of Digital Line Current Differential Relays Using Digital Communication	Completed
C37.245	Guide for the Application of Protective Relaying for Phase Shifting Transformers	Completed
C37.246	Guide for Protection Systems of Transmission to Generation Interconnections	Completed
C37.247	Standard for Phasor Data Concentrators for Power Systems	Completed
C37.248	Guide for Common Format for Naming Intelligent Electronic Devices (COMDEV)	Completed
C37.250	Guide for Engineering, Implementation, and Management of System Integrity Protection Schemes	Completed
C37.90	Standard for Relays and Relay Systems Associated with Electric Power Apparatus	Completed
C37.90.1	Standard Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus	Completed
C37.90.3	Standard for Electrostatic Discharge Tests for Protective Relays	Completed
C37.91	Guide for Protecting Power Transformers	Completed
C37.92	Standard for Analog Inputs to Protective Relays From Electronic Voltage and Current Transducers	Completed
C37.95	Guide for Protective Relaying of Utility-Consumer Interconnections	Completed
C37.96	Guide for AC Motor Protection	Completed
C37.99	Guide for the Protection of Shunt Capacitor Banks	Completed
C57.13.1	Guide for Field Testing of Relaying Current Transformers	Completed
C57.13.3	Guide for Grounding of Instrument Transformer Secondary Circuits and Cases	Completed
P1613	Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus	Draft Development
P1646	Standard Communication Delivery Time Performance Requirements for Electric Power Substation Automation	Draft Development
P2030.100.1	Monitoring and Diagnostics of IEC 61850 Generic Object Oriented Status Event (GOOSE) and Sampled Values Based Systems	Draft Development
P2030.12	Guide for the Design of Microgrid Protection Systems	Draft Development
PC37.1.2	Guide for Databases Used in Utility Automation Systems	Draft Development
PC37.1.3	Recommended Practice for Human Machine Interfaces (HMIs) used with Electric Utility Automation Systems	Draft Development
PC37.101	Guide for Generator Ground Protection	Draft Development
PC37.102	Guide for AC Generator Protection	Draft Development

PC37.104	Guide for Automatic Reclosing on AC Distribution and Transmission Lines	SA Ballot: Comment Resolution
PC37.106	Guide for Abnormal Frequency Protection for Power Generating Plants	Draft Development
PC37.109	Guide for the Protection of Shunt Reactors	Draft Development
PC37.110	Guide for the Application of Current Transformers Used for Protective Relaying Purposes	SA Ballot: Comment Resolution
PC37.113	Guide for Protective Relay Applications to Transmission Lines	Draft Development
PC37.114	Guide for Determining Fault Location on AC Transmission and Distribution Lines	Draft Development
PC37.120	Protection System Redundancy for Power System Reliability	RevCom Agenda(22 Oct 2021)
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PC37.249	Guide for Categorizing Security Needs for Protection and Automation Related Data Files	SA Ballot: Pre- Ballot
PC37.251	Standard for Common Protection and Control Settings or Configuration Data Format (COMSET)	Draft Development
PC37.252	Guide for Testing Automatic Voltage Control Systems in Regional Power Grids	Draft Development
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
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

PC37.90.2	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: Invitation
PC37.90.3	Standard Electrostatic Discharge Tests for Protective Relays	Draft Development
PC37.92	Standard for Analog Inputs to Protective Relays From Electronic Voltage and Current Transducers	SA Ballot: Comment Resolution
PC37.95	Guide for Protective Relaying of Utility-Consumer Interconnections	Draft Development
PC37.99	Guide for the Protection of Shunt Capacitor Banks	Draft Development

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

- CO would like to make an announcement to the PSRC. If anyone has concerns about line tuners or the C93.4 standard, IEEE Standard for Power-Line Carrier Line-Tuning Equipment (30 kHz to 500 kHz) Associated with Power Transmission Lines, please attend the PSCCC C2 study group at the January meeting.
- CO anticipates making a motion at the PSCC MC meeting to go ballot for PC93.5-2021/Cor1 – Corrigenda for C93.5 American National Standard Requirements for Single Function Power-Line Carrier Transmitter/Receiver Equipment.
- SO anticipates the following actions to be taken on Friday:
 - Motion to create a new Task Force to investigate the ways software and hardware traceability could be improved for utilities, upon recommendation of Working Group S1
 - Motions to move S14, TLS in Power System Applications, and S16, Application of IDS and IPS to Electric Power Systems, from Study Group to Task Forces
- 1547.3 Guide for Cybersecurity of DERs Interface with Electric Power Systems expects to go to ballot following their October 13-14 meeting.

PO had 13 sub-groups meet this week.

- P1WG - C37.238a - Amendment to add TLV for UTC Leap second event is now working through comment resolution.
- P19SG - Study Group for Universal Utility Data Exchange (IUUDEX) (From PNNL) approved the request to submit a PAR and become a WG.

One of the PSCCC subcommittees that does not meet with us during the week is the E0 (Wire Line Subcommittee). They maintain 12 Standards and two new Addendums.

- Current activity includes 3 standard revisions:
 - Std. 820, IEEE Standard Telephone Loop Performance Characteristics.
 - Std. 1692, Guide for the Protection of Communication Installations from Lightning Effects.
 - Std 367-2012, Recommended Practice for Determining the Electric Power Station Ground Potential Rise and Induced Voltage from a Power Fault.

If E0's work sounds interesting to you, please reach out to the E0 chair, John Fuller or myself.

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

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

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

- The P2800 SA 1st Recirculation Ballot closed on 9th July.
- The ballot was successful with **86%** response rate (>75% was required) and **89%** approval rate (>75% was required)
- Received **406 comments** (235 are “must be satisfied”) that will all need to be resolved prior to recirculating a new Draft 6.2 in, hopefully, early October.
- Timeline: Publication in **Q1/Q2 2022**.

I. NERC Report: Rich Bauer

Draft Reliability guidelines

- Recommended Approaches for FLS Program Design with Increasing Penetration of DERs (posted for 45 day comment period in June)

Standards Projects

- PRC-005 – ongoing SAR drafting (4th posting of SAR)
 - Maintenance requirements for protection functions in the AVR system
 - And BES protection functions in other control systems
 - DC systems not presently covered
- PRC-019/MOD-025 * Drafting Team formed (Jason Eruneo – Chair)
 - Combined with MOD-025 into one project
 - Inverter Based Resources
 - SSSL
- PRC-023
 - Drafting Team nominations closed 8/10
 - SAR posted for comment – closed 7/28
 - Remove OOSB Requirement R2
- PRC-002
 - Drafting Team nominations closed 7/30
 - Two SARs posted for comment – closed 7/13
 - IRPTF SAR and Glencoe Light SAR

Whitepapers / Reports

- PRC-019 Technical Reference posted
<https://www.nerc.com/comm/RSTC/SPCWG/PRC-019-2%20Technical%20Reference%20Document.pdf>

Lessons Learned

- Lesson Learned LL20210802 – Multiple Faults in Rapid Succession Contribute to Relay Misoperations Leading to Loss of Load
[https://www.nerc.com/pa/rrm/ea/Lessons Learned Document Library/LL20210802_Multiple_Faults_Contribute_to_Relay_Misop_Load_Loss.pdf](https://www.nerc.com/pa/rrm/ea/Lessons%20Learned%20Document%20Library/LL20210802_Multiple_Faults_Contribute_to_Relay_Misop_Load_Loss.pdf)

Disturbance Report

- Odessa Disturbance, Texas Events: May 9, 2021 and June 26, 2021
https://www.nerc.com/pa/rrm/ea/Documents/Odessa_Disturbance_Report.pdf

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 someone 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

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

REMINDER Standards WG Awards/Certificates

- The IEEE Standards Association Working Group Awards procedure to request certificates of appreciation for completed work (Completed = Approved Standard) has to be initiated online by the WG Chair or Vice Chair
- IEEE SA Awards website:
<http://standards.ieee.org/develop/awards/wgchair/wgawards.html>

PSRC Young Professional Award

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

B3: 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 September remote meeting was 456 (PSRC 286, PSCCC 16, Both 154), which is a new record in attendance for us.

Out of 56 new attendees, 31 were in our remote Newcomers Orientation meeting on Monday. Cathy Dalton sent follow up meeting emails to each newcomer, to support our retention program. In that way we are encouraging each of the newcomers to continue their attendance and participation.

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

B4: Long Range Planning Working Group

Chair: Pratap Mysore

No report.

B5: Publicity Working Group

Chair: Cathy Dalton

Vice Chair: Mal Swanson

Assignment:

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

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

Chair: Don Lukach

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

B9: Web Site Working Group

Chair: Rick Gamble

No report.

L. Items of Interest from the Main Committee Meeting:

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

C26: C37.233 IEEE Guide for Power System Protection Testing

Approved to ballot by Subcommittee via email

Resolving MEC comments

C28: C37.242 Guide to the Synchronization, Calibration, Installation and Testing of PMUs for Power System Protection and Control

Awaiting publication

C31: C37.120 Protection System Redundancy for Power System Reliability

Ballot: 82% response, 79% approval (11 negative), 280 Comments

Resolve comments and recirculate in July

C36: Summary of Role of Protective Relays in the Smart Grid

Ready for Subcommittee review/approval

New Task Force

CTF-47: *Relay Modeling in Electromechanical Dynamic Simulations*

Assignment:

Provide writing contributions to the PES report being prepared by PSDP Committee TF

“Integrating Relay Models with RMS Dynamic Simulations”

Chair: Evangelos Farantatos

Extension Request

Motion: Working Group C26 moves to extend the PAR for IEEE PC37.233, Guide for Power System Protection Testing, for 1 year.

Reason: The PC37.233 Balloting Body has been formed and the Guide has gone through Mandatory Editorial Coordination. We request an additional 1 year be added to the length of the PAR to provide time for Initial Ballot Circulation, Comment Resolution, and Ballot Recirculation. This Guide is presently 127 pages in length and a large amount of balloting comments are expected. C26 has made use of WebEx meetings and is dedicated to following this work through to publication prior to the End-of-Calendar year 2022 deadline.

Motion made by Fred Friend, second by Don Ware. Motion passed.

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

D39: Revise C37.104 IEEE Guide for Automatic

Reclosing for AC Distribution and Transmission

Lines - Resolving Ballot Comments – Expect to

Recirculate the Ballot before the January Meeting

D47: Revise C37.243 Guide for Application of Digital Line

Current Differential Relays Using Digital

Communications – PSCC Joint Committee Work

Alla Deronja – Chair

D48: Create Report on Single Phase Trip and Reclose on
Transmission Lines- Working Group Created
Kamal Garg- Chair

Motion: D Subcommittee motions to Revise IEEE Guide C37.243, IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication with the following Assignment, Scope, and Purpose. The PSCCC will be a Joint Committee in this work contingent upon approval from their committee. The PSRC will be the lead committee in this work.

Motion made by Bruce Mackie, second by ____. Motion passed.

Subcommittee H - Relaying Communication and Control – Aaron Martin

Revised PAR (C37.243)

Proposed Title: IEEE Guide C37.243 for Application of ~~Digital~~ Line Current Differential ~~Relays~~ Protection Using Digital Communications

Output: IEEE Guide, **Project Number:** PC37.243

WG Assignment: Revise IEEE Std C37.243-2015, IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication

Revised PAR

Proposed Scope:

This guide presents ~~practical~~ line current differential ~~schemes~~protection using digital communications. Operating principles, synchronization methods, communication channel-~~requirements~~ design, current transformer (CT) ~~requirements~~ issues, ~~external time reference requirements~~, backup protection considerations, testing ~~considerations~~ methods, and troubleshooting fundamentals are included. It also provides specific guidelines for various application aspects including multi-terminal lines, series compensated lines, mutually coupled lines, line charging current, in-zone transformers and reactors, single-phase tripping and reclosing, as well as communications ~~channel requirements~~technologies.

Proposed Purpose:

This guide is intended to assist engineers in applying line current differential protection using digital communications channels.

Chair: Alla Deronja **Vice-Chair:** Steve Klecker

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

IEEE PSRC SC H is responsible for 16 (out of 64) IEEE PSRC Standards, Co-sponsor of 1 standard, and Liaison to new PAR for PNT resiliency standard. It currently has 17 active Working Groups (WGs) and 1 task force: 9 are producing or revising IEEE PSRC Standards and 8 are generating IEEE PSRC and PES Reports.

HSC met this morning with 25 members. Quorum was established and January minutes were approved.

WG H22 IEEE Guide PC37.249 “Categorizing Security Needs for Protection, Automation and Control ~~Control and Automation~~ Data Files” received approval from the HSC to submit a request for a 1 year extension of the PAR. Chair A. Makki

Motion: Working Group H22 motions to extend the PAR for IEEE Guide PC37.249, Guide for Categorizing Security Needs for Protection, Automation and Control Related Data Files, for 1 year.

Reason: The group has formed the balloting body and completed the MEC editorial review. The group intends to begin the balloting by October 10th 2021. The group needs an extension for 1 more year to complete the balloting. In addition to the regular meetings, the group plans to conduct a sequence of monthly meetings over the web to expedite the resolution of the balloting comments.

Motion made by Aaron Martin, second by ____. Motion passed.

Motion: Working Group H41 motions to extend the PAR for IEEE P1646 Communication Delivery Time Performance for 2 years – end of 2023.

Reason: H41 usually meets monthly to address outstanding issues. Currently, the member are refining the reference model. Once that is complete all normative table and text need to be aligned with the reference model. This alignment should be complete by the end of 2022 and the draft ready for internal review and submitted for ballot.

Motion made by Aaron Martin, second by ____. Motion passed.

“H” Subcommittee Report on WG progress of note

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

H17: Submitted draft report to HSC on “Establishing Links between COMTRADE, IEC 61850, and CIM” for initial approval

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

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

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

Chair: M. Kanabar.

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

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

WG H35 has finished and published Report on “COMTRADE: Next Generation” it was approved by PSRC Officers in July.

New WG H53 met for the first time to co-sponsor the revision of IEEE P1854 Use Guide for Smart Distribution Applications. Chair X. Ding

New TF HTF54 met for the first time to plan the submission of the PAR to revise IEEE Standard for Common Format for Transient Data Exchange (COMTRADE). Chair M. Adamiak

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

I SC met today with 28 members present – quorum was met.

- Neglected to Approve I SC Minutes from January 2021; will do email ballot.
- Reviewed “Quorum”, “Majority”, and “Passing a Motion” to clear up confusion
- 19 Active WG and 1 TF

WG updates of note:

- I31, I36, I37, I40 - C37.90.x and 1613
 - C37.90.2 just starting ballot – I-SC Approved PAR Extension to complete balloting process
 - 1613, C37.90, C37.90.3 drafts are close, probably January will request to form ballot.
- I38 - C37.92 – analog inputs
 - Making progress, probably January will request to form ballot.
- I-30 - C37.235 – Rogowski coils
 - Ballot complete; on RevCom Agenda for October
 - I-SC approved PAR extension if needed.
- I40- C37.90.1 – SWC and EFT
 - adding new requirement for 100 kHz testing in addition to existing 5 kHz test
- I33 – Report on Review of Relay Testing Terms
 - Final draft passed WG ballot and submitted to I-SC
 - I-SC Chair will send out for review, comment, and email ballot for approval.
- ITF48 – Review and revise C37.103-2015 - IEEE Guide for Differential and Polarizing Relay Circuit Testing.
 - Just starting – Request earlier time slot next meeting
- I29 – C37.110 - CT application
 - Resolving comments.
 - I-SC Approved PAR Extension to complete ballot process.
- I32 – Survey relay test practices
 - Andre Uribe working with IEEE PES Marketing to distribute survey and sort responses
- I47 Review and revise: *IEEE C37.231-2006 - IEEE Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control*.
 - PAR not yet submitted
 - Considering Joint Sponsor with PSCCC for Cyber Security Issues

OTHER TOPICS

- Request Transformer Liaison if someone attends the October Meeting.
- Emails from 123Signup may not get through with attachments.
 - Suggest sender send PDF which seem to get through
 - Suggest sender send “announcement” without attachments before email with attachments.

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

J SC met today with 17 members present – quorum was met.

- J13 Modeling generator controls (report) – ready for MC presentation January 2022
- J21 Motor protection tutorial – in process, will be working closely with J22 (C37.96 revision)

Four PAR activities:

- J16 Revise C37.101 Generator ground protection: PAR extension (3yr) requested
- J17 Revise C37.102 AC generator protection: WG ballot comments being worked through, PAR extension (1yr) requested
- J19 Revise C37.106 Abnormal Frequency: Sponsor ballot early 2022
- J22 Revise C37.96 Motor protection: PAR submitted this week (needs workspace on IEEE-SA imeetcentral)

New WG J24 Disturbance Recording applied to Generators and Auxiliary Systems

- Assignment: Develop a report 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.

New WG J25 Synchronous condenser protection

- Assignment: 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.

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

Published guide!

- C37.91-2021, Guide for Protecting Power Transformers

- Thank you to K16 WG and officers:
 - Chair: Will English
 - Vice-chair: Steve Conrad

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

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

WG near completion:

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

Established WG’s continuing work:

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

New K31 WG

- C37.119, Guide for Breaker Failure Protection of Power Circuit Breakers
 - Chair: Vahid Madani
 - Vice Chair: Brandon Davies

M. Presentations: Gene Henneberg

K28, Geomagnetic Disturbances (GMD) Impacts on Protection Systems

-- Qun Qiu and Steve Klecker

C25, Protection of Wind Electric Plants

-- Martin Best

Adjournment:

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

SUBCOMMITTEE REPORTS

System Protection "C" Subcommittee of the PSRC

September 23, 2021 Minutes

Chair: Fred Friend fafriend@aep.com

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

V. 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.

vi. Meeting Minutes

The System Protection Subcommittee of the PSRC met on September 23, 2021 at 11:00 AM via WebEx.

The participants were displayed by the teleconferencing software tool. A quorum was achieved (42 of 61 members and 44 guests), and the May 2021 minutes were approved (Gene Henneberg made motion, Jun Verzosa seconded, passed with no opposition).

Benjamin Kazimier motioned to approve the agenda, Jay Anderson seconded, and the agenda was approved with no opposition.

vii. Advisory Committee Items of Interest

- WG agendas are required to be posted at least two weeks prior to the meeting.
- WG meeting minutes due to Mike and Fred by Friday, October 1. Please use the new template and include your assignment.
- WG meeting attendance should still be logged in 123Signup. Support is expected through the end of the year.
- First-time attendees need to create 123Signup PSRC account to be added to mailing lists.

- A custom web page is available for each WG, if the WG Chair wishes to use it. Contact Rick Gamble, webmaster@pes-psrc.org
- WGs that complete their work are encouraged to present it to the IEEE community through WEBEX. Contact PSRC officers or Cathy Dalton (Publicity Chair) for further information.
- Registration for this meeting was about 456, including 66 first time attendees.
- The Awards Ceremony will take place during the Monday night reception for the May and September meetings when we can resume in-person meetings.
- WG officers should request certificates for their members upon completion of their work. Hugo Monterrubio can address any open questions.
- The IEEE SA style manual was revised in 2021. Working group reports should follow word usage indicated in Clause 12.2.5.
- WGs with a PAR must show Copyright and Patent Policy slides at each meeting.
- New templates for the O&P and P&P were approved in 2020 and are coming soon. Additional information is expected to follow.
- WG chairs for PAR work must be IEEE PES and IEEE SA members.
- A file share application for non-PAR working groups has been developed. If you are interested in using this please request from Subcommittee Chair.
- The Entity Proposal Management system will be used for all potential joint work.
- All are reminded and encouraged to apply for Senior Membership in the IEEE, if you are eligible.
- There is a review process in place for Entity standard development, and IEEE is working on facilitation.
- Emails with some attachments are blocked by some participants' firewalls. Please be aware of this when sending files via email.

VIII. Working Group Reports

The minutes of the Working Groups are attached.

IX. Old Business

Open ideas for new projects include:

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

The subcommittee discussed C36 forming a joint working group with H subcommittee to combine C2 Role of Protective Relaying in the Smart Grid and H2 Protective Relay Applications Using the Smart Grid Communication Infrastructure reports (on PSRC web site) into a Technical Report (Resource Center). This item was withdrawn.

The draft standard from PSRC WG H41 for Power System Communication Delivery Time Performance Requirements, P1646 was circulated for comments. Please submit all comments by 31 December 2021 directly to Dennis Holstein at holsteindk@ocg2u.com.

X. New Business

A TF has been established under the Power System Dynamic Performance (PSDP) committee titled "Integrating Relay Models with RMS Dynamic Simulations". Evangelos Farantatos brought a motion to form a new Task Force on Relay Modeling in Electromechanical Dynamic Simulations. The motion was seconded by Gene Henneberg and was approved by the subcommittee with no

opposition. A new Task Force CTF47 is created with Evangelos Farantatos is chair. The assignment of the TF is to contribute to the report Integrating Relay Models with RMS Dynamic Simulations in collaboration with PSDP.

XI. General Discussion

IEEE 1547.3 is having an upcoming meeting in October, which is expected to be the last review prior to submitting to ballot. Tony Johnson can be contacted for additional information.

XII. Working Group Minutes

C-23: Coordination of Synchrophasor Related Activities

Chair: Allen Goldstein

Vice Chair: Gustavo Brunello

Secretary: N/A

Output: Discussion Forum

PAR and PAR expiration: N/A

Established Date: September 2013

Expected Completion Date: On Going

Draft: N/A

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

Meeting Date and Time: Web-Meeting, On Sept 09, 2021 at 10:20pm CDT

Attendance: 8 members 13 guests No Quorum

Call to order

Officer presiding: Allen Goldstein

Officer recording minutes: Allen Goldstein

Quorum was not reached, Minutes previously approved by email vote.

Call for Patents: N/A

Summary of Activities and Discussions

Presentation of IEEE PSRC and PSCC synchrophasor activities along with several status updates.

Presentation of activities at NASPI and NASPI Task Teams

Discussion of Synchrophasor related activities:

- “High speed measurements” (focus on IBR (load as well as gen.))
 - Just POW or other processed info (high-speed phasors?)
 - Goodness of Fit
 - Synchrophasors are a form of signal compression (lossy)
- Advanced Networks (technologies on the horizon (MPLS, etc.)
- Applications of the measurements (AI, ML, Data Mining, etc.)
 - What data needs to be archived?
 - compression of archived data
 - What about retrieval?
- Cybersecurity – both streaming and archival
 - Not particularly applicable to NERC – should be discussed
 - How do we pass data between organizations? CIP compliance
- How do the above map to PES work?
 - Are there needs to standardize?

C-25: Summary Paper and Presentation on Protection of Wind Electric Plants

Chair: Martin Best

Vice Chair: Amin Zamani

Secretary:

Output: Summary Paper

Established Date: May 2021

Expected Completion Date: 2022

Draft: 0

Assignment: Prepare a summary paper and presentation on the PES Technical Report TR87 – Protection of Wind Electric Plants.

Call to order, Introductions

The meeting started with a brief review of the May 2021 minutes.

Record approval of minutes from previous meeting.

The Working Group is searching for a new chair, as Martin will likely be retired by the time the summary paper is completed.

Volunteers were assigned to write individual sections of the summary paper based on the topical outline from the report. The outline and writing assignments appear at the end of the minutes.

Pushpanjali Prasad was added to the list of WG members.

Technical topics:

- 1.) No specific technical topics were discussed.

Action items :

- a. Yuan Liao will locate the IEEE standard template for the summary paper.
- b. Martin will provide a link to the attendees for accessing the TR87 report.

**Respectfully submitted,
Martin F. Best**

Adjournment: 1:50 CDT 9/20/2021

Next meeting: JTCM 2022

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

Chair: Don Ware

Vice Chair: Matt Black

Secretary: Zach Zaitz

Output: Revise Guide

Established Date: January 2016

Expected Completion Date: December 2022

Draft: 5.0

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

The C26 working group met online instead of in-person meeting due to COVID-19 on Monday, September 20, 2021 with 29 attendees, 13 members and 16 Guests. Membership quorum was satisfied.

Matthew Black hosted the meeting as he has done on all Web meetings. Fred Friend kicked off meeting as a C-SC Host.

Matt reviewed the IEEE Patent Policy and Copyright Policy slides.

Meeting Notes:

- Matthew Black and Don Ware presided over meeting.
- Reviewed minutes, Rafael Garcia motioned to approve, 2nd by Angelo Tempone
 - Minutes approved without objection
- Vice-chair and Chair's comments:
 - PAR extension to end of 2022 has been submitted
 - Awaiting NesCom discussion of this extension request at their October meeting
- The patent slides were displayed. No patent concerns were raised.
- Discussed the table of comments that was created based on balloting comments.
- Discussed several of the technical comments on the guide as a group:
 - Definition of application tests, agreed to table discussion about Type Tests at this time.
 - Wording of commissioning tests involving complicated scenarios.
 - Relay contact testing not associated with self-monitoring capabilities.
- With the list of comments needing to be addressed, the C26 WG will begin meeting bi-weekly to address the comments of a technical nature
- Discussed that many of the editorial comments pertain to uses of words such as "should" which should not be used in a guide
 - Vice Chair requested volunteers to form a smaller team to meet weekly to address these comments:
 - Matt Black
 - Zach Zaitz
 - Tony Seegers
 - Vahid Madani
 - Angelo Tempone
- The latest version of the draft 5.0 may be found at <https://iee-SA.meetcentral.com/pc37233/folder/WzlwLDc5MTY3OTdd>
- Motion called to adjourn meeting. Tony Seegers moved to adjourn and Kevin Donahoe 2nd the motion. The meeting adjourned at 3:34 PM Central.
- Our next meeting will need a single session with maximum participation of 40 people. We please request conflict avoidance with C38, D47, H45, H46, I43 and I45.

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

Chair: Allen Goldstein

Vice Chair: Harold Kirkham

Output: IEEE Guide, C37.242

PAR and PAR Expiration: December 2021

Established Date: October 2015

Expected Completion Date: October 2021

Draft: SA Edit V2

Assignment: Revision of C37.242 Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control

Meeting Date and Time: Web-Meeting, On Sept 09, 2021 at 10:20pm CDT

Attendance: 9 members 20 guests

Call to order

Officer presiding: Allen Goldstein

Officer recording minutes: Dean Oulette

Quorum was not reached, Minutes previously approved by email vote.

Call for Patents: No response

Summary of Activities and Discussions

Revision is complete, All balloting and reballoting complete with 100% approval. Approved by Nescom.

WG reviewed first SA edit draft and submitted comments, second draft was reviewed by WG and 27 comments remain, these comments were submitted to SA editor immediately following today's meeting.

Adjourn at 11:00 CDT

Next Meeting:

Same time slot, Room for 30 people (if in-person).

C-29: Power System Testing Methods for Power Swing Blocking and Out of Step Tripping

Chair: Kevin W. Jones

Vice Chair: Mike Kockott

Secretary: N/A

Output: Tutorial

Established Date: May 2016

Expected Completion Date: May 2022

Draft: 1.07 (within two weeks)

Assignment: Create a report on test instructions/parameters to accompany the PSRC documents Application of Out-Of-Step Protection Schemes for Generators, and Tutorial for Setting Impedance Based Power Swing Relaying on Transmission Lines, to aid the users in quality testing of their settings and systems when following the working group outputs which recommend testing of complex relay settings and systems.

Working Group C29 met in a single WebEx session on Tuesday, September 21, 2021, 8:00-9:00 AM CDT with 24 attendees (9 Voting Members and 15 Guests).

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

Kevin thanked Jason Eruneo for his review comments. Kevin accepted all, and so they have been included within the upcoming draft version 1.07.

Mohit informed the meeting that he had done work on chapter 2. He will email this to Kevin who said he'd make the updates to the draft. When Kevin has completed these updates, he will put the latest draft on the ShareFile site. Kevin expected to be able to do this within two weeks. The draft version Kevin will upload to the ShareFile site will be 1.07.

Rob asked if the scope for C29 needed to be expanded to fall in line with the D29 increased scope due to the impact of IBRs. The decision was no, as to date the functions in the relays to be tested remained unchanged, with just possible different in-service settings. However, it was decided to make mention of this in the Introduction to prompt awareness. Rob will write this contribution.

Next there was a discussion on the terminology and definitions for the different types of testing. To get clarity and a common understanding, Deepak offered to investigate the IEEE definitions as well as for consistency and uniformity those used by C26 in C37.233 – Power System Protection Testing Guide.

After some discussion it was decided for now that Dynamic testing and Transient testing were sufficiently different, and so should be treated in separate sections in chapter 2.

The plan going forward is to have chapter 2 completed by next meeting in January 2022. The team to work on this will be Deepak (lead), Mohit, Scott and Jun. The intention is for this team to have an agenda item at the January meeting to present their work on chapter 2. Once chapter 2 is done, writing assignments to produce chapter 3 will follow, where the types of tests identified in chapter 2 will be assigned to the different test categories based on the purpose for the testing, example new function evaluation and approval, verification of settings, commissioning, and post event analysis.

Daniel's agenda item to get some test results using RelaySimtest that he can present to the WG will move to the January meeting. Deepak also informed that he had some similar material that

he could present at the next meeting. The decision of Daniel or Deepak for this presentation will be made closer to the January meeting time.

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

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

Chair: Solveig Ward

Vice Chair: Alla Deronja

Secretary: Alla Deronja

Output: Guide

Established Date: September 2017

Expected Completion Date: December 2021

Draft: Final

Assignment: Development of a guide for protection system redundancy

WG C31 did not meet at this PSRC meeting.

C-33: Support for WG-P2004 “Recommended Practice for Hardware-in-the-Loop (HIL) Simulation Based Testing of Electric Power Apparatus and Controls”

Chair: Dean Ouellette

Vice Chair: Sakis Meliopoulos

Secretary: Aaron Findley

Output: Recommended Practice

Established Date: September 2018

Expected Completion Date: December 2021

Draft: D2

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

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

A call to order of the meeting was made with 7 members, and 13 guests in attendance.

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

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

Dean Ouellette presided over the meeting and presented a summary of the 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.

Dean relayed the need for support on Chapter 6, interfacing with the hardware of interest, Tony noted that it appeared there appeared to be sections that needed a fair amount of writing. Dean will reach out to Panos Kotsampopoulos to identify specific needs for support.

Brian Hosseini and Jason Eruneo expressed an interest in contributing, Dean agreed to request access for them to collaborate on the P2004 iMeet site.

Action Items:

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

Dean to get clarification on the scope of the chapter 6 writing assignments.

Dean to add Brian and Jason to the P2004 iMeet site.

Outstanding writing assignments:

- Internal Faults, Normann and Ali to review and revise
- Figure F.1, Ali, Dinesh, Norman to review. Replacing protective functions with more generic box, in addition to other comments.
- F.3.1: Normann suggests a re-write adding discussion of GCC and salient vs. cylindrical rotor.
- F.4: Normann suggested adding a note pointing to the software specific documentation for data entry format.
- F.5.1.1/F.5.1.2: Ali to provide an example and reference.
- F.6.1: Normann to add explanation of H and D constants.
- F.7.2: Dale Finney, Normann, Ali to expand this section discussing both overload and overexcitation.
- F.8: Dale, Ali, Normann, Deepak to provide content.
- F.2: Norman, Ritwik to provide better diagram from other standards.
- F.11: Aaron to add discussion of adjacent generators.
- F.12: Aaron to include discussion of secondary burden and remanence (ref. IEC 60255-187-1).
- F.15: Dinesh, Normann, Dale to provide content
- Figure F.3 to be revised by Dinesh and Normann
- F.19: Normann to provide comments on this section including a discussion of which functions cannot be tested via HIL.

New Business

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

Meeting was adjourned at 08:25 am CDT.

CTF34: Inverter-Based Short Circuit Current Impacts

Chair: Kevin W. Jones

Vice Chair: Gary Kobet

Secretary: N/A

Output: N/A

Established Date: September 2017

Expected Completion Date: January 2022

Draft: N/A

Assignment: Coordinate/communicate the efforts of the PES/NERC Low Short Circuit Current Impacts Task Force and PSRC working groups addressing the issues of inverter-based resources.

Working Group CTF34 met via WebEx in a single session with 10 voting members and 64 guests (74 total). The Chair presided over the meeting and the Vice-Chair recorded the minutes. The meeting was called to order by Kevin Jones on Wednesday, September 22, 2021 at 0910 CDT. The minutes from the May 5, 2021 WebEx meeting were reviewed and approved.

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

- C25 Protection of Wind Electric Plants - Dean Miller: Work completed, paper posted on PES-PSRC website, TR-87 https://resourcecenter.ieee-pes.org/publications/technical-reports/PES_TP_TR87_PSRC_050121.html; C25 working on conference paper. C25 will no longer be monitored by CTF34.
- C38 Guide for the Design of Microgrid Protection Systems - Mike Higginson: Still working on draft, will start monthly meetings with intent to send draft out for ballot this year, SA ballot early next year (2022).
- C45 Protection and short-circuit modeling of systems with high penetration of inverter-based Resources – Ali Hooshyar: Held second meeting yesterday, still working on initial outline, writing assignments made. Four presentations in yesterday’s meeting, some discussion about need to improve models from C24 work including negative sequence current contribution. More calls scheduled this fall before 3rd meeting in January.
- D29 Tutorial on Setting Impedance-Based Power Swing Blocking and Out-of-Step Tripping Functions on Transmission Lines - Kevin Jones: Discussed how to set blinders, some studies performed using CAPE TS-Link between CAPE and PSSE, with different mixes of conventional machines and IBR. When IBR increases from none to 50% IBR, swing rates increase significantly from 0.6 Hz to 2.4 Hz. Some model adjustments to be made to solve PSSE convergence issues. Question was asked whether RECG_C model would improve issues with load flow? Comment was made that model lacking for use in dynamics studies; EMT studies may be required.
- D38 Impact of High SIR on Distance Relaying - Christopher Walker: Working on draft 0.5, initial writing assignments being developed, section on IBR impacts included. 2023 completion date.
- J18 Investigate the effect sub-synchronous oscillations due to inverter based resources (IBR) on rotating machinery protection and control- Normann Fischer: No report
- NERC –
 - Modification to PRC-019 ongoing, applicable to IBR but standard generally addresses synchronous machines, language being modified to include IBR-specifics, also discussion of SSSL for synchronous machines, SAR posted for comment, taking nominations for drafting team members, coupled with MOD-025 (real/reactive power capability testing) as one project

- https://www.nerc.com/pa/Stand/Pages/Project_2021-01_Modifications_to_MOD-025_and_PRC-019.aspx
 - PRC-002, two SARs, one from IRPTF, locating DFRs based on short circuit capacity will not work for high IBR penetration. Project underway, drafting team nominations.
 - <https://www.nerc.com/pa/Stand/Pages/Project-2021-04-Modifications-to-PRC-002-2.aspx>
 - PRC-023 as it impacts D29: SAR in development, out-of-step schemes must not prevent tripping during faults, existing requirement R2. Some discussion over attempting to remove this requirement on this revision.
 - PRC-024 has been modified & approved by FERC, can be removed from list to be monitored.
 - Another disturbance report published Odessa Texas on NERC website: [May/June 2021 Odessa Disturbance \(nerc.com\)](https://www.nerc.com/pa/rrm/ea/Pages/May-June-2021-Odessa-Disturbance.aspx) [Report \(nerc.com\)](https://www.nerc.com/pa/rrm/ea/Documents/Odessa_Disturbance_Report.pdf)
<https://www.nerc.com/pa/rrm/ea/Pages/May-June-2021-Odessa-Disturbance.aspx>
https://www.nerc.com/pa/rrm/ea/Documents/Odessa_Disturbance_Report.pdf
- P2800
 - <https://publicreview.standards.ieee.org/> [publicreview.standards.ieee.org]
 - Results from 1st recirculation 89% approval, working through comments
 - Each comment will be addressed whether ballot positive or negative
 - Hope to publish standard by early 2022

Chair Kevin Jones adjourned the meeting at 1010 CDT.

C-36 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: January 2023

Draft: 0

Assignment: To develop an IEEE summary paper based on the C2 report "Role of Protective Relays in the Smart Grid"

C36 met on Wednesday, September 22, 2021, by a web meeting from 1:10PM to 2:10PM. There were 6 voting members, and 16 non-members present. Ben Kazimier chaired and presided over the meeting. Steve Klecker recorded the minutes.

There was discussion if this should be a transaction paper or a technical report. It was decided that Fred Friend would submit it as a transaction paper. If it is rejected as a transaction paper, then it will be submitted as a technical report.

Additional notes:

C36 will meet for the JCTM in January, 2022. The working group agrees to keep the group open and active for the purpose of writing abstracts and creating presentations for submitting C2 or

the C36 paper, as appropriate, to various conferences. The date of expected completion is updated to reflect this plan. The list of conferences with possible volunteers was also updated. Assignments are given in the section below.

Conferences for Possible Submission of C2 / C36 work with Volunteers:

Edison Electric Institute – Rob Fowler

Cigre – Grid of the future – organized by US National committee – Alex A.

IA/NE, October, 2022 – Volunteer Needed

MIPSYCON, November, 2021 – Steve K.

GA Tech – Presented by Taylor in April, 2021

Texas A&M – 2022 – Volunteer Needed (**Maybe submission period is over-Steve K. to check**)

WPRC – October 18-22, 2021 - Steve K.

Pac World – August, 2021 - Yuan L. presented in August, 2021.

APAP - Asia 2021– Alex A.

DPSP European developments in power system protection 2022– Alex A.

IEEE general meeting – Have to submit paper

IEEE T&D - Have to submit summary paper

PSRC Main Committee Meeting – Presented by Taylor, May, 6, 2021.

Link to C2 paper:

<http://www.pes->

[psrc.org/kb/published/reports/PSRC%20WG%20C2%20-%20Role%20of%20Protective%20Relaying%20in%20the%20Smart%20Grid.pdf](http://www.pes-psrc.org/kb/published/reports/PSRC%20WG%20C2%20-%20Role%20of%20Protective%20Relaying%20in%20the%20Smart%20Grid.pdf)

C-38: P2030.12 Guide for the Design of Microgrid Protection Systems

Chair: S. S. (Mani) Venkata

Vice Chair: Michael Higginson

Secretary: Geza Joos

Output: IEEE Guide, P2030.12

Draft: 0.9.1

Expected Completion Date: February 2022

PAR Expiration Date: December 2022

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

September 21, 2021 Meeting Minutes Online Meeting

Officer Presiding: Mani Venkata

Minutes Prepared By: Michael Higginson / Geza Joos

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

The meeting commenced at 3:30 PM central time. There were 61 attendees, with 19 voting members, 8 non-voting members, and 34 non-members. Quorum was met.

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

Minutes for the last meeting 4 May 2021 were reviewed. It was moved to approve the unapproved meeting minutes. The motion was seconded, and the minutes were approved by the working group without opposition.

The working group reviewed the agenda for this meeting. It was motioned to approve the agenda, with a seconder, and no opposition from the working group.

Mani Venkata started the meeting by discussing the status of the guide and stating the following: (a) the guide is nearly completed and most of the sections have been completed and reviewed; (b) the timeline for completion of the work is 2022, the PAR expires December 2022; (c) all writing assignments have been completed, except for a few outstanding issues to be resolved in meetings between now and December 2021, see action items in the minutes; (d) this step will be carried out in conjunction with a full review of all sections by all the working group members, with an internal ballot and comment resolution, a process that should be completed by end of 2021; (e) the requirements and process for submission to the IEEE SA Mandatory Editorial Coordination, will follow; (f) the IEEE SA balloting process would begin in early 2022 after approval of the guide by the appropriate bodies within PSRC.

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

- Section 4:
 - Completed, no update received.
- Section 5:
 - All comments were resolved.
- Section 6:
 - There is one remaining open comment on this section. **Sebastien Billaut** volunteered to address this comment within the coming week.
- Section 7:
 - Most of this section is considered complete.
 - A new section 7.1.3 on Black Start by Michael Higginson, section 7.4 on Relay Interoperability by Neil Shepard, and revisions to the FLISR section by Mohammad Zadeh, Lalitha Devarakonda, and Yuan Liao were integrated in draft 0.9.1 by **Michael Higginson** after the meeting.
 - Revisions to section 7.3 on inverter-based fault current were proposed by Fernando Calero. **Matthew Reno** volunteered to integrate these contributions.
 - **Matthew Reno** volunteered to review Section 7.5 for duplicate comments and add an introduction and transitions.
- Section 8:
 - There is one remaining open comment in this section. **Jim van de Ligt** volunteered to address this comment.
- Section 9:
 - Revisions are suggested to this section, related to the following: change title to modes of operation of the microgrid not of the protection system; revisit issues in islanded mode related to cold load pick-up (and transformer energization, in rush current), and load shedding.
 - Consider integrating this very short section into others sections if and as appropriate.
- Section 10:
 - This section is considered complete and is accepted, except for the general statements made in Section 10.1.1, that may not apply in the systems integrating inverter-based resources.
- Section 11:
 - This section is considered complete. It is suggested to update the references listed at the end of the section, some dated (2001).
- Section 12:
 - This section is considered complete.
- Annexes:

- Bibliography: the instructions provided in the IEEE Standards Style Manual will be followed.
- Other Annexes: the question is raised about the need to review them. In principle, there is no need, they are informative and provide additional information. They will be reviewed as part of the editing process of the overall guide.
- Section 2:
 - Normative references will be included as required. The document is a guide, and it does not specify mandatory requirements.

Action items on the draft guide: (a) individual commitments and action items should be completed within one month; (b) the revised document (draft 0.9.1) is posted on the P2030.12 iMeet website; any WG members can suggest changes, additions or corrections.

Geza Joos volunteered carry out the editorial review of the complete document. This task includes: organizing the Bibliography (Annex), generated by moving the references associated with each section to this Annex, with the more relevant references included in Section 2, normative references, if appropriate; identifying and removing duplications and regrouping topics as required.

It is proposed to hold one more meeting during the period October-November to resolve the outstanding issues and complete the review of the guide by end of December 2021.

The next regular meeting is planned for Jan 2022 PSRC Committee meeting (JTC meetings).

The meeting was adjourned at 5:30 PM central time.

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

Chair: Xiaopeng Li

Vice Chair: None

Secretary: Zhenyuan Zhang

Output: Guide

Established Date: February 2019

Expected Completion Date: December 2022

Draft: Third edition draft.

1. Call to Order

- The meeting was called to order at 8:00 a.m.
- The chair introduced all attendees and declared their affiliations.
- Main WG meeting attendance was recorded.

2. Roll call of participants

- 11 representatives from 7 entities and 15 Individuals attended the meeting by Webex. The total number of the attendees present counts 18. The participants make a quorum.
- WG membership consists of State Grid Corporation of China (SGCC), University of Electronic Science and Technology of China (UESTC), Southwest Jiaotong University (SWJTU), Xi'an Jiaotong University (XJTU), Chongqing University (CQU), Sichuan University (SCU) and Tsinghua University (THU). The DRs of the above entities are Xiaopeng Li (SGCC), Zhenyuan Zhang (UESTC), Kai Liao (SWJTU), Lixiong Xu (SCU), Zaibin Jiao (XJTU), and Yongjie Luo (CQU). Qinglai Guo from Tsinghua University was absence from the meeting.

3. Approval of agenda

- Chair Xiaopeng Li presented the agenda.

Motion #1

Approve the agenda for the third WG meeting of PC37.252.

Motion passed by voice vote without opposition.

4. Approval of minutes of previous meeting

- The minutes of the first WG meeting was sent to DRs in advance.

Motion #2

Approve the minutes of the first WG meeting of PC37.252.

Motion passed by voice vote without opposition.

5. Current progress

- Chair Xiaopeng Li introduced the current progress on the draft development.
- 1 preparatory meeting and 2 WG meeting have been held.
- Third-edition draft has been prepared.
- The suggestions and questions obtained from last WG meeting in September 2020 were responded and the corresponding revision have been made in the new draft.

6. Draft Discussion

- Dr. Zhou Mu from SGCC introduced the first-edition draft.
- The “regional power grid” should be defined clearly.
- The calculation cycle of zone division and the simulation platform were discussed.
- The fourth edition draft should be completed before 31, December 2021.

7. Date and place of next WG Meeting.

- A consensus was reached that if permitted the next WG meeting is expected to be scheduled online in March, 2022.

8. Unfinished business

- No unfinished business was brought before the WG.

9. New Business

- No new business was brought before the WG.

The WG adjourned at 8:57 a.m.

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

Chair: Vasudev Gharpure

Vice Chair: Mital Kanabar

Secretary: Mital Kanabar

Output: Tutorial planned (Paper, Presentation in future)

Established Date: January 2020

Expected Completion Date: December 2022

Draft: 1.01

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.

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

- a) Officer presiding: Vasudev Gharpure
- b) Officer recording minutes: Vasudev Gharpure
- c) The chair opened the meeting
 - a. The WG assignment was shown
 - b. The Tutorial is aimed at the general meeting 2022.
 - c. A proposal has been submitted, and decision is awaited.
 - d. Proposed tutorial outline was shared with the group.
- d) We did not have quorum, though no decisions were needed / made.
- e) Previous minutes had been approved electronically.
- f) Next meeting during the January 2022, JTCM.

C-41: 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, September 21, 2021 at 9:10am (CDT) with 33 participants (10 M, 23 G) via WebEx. Ken Martin (Chair) welcomed participants and briefed the objective of the WG, which is described in the assignment above. He also presented the proposed outline for the WG report (Characteristics of distribution measurements and Requirements for distribution system measurements).

Farnoosh Rahmatian provided a presentation on "*Distribution Waveform Characteristics – Harmonics with IEEE and IEC Standards*". Ken highlighted the existing P-class covers harmonics up to 1% and the M-class covers up to 10%, which adequate for distribution applications. He also added that mixing of harmonics can be treated as an interfering signal. Farnoosh agreed and added that most of existing PMUs filtering 2nd and 3rd harmonics and goodness of fit may be an interesting feature to consider for distribution PMUs that could cover DC offsets; this may increase computational burden but that is a practical need.

Allen pointed out that PMUs are good for filtering first few harmonics, however, when harmonics reach to the Nyquist rate of internal sampling rate PMUs shows a big spike of errors. When the frequency is off-nominal we may get more interference as we don't test for harmonic rejection at off-nominal frequency right now. Farnoosh agreed and added that we need good anti-aliasing filters.

Mario agreed with goodness of fit as an interesting feature as defined in EN 50160: 2010. In the chat window, Manuel stated that there is a testing standard IEC 62586-2:2013. Farnoosh added that we may need to consider frequency ranges, sags, swell, etc. in addition to harmonics. Farnoosh agreed to share one of his papers regarding the goodness of fit for qualifying PMU data for fault location during DC offset and transients. He added that we need to consider two or three categories of goodness of fit. Mahendra added that different quality flags may be suitable for identifying different categories.

Allen questioned when we plan to get this report for the subcommittee review and how our schedule look like. Ken said we are planning to finish this report in two years and it depends on how much we need to discuss and research on the topic. He added that we hope to start report contributions by the end of this year. Michael questions where's the practicality of utilities considering installing new devices. Ken said we don't have enough knowledge of distribution measurements yet to give a good answer.

Recorded by Dinesh Gurusinghe

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

Chair: Gene Henneberg

Vice Chair: Yi Hu

Output: Summary Paper

Established Date: September 2020

Expected Completion Date: December 2022

Draft: 1.5

Assignment: Write a conference paper summarizing the new C37.250 Guide for Engineering, Implementation and Management of System Integrity Protection Schemes.

Working Group C-42 met in web session on September 21, 2021 beginning at 1:10 pm CDT with 21 attendees.

WG Chair Gene Henneberg started the meeting by describing the objective of the WG. Gene reported that the paper abstract was accepted for presentation at WPRC 2021 and has been submitted for Texas A&M conferences. The due date for Georgia tech is September 30, 2021. Other conferences were discussed where the paper might be presented including UTC (UTC.org), IEEE PES GM 2022.

Web meetings were held bi-weekly after the May meeting for the paper authors to write and edit the paper. The paper was completed and submitted to WPRC on September 3, and a first draft of the presentation was submitted on September 4. Substantial presentation editing was completed at the September 17 web meeting.

Gene then led the review of the presentation. Several comments were received for improved explanation or emphasis.

Meeting adjourned at 2:05 pm CDT.

Meeting minutes by Gene Henneberg and Yi Hu on 09/22/2021.

The next Working Group meeting is scheduled in conjunction with JTCM meeting in January 2022.

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

C-43: Artificial Intelligence and Machine Learning technologies for power system protection and control applications

Chair: Yi Hu

Vice Chair: Adi Mulawarman

Output: Report

Established Date: January 2021

Expected Completion Date: December 2022

Draft: 0.20

Assignment: Prepare a report summarizing existing and new practical applications and challenges to use Artificial Intelligence and Machine Learning technologies for power system protection and control.

Working Group C-43 met in double WebEx session on September 22, 2021 with 85 attendees. Yi Hu and Adi Mulawarman presided the meeting. No round-the-table introduction of attendees was taken due to time constraints. Complete information of all attendees, including affiliations, was recorded by the WebEx, and subsequently provided to the Working Group chairs.

Session 1:

Chair briefly reviewed meeting agenda and WG C43 assignment with the attendees, then proceeded with the review of the first four sections of the current draft report by the team members who have been working on developing these sections since May meeting:

- Section 1 and 2 – Juan Piñeros
- Section 3 – Athula Rajapakse
- Section 4 – Abder Elandalousi

After the review, the following attendees have volunteered to review and comment the current draft report in response to Chair's call for more reviewers:

- Abel Gonzalez, Jean Raymond, Melvin Moncey Joseph, André Melo, Srikrishnan Chitharanjan, Steven Blair, Thai Li, Wayne Stec, Chaitali Naik, Sirak Belayneh, Yu Liu, Yujie Yin, Johannes Menzel, Ali Bidram, Ali Hooshyar, Nathan Wallace, Alex Apostolov

Vice Chair has sent the link to the current draft report to those who have volunteered to review it.

<https://iee-SA.meetcentral.com/p/aQAAAAAE0E6p>

Chair made a call for a broad participation and contribution to add contents for the remaining sections. The following volunteers have been assigned to various sections as discussed:

- Review section 1 – 4 and propose where to include the Suitability of AI/ML for P&C writeup – Sukumar Brahma
- Add an Introduction to Data Structure section – Juan Piñeros, Abder Elandalousi
- Add a Data Source section – Alex Apostolov, Krish Narendra, Dan Sabin, Yujie Yin
- Add examples to Application Illustrations section –
 - a. Examples from presentations made at May and September meetings
 - b. Post-event analysis – Yujie Yin
 - c. Motor Protection – Alex Apostolov
 - d. Fault classification and location with ML – Yu Liu
- Contributions to Risks and Challenges section – Sukumar Brahma
- Collect bibliography – Matthew Reno, Yu Liu, André Melo

Vice Chair of C43 and PSRC Chair Murty Yalla reviewed and discussed the role and responsibilities for WG members with the meeting attendees.

Chair announced the plan to continue the weekly WG C43 call after this September meeting for WG members and contributors to work on the new contents for the report. It has been suggested that instead of trying to find a time that works for most of people, which is very difficult to do for a large number of people, the WG should organize such working calls for each section with a section lead. It will be much easier to schedule such calls with smaller teams. Chair and Vice Chair will reach out to the signed up volunteers to organize these working calls as suggested.

Session 2:

The session proceeded with the following two presentations:

- Detecting Relay Misoperations using Field Data from PMUs – Opportunities and Challenges (Sukumar Brahma)
- Hybrid Intelligent Model for Protection Settings Optimization – Experience (Juan Piñeros)

The presentations were well received and will be added as examples to Application Illustrations section.

Meeting adjourned at 12:30 PM CST.

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

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

C-44: 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: 2

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

C44 met virtually from 2:20 to 3:20 pm CST on Monday, 9/20/2021 with 25 attendees.

Sukumar first summarized the status of the paper. All the sections in the paper have been completed with contributions from Sukumar, Dean Miller, EPRI, ASPEN, Siemens and ETAP.

There was a short discussion whether the material in the paper is new and qualifies for an IEEE Transactions on Power Delivery paper. Sukumar emphasized that the paper was rewritten and there are no copied sections from the C24 report. The simulation results are also new. Sukumar referred to the information for WG/TF paper submissions at the link below.

<https://cmte.ieee.org/tpwr/three-types-of-papers-interested-by-pwr/>

The participants agreed to proceed with submission of the paper.

4 reviewers were identified, Manish Patel, Ritwik Chowdhury, Yuan Liao and Deepak Maragal. Sukumar will send the paper to the reviewers and request review within 3 weeks. Then approval from the WG members will be pursued. After that the paper will be sent to the C subcommittee officers for final review before submission.

The WG will need a room of 30 with a computer projector (in case of physical meeting). Please avoid conflict with C38, CTF34, C45, B10 and C25, in that order.

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

Chair: Ali Hooshyar

Vice Chair: Manish Patel

Output: Report

Draft: N/A

Established Date: May 2021

Expected Completion Date: December 2024

Assignment: To prepare a technical report to investigate short-circuit modeling and protection of systems with high penetration of IBRs as a continuation of the works of WGs C32 and C24

Ali (Chair) presented the meeting minutes. Ritwik motioned, Gene seconded. Ali talked about the different contributors for the report so far. The latest draft of the report is available here (<https://psrc.sharefile.com/d-s585b4b01029646ec83e9ddd2b02f5ff>). There were approximately 90 attendees.

Aboutaleb from EPRI started his presentation on IBR short circuit model:

- How do we use VCCS (Voltage Controlled Current Source) tabular model for representation of negative-sequence current inject of IBRs?
- C24 report is the starting point. Should there be two tables?
- The table representing negative-sequence quantities by itself may not work since it could exceed the IBR current limit.
- Several options for tabulating the data was presented. Some options could be impractical due to a very large number of rows.
 - If using only V1 and V2, inaccuracy could be ~20% in I1 and I2 amplitude (on average). And up to 30 degrees in phase angle. Worst case error was in the vicinity of 40% for the amplitude. This is for Type 4.
 - Type 3 is less complicated. Separate tables for V1/I1 and V2/I2 is acceptable even though there is some coupling between the tables. This is because of the machine.

Sherman practical experience from users:

- Users can populate the tables in creative ways. Best to steer away from tables.
- The most complicated method was the dq-axis related.
- You could get different results depending on which phases were faulted (e.g., AB vs BC vs CA could be different). This is because negative-sequence could project differently in the d and q-axis. When you have pre-fault, you establish the d- and q-axis. You could end up with three different answers.

Q&A for Sherman and Aboutaleb:

- Ali: Are there references that reviews the different current limitation logic? Could they be interpreted from the grid codes? Aboutaleb: There is no comprehensive work on this. We don't know exactly how manufacturer's do it. German code hints towards equal priority between I1 and I2. Manish: Grid codes, UK, German, Australia, and P2800 stay silent.
- Sebastien: The negative-sequence current could drift. The reaction times from the manufacturers are fast and the current limits are not very restrictive.
- Ilhan: Agrees with Sherman about steering away from tables. The standards provide requirements. Most are IGBT based converters, can go up to 120% typically, and temporarily up to 200% for 10 ms. Aboutaleb: Table model is only one implementation, the other is to calculate it based on equations. This is related to Sherman's point.
- Steve question on EPRI: Last slide of DFIG, was it non-crowbarred behavior? Aboutaleb: It wasn't crowbarred.
- Sherman: NERC has defined power factor angle as the opposite of what we defined in C24. Recently, users have used the opposite of what ASPEN requires. For manufacturers, when V1 is less than 1, power-factor is negative.

Jason Eruneo talked about pilot schemes, 87L, and presented possible questions and topics for the report. Steve Miller talked about overcurrent, directional, distance, pilot, and differential elements.

Ali adjourned the meeting. We will reach out the volunteers for their contributions for the next meeting.

CTF46: Study the drafting of 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: TBD

Secretary: N/A

Output: Recommendation to C Subcommittee

PAR and PAR expiration: N/A

Established Date: May 2021

Expected Completion Date: Sept 2021

Draft: N/A

Assignment: Study the drafting of a summary paper of C37.242

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

Attendance: 6 members

16 guest

Call to order

Officer presiding: Allen Goldstein

Officer recording minutes: Deepak Maragal

Quorum was not reached.

Call for Patents: N/A

Summary of Activities and Discussions

Chair Presented agenda for the meeting. Vice Chair for CTF46 was mentioned as Deepak Maragal

Monthly meeting are conducted: 8 yes and 1 No.

Page limit discussion : 10 pages for Transaction

Assigned statement was discussed for WG. Motion made by Chair for converting to WG and it would be brought to C subcommittee for voting.

Allen Goldstein showed the interface on how to use the overleaf.

The paper outline was discussed.

Each topic to have subsection on future work.

Deepak as Volunteer to lead the section on "Need for a PMU Guide"

Erin Jessup to lead section on "Summary of Guidance" section.

Chair will ask someone to lead section on Gaps and Guidance

Vahid brought the discussion on "Point on Wave" and "PMU". A new subtopic is added in Relationship between Synchrophasors and Point-on-wave measurements.

The Chair filled in a Working Group formation request and submitted it to C subcommittee chair. Next meeting CTF46 will be a working group.

D: LINE PROTECTION SUBCOMMITTEE

Chair: Bruce Mackie

Vice Chair: Meyer Kao

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

- The Subcommittee meeting met virtually via WebEx on Thursday, September 23rd, 2021 from 11:00 AM to 12:15 CDT.
- Officer presiding – Bruce Mackie
- Officer recording minutes – Meyer Kao
- The Subcommittee meeting was called to order by the Chair
- New D-subcommittee members: Kamal Garg and Brandon Lewey
- The virtual meeting was attended by 33 voting members, one non-voting member and 36 guests. Quorum was met.
- Minutes from the May 2021 meeting held virtually were approved - motion made by Don Lukach and seconded by Jonathan Sykes.
- Agenda for the D Subcommittee September 2021 virtual meeting was approved - motion made by Bryan Boysen and seconded by Rick Gamble.

The Chair reviewed items of interest from the Advisory Committee.

- WG Chairs: please send up to date minutes to Chair and VC by Friday, October 1st
- Reminders:
 - Please use template
 - Please update meeting attendance on 123 Signup; keep records of newcomers who are not in the system
 - Template for Technical Reports (including Tutorials)
- Reminded subcommittee members on Standards WG Awards
 - IEEE SA Working Group Awards has new Procedure to request certificates of appreciation for completed (Approved Standard) work.
 - Must be requested by WG Chair or VC directly from the IEEE SA.
 - <http://standards.ieee.org/develop/awards/wgchair/wgawards.html> [standards.ieee.org]
 - Visit the IEEE SA Awards webpage after the Standard has been approved and published. You will need the IEEE Standard Number and year of publication: e.g. XXXX(Standard number)- XXXX (Year)
 - <http://standards.ieee.org/develop/awards/wgchair/wgawards.html>
 - The process is very simple and will require to list the names of the WG officers and members

- The awards can be shipped to the person who is filling out the form OR can all be sent to an event. If you want these awards to be handed at our next PSRC Awards Ceremony then choose to have them be sent to an event and enter your name or the name of the awards Chair (Hugo Monterrubio) for collection. Important to verify and add the address of the Hotel of our next PSRC Meeting to arrive Monday or earlier.
- Please email Hugo Monterrubio (HugoM@ieee.org) for any questions and also to notify when the awards have been requested for your Standard or Guide WG so we can follow up with IEEE SA
- For all future in-person PSRC May and September meetings our Monday night Welcome Reception will feature an Awards Ceremony. Please take this into consideration when making travel plans for future PSRC meetings. Don't miss this opportunity to help recognize or be recognized for the work that our Committee and fellow PSRC members do throughout the year.
- PSRC web page WWW.pes-psrc.org
 - Rick Gamble is contact for D SC (Webmaster)
 - A custom web page is available for each WG, if the WG Chair wishes to use it. Contact Rick Gamble, webmaster@pes-psrc.org
- SA Documents are reviewed for terminology – Important for Subcommittee to review technical reports
- Recognized the need for a file share application for non-PAR WG's - <https://www.pes-psrc.org/psrcsharefile.html>
- WGs that complete their work are encouraged to present it to the IEEE community through WEBEX. Contact PSRC officers or Cathy Dalton (Publicity Chair) for further information
- WG Chair requires PES and IEEE SA membership
- Reminder to apply for Senior Membership in IEEE
- P&P Manual is being Reviewed and Updated. O&P Manual will be Reviewed Next Year
- For each project development (PAR related) meeting show: Copyright & Patent Policies
- Entity Process
- PSRC Knowledge Base
- Attendance 413 with 51 first timers
- Future Meetings (Subject to Change)
 - January 2022 – Garden Grove, CA (hybrid currently)
 - May 2022 – Reno, NV
 - September 2022 – Orlando, FL

IEEE Standards Documents currently involved with WGs in D Subcommittee

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

Working groups gave reports on their activity.

Reports from the WG Chairs:

Reminder of Working Group Reports:

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

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

Chair: Kevin Jones

Vice Chair: Normann Fischer

Assignment: Create a tutorial on setting impedance-based power swing blocking and out-of-step tripping functions related to transmission line applications. Specific relay settings examples will be provided. Other methods of detecting out-of-step conditions that exist will be summarized and referenced but will not be discussed in detail.

Attendees: 55 (13-Voting Members, 1-Non-Voting Member and 41-Guests)

- 1.) The chair, Kevin Jones gave an update on the Test system (model). The test system is modeled in PSS CAPE-TS Link. The Out-of-step relay is also included in this model.
- 2.) Four (4) different cases of the model were run.
 - a. A base case that only contained conventional synchronous generators
 - b. A case where the ingress of inverter-based resources (IBR) was at 25% using Type 4 wind turbines as the IBR
 - c. A case where the ingress of IBR's was at 50%
 - d. A final case at which the ingress of IBR's was at 67%The reason for using different levels of IBR penetration in the power system is to determine what impact this has on the power swing slip rate (Hz). The models were run by Ce Zheng from Siemens.
- 3.) During the discussion on the impact on the percentage of IBR penetration on the Out-of-step swing rate and trajectory, Dr. Aboutaleb Haddadi from EPRI offered to do a presentation on the impact of IBR's on the swing rate and the swing trajectory at the next D29 meeting in January.
- 4.) Dr. Aboutaleb will also add a short section to the report that discusses the impact of IBR's on the swing rate and trajectory.
- 5.) The chair went through the report and made the following notes.
 - a. Verify and clean up, and if possible, simplify the equations and sketches in the report.
 - b. The chair and the vice chair will review and finalize section 6 of the report.

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

Chair: Karl Zimmerman

Vice Chair: Ted Warren

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

Working Group D30 met online at 2:20 PM on September 22, 2021 with 38 attendees, including 17 voting members. Thus, quorum was established.

Chair, Karl Zimmerman presided over the meeting. He brought the meeting to order, and showed the agenda, and the most up to date membership information. Vice-Chair Ted Warren recorded minutes, and D SC Chair Bruce Mackie moderated the Chat window.

Sebastien Billaut delivered a presentation on setting recommendations for the resistive reach on quadrilateral elements. The approach takes into account the X reach, relay angle measurement error, and margin. This led to an excellent discussion.

Also, the Chair proposed some significant edits to the tutorial, including reducing the sections on impact of CVTs, CTs, and transformer inrush, and on weak systems with high SIR – mainly since these topics are covered in great detail in related D SC working groups.

Meeting was adjourned.

Propose a single session for 30 attendees for January 2022 with computer projector.

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

Chair: Normann Fischer

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

Did not meet and not expected to meet in January 2022.

D35: Evaluation of Transmission Line Pilot Protection Schemes

Chair: Rick Gamble

Vice Chair: Brandon Lewey

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

Working Group D35 met on Tuesday, September 21, 2021 at 8:00am remotely via WebEx with 23 members and 31 guests.

The WG discussed next steps in bringing the report to completion. References and citations are being provided by the contributing members on their respective sections. Revised figures were reviewed such as the new DCUB and line current differential diagram.

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

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

For the next meeting, WG D35 will need a room for 50 and a computer projector, unless meeting remotely.

Action Items:

- Contributing Members – cite references in respective sections
- Brandon Lewey – revise Members and Contributors page
- Members – review the report and revised diagrams
- Kifle & Billaut – review DCUB logic diagram
- Zahid & Bell – provide example DCUB logic diagram

D37: Impact of Series Compensation on Transmission Lines

Chair: M. Kockott

Vice Chair: Luis Polanco

Secretary: Nuwan Perera

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

D37 met with 23 attendees with 11 members. We have received some writing and review assignment.

We are waiting for one writing assignment to complete all the writing assignments.

Few of us (WG officials/ Norman) have agreed to meet and review the comments before the next meeting (Jan 2022).

- 12th of Oct at 8.00 AM (central time)
- 9th of Nov at 8.00 AM (central time)
- 14th of Dec at 8.00 AM (central time)

Writing Assignments

Section 3.4: Bank unbalanced protection

- Norman to contact Mukesh Nagpal/ BC Hydro
- Mike to contact BPA and PG/E
- Nuwan to contact MB Hydro

Review Assignments

Section 1-3

- Mike/Nuwan to review

Section 4-6

- Norman/ Ritwik to review

Additional Review

- Mike to review D42 for related information
- Norman to follow-up with CIGRE to obtain the report on "Over-compensated transmission line protection"

Avoid conflict with C29, C41, D29, D42, D47, J18, and then, if possible, also D30, D38, J19.

D38: Impact of High SIR on Line Relaying

Chair: Chris Walker

Vice Chair: Greg Ryan

Assignment: Prepare a technical report to the line protection subcommittee to evaluate the impact of high SIR on line protection.

Agenda:

1. Introductions/Signup sheet/roster
2. Review Working Group Membership and Membership Process
3. Approve previous meeting minutes: first – Bruce Mackie second – Ted Warren
4. SIR Presentation by Bogdan Kasztenny
5. Discuss status and progress of report
6. Review writing assignments
7. Review submitted writing assignments
8. Discussion of next steps
9. Adjourn

We met with 48 attendees, 29 Members and 19 Guests.

Chris Walker opened the meeting at 10:20 and introduced himself and Greg Ryan introduced himself as the Vice Chair. Chris advised the working group that we are following the membership requirements of PAR related activities for the membership of this non-PAR related activity.

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

Bogdan Kasztenny presented to the working group on his paper "Settings Considerations for Distance Elements in Line Protection Applications". Bogdan's went over distance element fundamentals both Mho and Quadrilateral. Bogdan's presentation went through several considerations and ended with some recommendations. The paper was published at Georgie Tech and Texas A&M and is also available on SEL's Website. Bogdan also has a paper that he has published on Inverter Based Resources.

Chris reviewed the current status of the report. Chris brought up a discussion on the impact of high SIR on line differential protection. There have not been papers on this topic that we have been able to locate. If the working group is aware of any papers we request you send the information to Chris and Greg so we can distribute for Steve Klecker to review. Our section may just have a statement that it is a non-existent issue with line differential. Our work with this paper will have some effect on the transmission line guide and we are requesting members that are also a member of the transmission line guide update to harmonize the line guide with this paper. We are not planning on bringing sections from the current revision of the line guide but instead update the line guide with details from our D38 report.

Abu Bapary motioned to adjourn, Jack Wilson seconded and we adjourned the meeting at 11:21.

We are currently on draft 0.5.

For the next meeting we request a room for 50 with a projector and avoid conflicts with D43 and D46.

Outstanding assignments requested to be completed by August 1st.

D39: Revise C37.104 IEEE Guide for Automatic Reclosing of Circuit Breakers for AC Distribution and Transmission Lines

Chair: Manish Patel

Vice Chair: Brandon Armstrong

Assignment: Revise C37.104 Guide for Automatic Reclosing of Line Circuit Breakers for AC Distribution and Transmission Lines.

The working group met via a conference call on September 21st, 2021 at 9:10 am CT with 21 members and 28 guests. Quorum was met (based on attendee list provided by WebEx meeting log). Chair presented the IEEE Patent and Copyright policies. The minutes for May 2021 virtual meeting was approved unanimously without objection.

Presiding Officer – Manish Patel

Meetings recorded by – Manish Patel

One of the balloters during an initial ballot requested WG to define “relay” and “protective relay”. The guide already includes a definition for “reclosing relay”. The WG concluded that developing definition of “relay” is outside the scope of this standard. Manish Patel presented definition of “protective relay” which already exists in the IEEE dictionary for inclusion in this guide. This definition is generic and aligns with the use of term “protective relay” in this guide. No one objected with this approach. Manish Patel volunteered to request approval from the I2 WG.

Manish Patel presented addition of new content in clause 4.5.1 which explains why if voltage supervision is not applied correctly, the anti-pump scheme of a breaker may be defeated. Following a brief discussion, WG agreed to this new content. Abu Bapary volunteered to do an editorial review.

Manish Patel presented an update to clause 5.4.1 (Distributed energy resources) based on one balloter’s proposal, which now provides a more complete write-up for this clause. Most of this balloter’s proposal

is included in the latest draft, however, following statements from the proposal are not incorporated as they read as policy statements instead of engineering guidance.

Reducing the performance for the existing customers so that a new generation customer can reduce interconnection cost may not be considered fair to the existing customers whose input is not being made part of this design decision. Also, the performance of circuit being reported to the public utility commission will decline as a result of the change.

One of the comments received with an initial ballot noted that clause 6.3.5 (Multiple-breaker line terminations) does not discuss the difference between recloser per zone versus reclosing per breaker architecture. After brief discussion, it was concluded to add a brief write-up on this topic. Jim O'Brien volunteered to work with Michael Thompson and Rafael Garcia to develop this write-up.

A few more minor editorial/technical edits were discussed. Manish Patel concluded that upon completion of above activities, the draft will be ready for first recirculation.

For the next meeting, D39 will need a room for 60 and a computer projector

D42: Revise C37.113, Guide for Protective Relay Applications to Transmission Lines

Chair: Jeff Barsch

Vice Chair: Rick Gamble

Secretary: Josh Lamb

Assignment: Revise C37.113-2015, IEEE Guide for Protective Relay Applications to Transmission Lines

- g) Officers presiding – Jeff Barsch, Rick Gamble, and Josh Lamb
- h) Officer recording minutes – Josh Lamb
- i) Call to order – Jeff Barsch
- j) Chair's remarks – Copyright and patent slides presented. No issues identified.
- k) Results of call for quorum – Quorum achieved with 25 members
- l) Approval of Agenda (motion and second) – Sebastien Billaut 1st, Chris Walker 2nd.
- m) Approval of Minutes of previous meetings (motion and second) – Alla Deronja 1st, Jörg Blumschein 2nd.
- n) Brief summary of discussions and conclusions including any motions.
 - a. Reviewed and discussed arc resistance calculation
 - b. Reviewed and discussed CVT Transients
 - c. Reviewed and discussed various figures
- o) Action item: Ritwik Chowdhury to provide further explanation of the arc resistance calculation
- p) Recesses and time of final adjournment: Adjourned by Jeff Barsch due to time at 2:16 PM CDT.
- q) Next meeting date and location at January JTCM meetings

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

Chair: Greg Ryan

Vice Chair: Amin Zamani

Secretary: Joshua Hughes

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 that send information at relay speed, 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 virtually on September 22, 2021 at 09:10-10:10AM CST. There were total of 23 attendees in the meeting, 9 members and 14 guests.

Meeting Agenda

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

Summary of Meeting Discussion

- a) Meeting started with the Chair, Vice Chair, and Secretary introducing themselves. Since the attendee list was available and, to save time, no formal introduction was done for the rest of attendees.
- b) The Chair explained the requirements for membership, which is attending 2 out of the last 4 meetings. If anyone is interested to be a member of the WG and contribute, Please email the Chair (gryan2@ameren.com) and/or VChair (amin.zamani@ieee.org).
- c) The officers will take the action to follow up with members and get update on the status of their assigned tasks.
- d) Joshua suggested to update the section numbers (in the assignment list) based on the latest version of the draft (0.1).
- e) The Chair will update the report with the latest submissions and send out the latest draft for review.
- f) The Chair requested confirmation that Juan is still planning to add sections to the current version with regard to the smart grid and microgrid definitions and a short summary on microgrid impacts. Juan committed to having these additions by mid Oct.
- g) The Chair will follow up with Juan on his assignment and will keep Amin in the loop
- h) Bruce Mackie mentioned that the group should be aware of the scope per D subcommittee as some topics could encroach the K substation subcommittee. Expanding the scope would require working with the K subcommittee. The group agreed to keep the scope within D subcommittee (line protection).
- i) Andre Smit requested membership
- j) Dan Nordell offered to provide editorial review
- k) Swagata Das offered to work on the line sensors portion of the report
- l) Adi Mulawarman offered to work on the distance protection and DTT portion of the report
- m) Colleen Konsavage offered to work on the reconfiguration, IBRs and microgrids portion of the report. Colleen and Juan will collaborate on their sections prior to submitting them to the Chair to be incorporated into the current draft.
- n) Jackie Wilson offered to work on the volt/var control portion of the report

- o) The officers will share the assignment table and report scope with the members. People who are interested to contribute should email the officers with the section of their interest.
- p) Reviewer to send their comments/revisions to officers by December 3, 2021. The Chair will remind the members to submit their contribution.

Next meeting we request a room for 30 people with a projector and please avoid conflicts with D38, I47, C38, & C25.

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

Chair: Sebastien Billaut

Vice Chair: Karl Zimmerman

Secretary: Looja Tuladhar

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

Working group D44 Met Wednesday, September 22, 2021, at 3:30 PM central time, via the virtual online WebEx with 62 attendees.

14 were new attendees.

21 voting members were present out of 37 current voting members, so the quorum was met.

2 attendees requested to become voting members.

The Chair, Sebastien Billaut presided over the meeting. He brought the meeting to order and showed the agenda, the IEEE copyright guidelines slide for IEEE working group meetings. 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 May 2021 meeting. Abu Bapary made a motion to approve the May 2021 meeting minute, seconded by Angelo Tempone and approved.

The chair requested the working group members to connect with the assignment team and submit their contributions as a team.

Robert James made an excellent presentation on the Travelling Wave Method that generated live and great discussions.

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

For the next meeting, if face-to-face, we will need a projector and a room for 50.
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

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 2nd meeting of the D45 WG.

D45 WG met on 9/21/21 at 2:20pm CDT.

Attendance = 71

Members = 37 (requested membership through chat/Email)

Bruce has agreed to help with the secretarial work.

Jonathan opened the meeting with the agenda and requested that prospective members submit their membership to D45 in the chat. The team reviewed the minutes from the last WG and approved the minutes. We reviewed the scope and inclusions, exclusions, and open topics.

Scott Hayes led a discussion about how the California utilities are initiating fast tripping on their distribution system. He also led a discussion including the use a excel file that showed all the various topics used in the scope. Through the discussion he requested volunteers to write descriptions of the topics.

The team discussed that we need to avoid making any recommendations or the comparisons between effectiveness of topics. The writings need to be focused on the technical aspects of the topics.

Discussion topics included:

- Fault energy verse clearing time and amount of current
- Communications systems – remote end just opened and remote keying for fast clearing
- Synchrophasor solutions
- Conductor slapping and methods to prevent this
- Covered conductor/tree wire impact to relaying
- Spacer Cable and how this changes the impedance

Volunteers were gathers to write sections and WG leadership will send out the list and request additional volunteers. A couple of additional meeting may be needed prior to the next PSRC in January 2020.

Draft – no draft yet

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

Assignment: To develop a summary paper for C37.230-2007, “Guide for Protective Relay Applications to Distribution Lines”.

Agenda:

1. Introductions
2. Review Completed Writing Assignments for Sections 3, 4, 5, and 6 of the Summary Paper
3. Discuss Next Steps

Minutes:

- The working group met on Wednesday September 22, 2021 10:20 AM CST
- There were a total of 28 people in attendance with 12 members.
- Minutes were reviewed and were approved with no opposition.
- Brian Boysen presented status of summary paper
- Reviewed section 3 of the summary paper provided by Bruce Mackie.
- Reviewed section 4 of the summary paper provided by Juan Gers.
- Reviewed section 5 of the summary paper provided by Qun Qui.
- Reviewed section 6 of the summary paper provided by Josh Lamb.
- Brian will send the current draft out for review and vote by the working group. Reviews to be completed by Nov 1, 2021.
- Brian to schedule a working group virtual meeting prior to January meeting to address working group comments.
- For the January meeting will require a single session and a room for 25 with a computer projector. Avoid conflicts with D38.

D47: Revise C37.243, IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communications

Chair: Alla Deronja

Vice Chair: Steve Klecker

Assignment: Revise C37.243, IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communications.

The WG D47 met with 21 voting members, 2 non-voting members, and 30 guests on Wednesday, September 22, 2021, at the fall virtual PSRC meeting.

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

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

The quorum was met so the WG voted to approve May 5 PSRC, June 9, and August 19 WebEx meeting minutes. Motion: Chris Walker, 2nd: Bruce Mackie.

The chair informed the WG about a development during the project PAR submission process. The communication scheme design in the guide revision’s scope and in the Clause 6 content falls under the scope of PSCCC. It is beneficial to keep the communication design material in the guide and enhance it for the end users to know how to apply this type of protection. If this material were to be separated, the users would have to go through two or more different documents to get the information they need.

Also, coordinating revisions and timing of these documents will become an issue. Therefore, the PSRC and PSCC officers agreed that PSCCC will co-sponsor the guide revision with the PSRC leading the project.

There was a question raised whether a guide can have requirements in it as applications have requirements in order for them to work. Don Lukach clarified that standard guides can have requirements, but if they are documented in a guide, they must be accompanied with thorough explanations of why they are the requirements. We will have to watch the verbiage that may be introduced by the PSCCC team members to follow this practice.

The chair displayed the previously approved Title, Scope, and Purpose for the guide revision. Bruce Mackie made a motion to approve them for PAR submission with PSRC leading the revision and the PSCCC co-sponsoring. Galina Antonova seconded the motion, and there were no objections. The WG asked the SC D to permit the submission of the PAR to IEEE-SA NesCom.

TITLE:

Guide for Application of Digital Line Current Differential Protection Relays Using Digital Communications

SCOPE:

This guide presents line current differential protection using digital communications. Operating principles, synchronization methods, communication channel design, current transformer (CT) issues, backup protection considerations, testing methods, and troubleshooting fundamentals are included. It also provides specific guidelines for various application aspects including multi-terminal lines, series compensated lines, mutually coupled lines, line charging current, in-zone transformers and reactors, single-phase tripping and reclosing, as well as communications technologies.

PURPOSE:

This guide is intended to assist engineers in applying digital line current differential protection using digital communications channels.

The WG chair obtained the comments from the guide's original version IEEE-SA ballot and reviewed them. The WG was able to discuss a couple of them.

One comment was related to the sequence of clauses 4 and 5 in the guide because clause 4 is presently titled *Current differential line protection applications* which appears to be an incorrect and misleading title as the clause introduced the CD function and how it is compared to other line protective functions. The WG agreed that clause 4 should be retitled. The Clause 4 review team [...] will be asked to propose its new title.

Existing subclause 5.3 *Current measurement techniques* is supposed to cover current measurement techniques but includes only Rogowski coils and the IEC 61850 process bus. The process bus is not a current measurement technique; it is technology to allow measurements taken at the source to transfer to relays.

Gustavo Brunello reviewed the Rogowski coil material in Appendix A and believes it has no value. He proposes to remove it. We could just reference a respective report in the guide and write a paragraph to be included in 5.3. The Clause 5 review team will be asked to propose its new title.

Clause 6 review team is asked to come up with the new outline. Any PSCCC members are welcome to the WG to help rewrite the communications related clause 6.

Previously distributed clause review assignments are due to the Chair by December 1, 2021. Please email them to aderonja@atcllc.com.

Clause 4: Dinesh Gurusinghe [lead], Sudarshan Byreddy, Xavier Manel-Ia Pujol.

Clause 5: Jayaprakash Ponraj [lead], Gopal Gajjar, Fred Agyekum.

Clause 6: Galina Antonova, Jörg Blumschein, Steve Klecker.

Clause 7: Bruce Mackie [lead], Qun Qiu, Vamsi Krishna Vasireddy, Kamal Garg, Jim O'Brien.

Clause 8: Sughosh Kuber, Matt Black.

We request a meeting at the PSRC January 2022 meeting. Please avoid conflicts with C31, K22, K31, and I2.

Motion: Working Group D47 motions to Revise IEEE Guide C37.243, IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication with the following Assignment, Scope, and Purpose. The PSCCC will be a Joint Committee in this work contingent upon approval from their committee. The PSRC will be the lead committee in this work.

Motion by Alla Deronja, Second by Gustavo Brunello

Revised PARS:

Proposed Title: IEEE Guide C37.243 for Application of Digital Line Current Differential Relays Protection Using Digital Communications

Output: IEEE Guide, **Project Number:** PC37.243

WG Assignment: Revise IEEE Std C37.243-2015, IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication

Proposed Scope:

This guide presents ~~practical~~ line current differential ~~schemes~~ protection using digital communications. Operating principles, synchronization methods, communication channel requirements design, current transformer (CT) ~~requirements~~ issues, ~~external time reference requirements~~, backup protection considerations, testing ~~considerations~~ methods, and troubleshooting fundamentals are included. It also provides specific guidelines for various application aspects including multi-terminal lines, series compensated lines, mutually coupled lines, line charging current, in-zone transformers and reactors, single-phase tripping and reclosing, as well as communications ~~channel requirements~~ technologies.

Proposed Purpose:

This guide is intended to assist engineers in applying line current differential protection using digital communications channels.

Chair: Alla Deronja

Vice-Chair: Steve Klecker

Members of D-Subcommittee voted to approve with no objection.

DTF48: Investigate the need to Create Report on Single-phase Trip and Reclose on Transmission Lines

Chair: Kamal Garg

Vice Chair: Ilia Voloh

Assignment: Make a recommendation to the D subcommittee whether to form a working group and if the recommendation is to proceed, to develop a recommended assignment for the D subcommittee to consider.

Date: Tuesday, Sep 20, 2021

Time: 3.30 – 4.30 PM (CST)

Venue: WEB Meeting

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

Task Force DTF48 met on Monday, September 20, 2021 at 3.30 pm CST in a single session with 56 attendees. All attendees were considered members of this task force. This was the second meeting of the task force. Task force week seek approval in September PSRC meeting for form a WG.

1. Second meeting of the task force, 56 PSRC members in attendance
2. Assignment was approved by Task force to form a WG group with the abovementioned assignment. Motion by Pratap Mysore and Second by Alla.
3. July 15, 2021 minutes of meeting approved. Motion by Normann Fisher and second by Jonathan Sykes.
4. Proposed outline is attached on second page. Please provide feedback to Ilia and Kamal if there are any questions and comments. (See following page)
5. Presentations by David Jacobson (Manitoba Hydro) and Davis Erwin (PG&E) on SPT. Excellent questions and discussion.
6. Share point sites will be setup for this WG. All the presentations will be available.
7. Single-pole vs single-phase was discussed in D subcommittee meeting. A small group with work to propose recommendations.
8. Adjourn 4.30 PM CST.

Proposed Outline (9/20/2021):

1. General –considerations for SPT&R
 - Faulted phase selection,
 - Arc deionization, shunt reactors
 - Single-phase automatic reclose
 - Phase open condition and effects of unbalance currents
2. Benefits of SPT&R
3. Requirements for SPT&R
 - Circuit breakers
 - Relays, supporting single-phase functionality
 - Integration relays into scheme.
4. Phase selection issues and techniques – different implementations.
5. Series Compensated lines protection and control issues for SPT&R.
 - Single-phase or three-phase bypass.
 - Coordination with series-capacitor bank controls, Automatic or manual insertion.
6. Single-phase open condition
 - Inhibiting functions, which can misoperate during open phase (neutral, negative-sequence, directional etc.)
 - Impedance-based functions issues: phase and ground distance, power swing and out-of-step issues during open phase
 - Resonance and protection issues associate with resonance frequency, effect on the tracking frequency
 - Arming for three-pole tripping if fault during AR dead time occurs
7. Line protection SPT initiation methods
 - Functions capable to initiate single-phase tripping
 - Segregating functions initiating single-phase and three-phase trip
 - Conditions to force three-phase trip
 - Dealing with evolving faults and converting single-phase to three-phase trip
 - Parallel lines and cross-country faults issues
 - Radial and weak-infeed terminal issues, adjacent lines issues
8. Single/three phase Autoreclose initiation.
 - Two-line breakers AR coordination.
 - Two- or three-line SPR relays coordination.
 - Successful reclose (transient fault) and reset.
 - Unsuccessful reclose (permanent faults), lockout and reset.
 - Breaker fail to reclose
 - Adaptive recloser.
9. Single-phase Breaker Failure implementation
10. Application Issues
11. Commissioning issues
12. Examples and Events

Motion: Task Force DTF48 motions to create Working Group D48, Create Report on Single-Phase Trip and Reclose on Transmission Lines, with the following Assignment.

Assignment: Prepare a report focusing on the considerations associated with a single-phase tripping and reclosing on transmission lines.

Motion by Kamal Garg, Second by Steve Conrad

Chair: Kamal Garg Vice Chair: Ilia Voloh

Members of D-Subcommittee voted to approve with no objection. New Working Group D48 is formed

Motion: Motions to create Task Force DTF49, Determine Recommendation on the term Single-Phase Trip versus Single-Pole Trip, with the following Assignment.

Assignment:

Make a recommendation to the D subcommittee whether to form a working group and if the recommendation is to proceed, to develop a recommended assignment for the D subcommittee to consider. If a working group is not formed, make a recommendation regarding the term.

Motion by Ilia Voloh, Second by Pratap Mysore

Chair: Bruce Mackie Vice Chair: TBD

Members of D-Subcommittee voted to approve with no objection.

There were multiple comments and opinions regarding this issue. Chair of D-Subcommittee will decide if TF is needed.

Liaison Reports

T&D Committee / Distribution Subcommittee

The T&D Committee / Distribution Subcommittee meeting was held virtually, 19 -21 July 2021. The next planned meeting will occur during the IEEE Joint Technical Committee Meeting, 10 - 12 January 2022.

The Distribution Subcommittee is comprised of working groups focused on Distribution Reliability, Switching and Overcurrent Protection, Smart Distribution, Distributed Resource Integration, and Stray and Contact Voltages. Most recently the Volt-Var Control and Optimization Task Force has been elevated to a Working Group. Two new working groups have been formed: Distribution Reliability and Distribution Resiliency. Additional information is available from: <https://cmte.ieee.org/pes-dist/>

The following are items of interest to the Line Protection Subcommittee:

Working Group on Smart Distribution <https://cmte.ieee.org/sdwg/>
Sal Martino, Chair Fred Friend, Vice-Chair Kate Cummings, Secretary

P1854: Guide for Smart Distribution Applications.

Scope: This guide identifies and categorizes important smart distribution applications, develops descriptions of the critical functions involved, defines important components of these systems, and provides examples of the systems that can be considered as part of distribution management systems or other smart distribution systems. This guide includes discussion on control, communications, and cybersecurity considerations when deploying smart distribution applications.

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

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

P1885 'Guide for Assessing, Measuring and Verifying Volt-Var Control Optimization (VVO) on Distribution Systems' was balloted and approved. The guide is on the October NESCOM agenda.

Scope: This guide provides practical methods for assessing, evaluating and verifying the benefits and impact of electric power demand, energy consumption and loss reduction of volt-var control optimization on electric power distribution systems.

Purpose: The purpose of this guide is to provide practical methods to estimate and verify the potential energy savings, demand reduction and loss reduction that can be achieved with distribution system VVO methods. This guide establishes uniform methods for distribution system modeling/measurements, load modeling/measurements, and performing assessment studies and pilots to forecast and verify the benefits.

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

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

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

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

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

Scope: This guide provides analytical techniques to assist in the placement of switching and overcurrent protection devices on medium voltage distribution circuits for reliability purposes.

Purpose: This guide provides means and methodologies for proper placement of switches and protective devices to achieve the desired performance characteristics and reliability for medium voltage distribution circuits, including feeder and branch line equipment, with operating voltages up to and including 38 kV. Drivers for device placement, such as reliability and operational considerations are identified. Various types of switching and overcurrent equipment are covered such as: manual switches, automated switches, reclosers, sectionalizers, and fuses. Impacts on reliability and device placement are addressed for factors such as fault rate, interruption duration, exposure miles, customers affected and distribution automation.

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

Old Business

None

New Business

None

General Discussion

None

Line protection operations of interest

None

Adjournment

Motioned by Sebastien Billaut, seconded by Greg Ryan

H: RELAYING COMMUNICATIONS SUBCOMMITTEE

Chair: Aaron Martin

Vice Chair: Hugo Monterubbio

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. Report on new relaying equipment designs tailored to specific communication requirements. Included are matters necessary to the function of such systems employed in the generation, transmission, distribution, and utilization of electrical energy, and their effects on system operation. Control systems include data acquisition and processing from devices such as transducers, Intelligent Electronic Devices (IEDs), and Human Machine Interfaces (HMIs) including the low-level interfaces to these systems. Power System control issues associated with Power System Dynamics are excluded from this scope.

- SC H met on September 23, 2021, via WebEx with 27 members and 50 guests.
- Quorum was confirmed using the WebEx polling functions.
- A vote was also taken virtually with the polling functions to approve the May minutes.

Announcements:

1. New items from September 2020 AdCom Meeting
 - a. January PSRC meetings to be hybrid – Virtual/In-Person. There is an acknowledgement that many companies will only support virtual attendance when the option is offered.
 - b. 123Signup is getting a reprieve. It's under new ownership and is popular with the PES. PSRC officers are asking that WG maintain meeting attendance for the September meeting. New guests in September meeting will not be available to add but will be available from Webex attendance sheets. New guest are being asked to register in 123Signup.
 - c. IEEE Digital Privacy Workshop is being offered October 7-8, 2021.
2. [Digital Privacy Workshop – IEEE Future Directions](https://cmte.ieee.org/futuredirections/events/digital-privacy-workshop/)

- a. New items from Awards and Recognition Meeting:
 - i. Look for large award dinner/reception at first face-to-face meeting.
 - b. New from Standards Coordination Meeting: No meeting
 - c. New items from SC and reminders carried from prior meetings:
 - i. WG officers to attend Standards Coordination meeting
 - ii. SC Members are required to Vote on Reports
 - iii. iMeet space available for Non-PAR WGs. PSRC Officers
3. have organized documents depository for non-PAR WGs
 - i. WG presentations to be reviewed by SC Officers
 - ii. Upon work completion, prepare a presentation to the MC

WG business:

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

The below 3 motions were carried electronically via WebEx voting during the meeting. All three motions were approved electronically.

Motion 1: Working Group H22 motions to adjust the title of their work.

- Proposed Title: Categorizing Security Needs for Protection, Automation and Control Related Data Files
- Output: IEEE Guide, Project Number: PC37.249
- WG Assignment: Develop an IEEE Guide
- Proposed Scope: This guide identifies and categorizes commonly used protection, automation and control related data files based on content, use, and risk of disclosure or compromise. Protection, automation and control related data files include, but are not limited to, files used for configuration, management, and analysis of protection, automation and control systems.
- Proposed Purpose: This guide adds granularity to security practices to precisely categorize security needs without impeding the use or access to protection, automation and control related data files.
- Chair: Amir Makki

Motion 2: Working Group H22 motions to extend the PAR for IEEE Guide PC37.249, Guide for Categorizing Security Needs for Protection, Automation and Control Related Data Files, for 1 year.

- Reason: The group has formed the balloting body and completed the MEC editorial review. The group intends to begin the balloting by October 10th, 2021. The group needs an extension for 1 more year to complete the balloting. In addition to the regular meetings, the group plans to conduct a sequence of monthly meetings over the web to expedite the resolution of the balloting comments.

Motion 3: Working Group H41 motions to extend the PAR for IEEE P1646 Communication Delivery Time Performance for 2 years – end of 2023.

- Reason: H41 usually meets monthly to address outstanding issues. Currently, the member are refining the reference model. Once that is complete all normative table and text need to be aligned with the reference model. This alignment should be complete by the end of 2022 and the draft ready for internal review and submitted for ballot.

WG 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.

- A. Introductions
- B. IEEE Patent slides
- C. IEEE Copyright slides
- D. Approval of previous meeting minutes
- E. Work on summary paper

There were 9 voting members, 1 non-voting member, and 13 guests present.

The technical report Application Testing of IEC 61850 Based Systems PES-TR84 is now finished and has been published. It can be found at: http://www.pes-psrc.org/kb/published/reports/H6_17.6_Application_Testing_of_IEC_61850_Based_Systems.pdf and at Application Testing of IEC 61850 Based Systems (ieee-pes.org)

The working group worked on creating the summary paper by removing sections of the technical report. The working group was able to develop a draft (0.5) that removed sections of the original report up to clause 4.1.

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

Charlie Sufana

H6 Chair

Voting members attending: 9 out of a total of 19 voting members

NAME	AFFILIATION
Charles Sufana	Retired
Jay Anderson	ComEd
Jason Buneo	General Electric
Aaron Martin	Bonneville Power Administration
Daniel Reckerd	Duke Energy
Marcos Velazquez	Doble Engineering Company
Emmoji Vundekari	GE
Quintin Verzosa	Doble Engineering
Austin Wade	SEL

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

NAME	AFFILIATION
Dustin Tessier	Tesco Automation Ltd

Guests attending 13

NAME	AFFILIATION
Peiman Dadkhah	NuGrid Power
David Dolezilek	SEL
Abel Gonzalez	Megger
Byungtae Jang KR	KEPCO
Layne Kratzer	S&C
Thai Li	Beckwith Electric CO
André Melo	SE
Scott Mix	Pacific Northwest National Laboratory
Hugo Monterrubio	Beckwith Electric
Gayle Nelms	SEL
Safety Pepeljak	YRC Companies
Juan Placid	J J Power & Energy Inc.
Bryan Simmons	Nashville Electric Service

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.

WG met on Tuesday 9/22 at 9:10AM with 21 attendees. Meeting minutes are pending to be compiled by the WG officers and will be added to these minutes at a later date.

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 2021

Expected Final Draft: 8.14

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

September 2021, Meeting Minutes:

- The WG met on time with 21 colleagues in attendance. Quorum was established (8 out of 12 voting members attended).

- The Chair informed the WG that thanks to Malia Zaman, our IEEE SA guide, the balloting group has been formed (June 21, 2021) with 72 accepting. The WG has until December 20, 2022 to submit the Guide for vote by the balloting group.
- The Chair briefed the WG on the PC37.249 presentation at the PES annual meeting and showed the power point slides of the summary presentation.
- The WG voted to file a PAR extension request for another year to make sure that the WG has enough time to address the balloting comments. The request was submitted by the SC and approved by the MC and filed on October 12, 2021.
- The WG voted to file a PAR revision request to change the title and all occurrences of the terms protection, control, and automation (PCA) to protection, automation, and control (PAC). The request was submitted by the SC and approved by the MC and also filed on October 12, 2021.
- The WG plans to meet again during the next meeting to begin the review of the balloting process results.

Respectfully Submitted,
Charles Sufana and Amir Makki

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 – 2021 SEPTEMBER 20

MEETING LOCATION AND TIME

Date and Time: Monday, 2021 September 20 (9:00 to 10:00 AM Central Time)
Meeting Location: Web Meeting in Conjunction with the Virtual IEEE PSRC and PSCC Committee Meetings
Chair: Mario Capuozzo
Vice Chair: Benton Vandiver
Secretary: Daniel Sabin
Minutes to this meeting 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 now 2022 December 31.

MEETING ATTENDEES

The following 21 people attended the meeting on May 5. Of these, 8 of the attendees were members of the working group out of a possible 15.

First Name	Last Name	Affiliation	H27 Status
Jörg	Blumschein	Siemens	Member
Mario	Capuozzo	Doble Engineering Company	Chair
Herb	Falk	Outside the Box Consulting Services	Member
Jean-Sebastian	Gagnon	Vizimax	Guest
Shane	Haveron	AMETEK	Member
Theo	Laughner	Lifescale Analytics	Member
Thai	Li	Beckwith Electric	Guest
Deepak	Maragal	New York Power Authority	Member
Aaron	Martin	Bonneville Power Authority	H Subcom Chair
André	Melo	Schneider Electric	Guest
Madhab	Paudel	Eaton	Guest
Wayne	Pawley	SISCO	Guest
S	Pepeljak		Guest
Thomas	Rudolph	Schneider Electric	Guest
Daniel	Sabin	Schneider Electric	Secretary
Charles	Sufana	Consultant	Guest
Benton	Vandiver	ABB	Vice Chair
Jun	Verzosa	Doble Engineering Company	Member
Emmoji	Vundekari	GE Grid Solutions	Guest
Malia	Zaman	IEEE-SA	Program Manager
Byung Tae Jang			Guest

PATENT SLIDES

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

MINUTES FOR LAST MEETING

Not Done Yet: Minutes from the last meeting on March 4 were reviewed and approved.

MEETING DISCUSSION

The working group meeting focused on a review of the latest draft of IEEE PC37.251, which was posted to the working group's iMeet Central workspace at <https://ieee-sa.imeetcentral.com/h27/>.

The chair discussed a comment on the latest draft that requested to add a private namespace to section 4 to support the requirement that any extension outside the IEC standard shall create a "Private Namespace" according to IEC 61850-1-2 Clause 5.1.5. One approach discussed was to make COMSET a "transitional namespace" and to ask IEC TC 57 Working Group 10 for their input.

It was noted that COMSET is more than an ICD file as it stands now, COMSET is also a proposal for some changes in the IEC-61850 SCL that would improve its ability to extend and fully support the COMSET feature set and extend to other non-61850 devices.

This depends upon IEC TC 57 WG10 acceptance and the full benefit of using this work to extend the SCL. Benefits are better support for all 61850 devices and extended support for non-61850 devices and provide a common exchange format for protection & control devices.

The working group next discussed the pros and cons of having COMSET be its own file type because of the overlap between ICD and COMSET, and the suggestion that use cases be provided to clarify when to use an .ICD file and when to use a .COMSET file. The working group agreed by consensus to add a few paragraphs via a use case.

Also, the issue of setting dependencies should be noted up front as to the usage limitations that are known.

Versioning was discussed Herb Falk recommended that ParamRev be used to handle revisions.

Capitalization was discussed. Should we add instruction on how parsers should handle upper and lower case?

ACTION ITEMS

- IEC TC 57 Working Group 10 will be asked for their for their input on whether to propose COMSET as a "transitional namespace".
- Action Item: Michael Häcker will be asked for more details regarding his suggested changes regarding SetMod.
- Action Item: Michael Häcker will be asked to provide more information on the Data Object model that would ease confusion between per unit and percent in settings.

NEXT MEETING

The next meeting of the IEEE PES Power System Relaying & Control Committee will be October 18 and will meet via Microsoft Teams.

CURRENT WORKING GROUP MEMBERSHIP

1. Capuozzo, M. (Chair)
2. Vandiver, B. (Vice-Chair)
3. Sabin, D. (Secretary)
4. Blumschein, J.
5. Falk, H.
6. Haveron, S.
7. Laughner, T.
8. Maragal, D.
9. Verzosa, Q

H30: IEC 61850 User Feedback

Chair: D. Maragal

Vice Chair: A. Martin

Secretary: D. Tessier

Output: User Feedback

Established: September 2014

Estimated Completion Date: Ongoing

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

Reviewed Agenda

Thank you to Mr. Aaron Martin for fulfilling the role of Vice-Chair. Aaron has opted to step-down and will help the transition as acting-Secretary. On behalf of TF, we appreciate all that he has done to establish H30 and creating a channel for IEC 61850 user feedback.

Reminded members of the role of H30 to consolidate, clarify, and disseminate user's feedback to the associated stakeholders, including IEC, IEEE, UCA, vendors, and the like.

Craig Preuss asked what the official status of the group is and for formal procedures and guests.

UCA SCL IOP: November 8 – 12th, 2021 for virtual IOP. https://iec61850.ucaiug.org/2021-22_IOP/default.aspx

What is new with this IOP compared to past IOP? This IOP is broken into two "events". First IOP is virtual SCL IOP focused on SCL tooling, and second IOP is tentatively planned for 2022 in Italy. Call out for witnesses/testers. Contact Herb for more information.

1. Discrepancy of process bus & merging unit terminologies with device capabilities & usage
2. Different terminology is being used to describe process level devices, which are not standardized and is drawing confusion. Using the same terminology to describe devices that have different functionalities makes it difficult to establish a common understanding on device "types" that have different levels of functionality. "Merging Unit" terms is too vague and needs standardization/clarification.
3. IEC 61850-7-500 is a modelling guideline that summarizes these generic terms from a conceptual point of view, however these terms are not associated to any normative requirements. Some common terms in IEC 61850 are SAMU, PIU, BIED, CBC, MU, IED, etc. Jean-Sebastien and Dustin Tessier believe there is need to improve the standard terminology of the IEC 61850 devices within WG10 first, then advocate for adoption by TC38, TC95, TC3, etc. Consistent terminology for "physical device types" should be checked and updated across the core parts of the standard (7-1, 7-2, -6,), as well as Technical Reports such as 7-5, 7-500. The glossary (part 2) should also be updated to capture these standard terms. Action: Submit concerns to UFTF red mine
4. IEC 61869 has defined conformance classes of devices that summarizes different levels of conformance and could be a starting point for discussion for these types of products. IEC 61869 states: Therefore, not all of the models or services defined in the IEC 61850 series need to be implemented in all merging units. The services that are required to be implemented are defined in terms of conformance classes within this subclause 6.903.13.1. The conformance classes are defined using the abstract communication service interface (ACSI) conformance statements specified in 6.903.13.2 through 6.903.13.6, which in turn are based on those in IEC 61850-7-2:2010, Annex A. The conformance classes may be summarized as follows:
 - class a: the minimal set of services required to transmit MU data using sampled values;
 - class b: class a capabilities plus the minimal set of services required to support GOOSE messages;
 - class c: class b capabilities plus services required to implement the IEC 61850 series' information model with self-descriptive capabilities.

- class d: class c capabilities plus services for file transfer, buffered and unbuffered reporting.
5. Could use the concept of IEC 61869 conformance classes to create generic categories IEDs, such as the following. These high-level categories would allow users a simp
 - Type 1A: MMS Client
 - Type 1B: MMS Server (sSrv#, sRp# test cases, etc)
 - Type 1C: MMS Client & Server
 - Type 2A: GOOSE Publisher (sGop#, etc.)
 - Type 2B: GOOSE Subscriber
 - Type 2C: GOOSE Publisher & Subscriber
 - Type 3A: SV Publisher
 - Type 3B: SV Subscriber
 - Type 3C: SV Publisher & Subscriber
 - Type 4A: PTP Slave Only
 - Type 4B: PTP Transparent
 - Type 4C: PTP Boundary
 - Etc.
 6. If adopted, these could then be referenced to abstract test cases in IEC 61850-10 and be referenced on UCA Certificate. This allows users to consistently reference a type of IED to ensure IEDs meet these basic functionalities. If IEC 61869's conformance classes (or the like) are to add-value, they would need to be recognized by IEC 61850-10 and UCA conformance testing so they can be specified as part of the conformance testing process.
 - Should aim to have harmonized terminology of process level devices across TC38 (Instrument Transformers), TC57 (61850/communication), and TC95 (protection), and all other product standards (TC17 – Breakers). IEC 61850 is not a product standard and is meant to compliment product standards such as IEC 61869 (IT), or IEC 62771-3 (HV Switchgear).
 - How to specify a process level device in the most intuitive manner without users having to "cherry pick" each of the relevant requirements from the various standards. This time-consuming and complicated for most power engineers.
 7. Implementation of Mode/Behavior in multiple logical nodes
 - Experience 1: Multiple LPHD's can exist in an IED but can there only be one LPHD per hierarchy. Since multiple roots/hierarchies (GrRef) can exist per IED, so can multiple LPHD.
 - Experience 2: Could not use 3rd party tool to configure MMS client for metering? Why can't a conformance tested IED not have its report configured by 3rd party SCT. Private elements used to create/reserve MMS client/server association. How to avoid? Conformance testing of client, server, and SCL tools need to be assessed.
 - Action: Inheritance of test modes with multiple root LDs/hierarchies and is UCA testing. Submit concerns to UFTF red mine. Should this be part of Redmine Bug 607, or create a new Bug.
 8. Closed meeting at 1:14PM. Follow-up meeting will be scheduled to cover remaining agenda items. Need to capture H30 feedback/response to Redmine Bugs so we can follow-up with action items to UFTF.

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.

The group reviewed the latest draft of the report. Chair categorized the working group tasks into 3 elements:

- Clarifying the definition of all parameters by defining the information with Timing charts, State charts and Characteristics Charts
- Identifying duplicate and missing elements
- Categorizing and representing the signals in more general manner

Past meeting discussions involving various protection functions was summarized, which included Distance, Supervision, Power Swing, Overcurrent, Frequency, and Sequence elements.

The need for nesting was discussed to reduce duplicate parameters. Members discussed the way to represent the parameters in different logical devices instead of using nesting.

The group highlighted the need to describe this in a schematic manner with logical device & nodes to further access the representation.

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

Meeting Minutes September 21, 2021

- Patent Slides presented.
- Introductions held. Add Dan Sabin to the list.
- Quorum was met with 5 / 9 members in attendance.
- Reviewed the PAR.
 - Deadline December 2022.
- Discussion of the standard draft.
- Discussion between Theo Laughner and Anthony Johnson, reviewing comments left on the draft by Anthony Johnson.
- Deletions were discussed, as well as the repositioning of certain sections in the file.
- Galina showed up, and so we went to approve meeting minutes, as we gained a quorum.
- Mario motioned to approve September 17, 2019 minutes, Anthony seconded.
- Tony motioned to approve December 2020 minutes, Mario seconded.
- May 7, 2020 similarly approved, Tony motion, Mario seconded.

- September 2020, similarly approved, Mario motioned to approve, Tony seconded.
- January 2021, Mario motioned, Tony approved.
- May 2021, Tony motioned, Mario seconded.
- Tony motions that at the end of the meeting start with a clean draft, that the chair will produce and then distribute to the team. Mario seconded.
- Theo will take an action item to review the membership roster and clean up based on attendance.
- Discussion moved to sections 5.1/5.2/5.3 regarding the flowchart for decisions regarding the decision process of selecting a database solution.
- Mario transmitted the example DB architecture to Theo for use in Section 4 (Database Application).
- Subsections 4.1 through 4.4 discussed. We need to wrap these sections up by January in order to meet PAR.
- Need help on 4.1 4.3 4.4 and 4.5. From 4.6 onwards, it seems well reviewed and fleshed out.
- 4.9 could use some work.
- Mario brought a discussion about the Introduction and flow of the document. Suggested that Section 3 be expanded to cover more of the database types and their features.
- Then section 4 becomes more or less an application guide.
- Introduction section is empty, but should be easy to fill out.
- Mario suggests that Section 6 be merged in with section 4, and that 7 (performance) be reduced, as it may be too complex for a protection expert.
- Chair held discussion about needing more meetings between now and January. Proposed October 26th Tuesday.
- Mario proposes to offer opinions about reorganization of the document as well as synthesizing.
- Galina offers to look at document structure as well.
- Tony motioned to adjourn. Mario seconded.

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, with 8 members and 5 guests in attendance. A quorum was present. This was the 21th meeting. Attendees introduced themselves and affiliation.

The call for patents was presented – no response.
 The copyright slides were presented.
 The agenda was reviewed and approved without change.
 Past minutes were approved.

Those attending focused on the following topics:

1. Dennis Holstein gave an update on the status of the standard.
2. Dennis will present a proposal to extend the end date of the PAR to the subcommittee.
3. Dennis will send the latest marked copy of the draft Standard to Fred Friend.
4. Dennis Holstein will check to determine if we can use or reference figure from another standard.
5. Dave Doleziak will put together thoughts on new latency tables.
6. Dennis will send out a Doodle pole to determine the best Monday date in Oct and November for the next regular meeting.

Attendee List

Members	
Dennis Holstein, Chair	OPUS Consulting Group
T W Cease	Consultant
Craig Preuss	B&V
Dave Doleziak	SEL
Jun Verzosa	Doble
Malcom Swanson	INIVEN
Eric Thibodeau	Hydro-Quebec
Herb Falk	OTB-Consulting Services
Guests	
Jackie Wilson	Ameren
Roger Ray	PowerComm Solutions
Wayne Pawley	Sisco
Dan Nordell	
Malia Zaman	IEEE

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

Chair: Aaron Martin
Vice Chair: Ralph Mackiewicz
Co-Vice Chair: David Dolezilek
Output: Guide
Established Date: 2018
Expected Completion Date: 2022
Current Revision: 2.1

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

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

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

Dolezilek moved to open meeting, second made but not recorded

Aaron Martin brought the meeting to order and discussed May 4 and July 8th meeting minutes
 Scott Mix moved to approve the minutes
 Karen Wyszczelski seconded
 Reviewed patent slides with no questions
 Reviewed copyright policy with no comments
 Old business – reviewed H44 Assignment 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
 Aaron Martin scrolled through the document draft to which he had applied formatting. He explained how he had organized the contributions and uploaded to the imeet site. He chose the format without macros.
 Aaron Martin Martin explained how he had combined some sections.

Ralph's unfinished work on chapter 5 had been introduced and included. Assignments were made for 5.3, 5.4, 5.5 which Ralph had not completed.
 Jose Ruiz mentioned that he had volunteered to do key words, acronyms, definitions, and references. He was interested to know when the document would be finished enough for him to begin. Aaron Martin said it is OK to begin this bibliography task now.

Karen mentioned that she had not yet completed the last writing assignment that she had volunteered to do previously mentioned 5.3, and 5.4.
 Dave asked about if the document was organized so that LNs are listed in similar section as proposed extensions and he recommended that a few of us review his organization.
 Dave Dolezilek mentioned that he felt that the LN and potential extensions should be organized together and Alex Apostolov agreed.
 Karen mentioned that she has submitted many of concepts for LN extensions to WG10.
 Aaron Martin needs a few people to review it and Dave Dolezilek volunteered.
 Aaron Martin would like to have an organizational review done in the next 30 days plus Karen's contribution. Dave, Jose, and Karen
 Aaron Martin recommended more frequent meetings to begin the edit process and have a final document at end of 2022.

Wayne from Sisco was introduced as a person that can provide the remaining work from Ralphs work station. He will provide previous minutes from the last meeting Ralph attended which was April 2021.
 Aaron Martin plans to get a PAR extension and enter 2023 with a final document and pursue balloting in 2023.

Bharat Nallah asked about the inclusion of IEC 62351 and he and David Dolezilek offered to review the section to see if other standards should be included.
 We asked the contributors of each table and drawing to provide a footnote and acknowledge source and fact that Aaron Martin has permission to use the artifacts. Specifically Dean was asked to confirm his and Herbs artifacts. Dean was not present to comment. Wayne offered permission for Sisco contributions from Ralph.

Alex proposed that we add RGOS and RSV descriptions.
 Emmoji Vundekari volunteered to document an overview of RGOS and RSV descriptions in a similar format as 5.1 and 5.2
 Alex Apostolov mentioned that 90-4 and 90-12 exist and he will further discuss Latency, jitter, and possible path asymmetry. There is a section in chapter 8.2 converging these topics.

Motion to adjourn Alex Apostolov with second by Jose Ruiz

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

Members	
NAME	AFFILIATION
Alex Apostolov	Omicron
Eugenio Carvalheira	Omicron
David Dolezilek	SEL Inc.
Aaron Martin	BPA
Scott Mix	PNNL

Dean Ouellette	RTDS
Jose Ruiz	Doble
Arun Shrestha	SEL Inc.
Karen Wyszczelski	SEL Inc.
Guests	
Andre Melo	SE
Byungtae Jang	Naver
Bharat Nalla	SEL Inc
Emmoji Vundekari	GE
Fernando Calero	SEL Inc
Gayle Nelms	SEL Inc.
Greg Zweigle	SEL Inc.
Hani Al-Yousef	Eaton
Jorg Blumshein	Siemens
Jun Verzosa	Doble
Marcos Velazquez	Doble
Mario Capuozzo	Doble
Matt Black	Sargent Lundy
Michael Cummingham	Powergrid
Mital Kanibar	GE
Nester Casilla	Doble
Nuwan Perera	Earlphase
Rich Hunt	Quanta Technology
Romulo Bainy	University of Idaho
Safety Pepljak	YRC Companies
Shane Haveron	Ametek
Thomas Rudolph	SE
Wayne Pawley	Sisco
Xiangyu Ding	S&C E
Yanfeng Gong	SEL Inc.
Yuchen Lu	EPRI
Yujie Yin	GE

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 # 18 (Sep 22, 2021) Minutes – PSRC Virtual meeting

The WG met on Sep 22, 2021 with 65 attendees including 30 members - 18 of them are voting members (out of 24) and 12 are non-voting members (out of 17).

Chair presided over the meeting and Secretary recorded the minutes of the meeting. Quorum was achieved during the meeting. Chair started the meeting by discussing the IEEE patent policy and other guidelines for WG meetings. No additional comments were received for the minutes of the May 2021 virtual meeting and minutes were approved.

Draft 5.0 of the guide was posted on Sep 22, 2021 in the C37.300 workspace in iMeetCentral. Comments from members are due by Nov 2, 2021, along with informal votes to check the readiness of Draft 5.0 for IEEE balloting.

Chair provided a brief overview of Draft 5.0 for the benefit of members and guests by focusing on the changes from the previous version of the draft (4.0). Changes were based on comments from the review team formed during the January 2021 meeting. Chair discussed updated project plan with IEEE balloting in Q2 of 2022. Request for PAR extension, if required, will be done after the IEEE balloting.

Brief discussions followed on the comments on Draft 4.0, focusing on communication protocols considered in the guide.

WG will meet during the next PSRC meeting.

Sincerely,

Ratan Das Paul Myrda Mital Kanabar

Attendee List

Members	
NAME	AFFILIATION
Ratan Das, Chair	GE Gas Power
Paul Myrda, Vice-Chair	EPRI
Mital Kanabar, Secretary	GE Renewable Energy
Alexander Apostolov	OMICRON Energy
Arun Shrestha	SEL
Austin Wade	SEL
Bharat Nalla	SEL
Bruno Andre	Schneider Electric
Catherine Dalton	EPRI
Craig Preuss	Black & Veatch
Don Ware	Power Grid Engineering
Erin Jessup	SEL
Frank Gotte	NEI Electric Power Engineering
Harsh Vardhan	GE Renewable Energy
Hugo Monterrubio	Beckwith Electric
Jay Anderson	ComEd
Jean Raymond	Hydro-Quebec
Jeff Shiles	Southern California Edison
Joe Xavier	ABB Inc
Jonathan Sykes	SEL
Jörg Blumschein	Siemens
Jose Ruiz	Doble Engineering

Mohammad Dadash Zadeh	ETAP
Raluca Lascu	DTE
Rich Hunt	Quanta Technology
Ritwik Chowdhury	SEL
Robin Byun	Bonneville Power Administration
Sakis Meliopoulos	Georgia Institute of Technology
Vahid Madani	GridTology, LLC
Yuan Liao	University of Kentucky

Guests	
NAME	AFFILIATION
Aaron Martin	Bonneville Power Administration
Abel Gonzalez	Megger
Abu Bapary	AEP
André Melo	Schneider Electric
Bryan Simmons	Nashville Electric Service
Byungtae Jang, KR	KEPCO
Chikashi Komatsu	Hitachi, Ltd
Chris Huntley	SEL
Daniel Freeman	
Daqing Hou	SEL
David Dolezilek	SEL
Deepak Maragal	NYPA
Dustin Tessier	Tesco Group
Eugenio Carvalheira	OMICRON
Evandro de Oliveira	Siemens
Fernando Calero	SEL
Galina Antonova	Hitachi
Gopal Gajjar	IIT Bombay
Greg Zweigle	SEL
Hura	Siemens USA
Jie Ren	
Jun Verzosa	Doble Engineering
Kei Hao	SEL
Konstantin Gerasimov	EPCOR
Krish Narendra	EPG
Madhab Paudel	Eaton
Michael Ritchie	
Mukesh Nagpal	BC Hydro

Robert James	
Safet Pepeljak	
Shane Haveron	AMETEK Power Instruments
Soon-Ryul Nam	
Thomas Rudolph	Schneider Electric
Wayne Hartmann	GE Grid Automation
Yanfeng Gong	SEL

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: v0.51

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 9/22/21 at 13:10 CDT. There were 30 attendees: 16 out of 23 voting members (including 1 new members, Nirmal Nair) and 13 guests, achieving a quorum. Minutes from the meeting in May '21 were approved .

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

Vice chair has completed a reorganization of the document for better grouping of topics and logical flow and uploaded to iMeet Central as version 0.52 shortly. Contributions already received were reviewed are included in this revision. The draft has also been updated to the latest .docm standard template.

There was a discussion over the scope of the document and whether material not specifically mentioned is allowed to be covered. The basis for this discussion is the topic of Lifecycle. This was decided to address as needed throughout the draft and perform a PAR modification at a later date if necessary. Topics of interest are Retro/Modifications to HMIs already in service.

Steve Klecker has requested an assignment. The chair & vice-chair will propose an appropriate topic in need of contribution.

The chair thanked the members who have submitted contributions and pointed out that many sections still require work. As iterated previously, we need to pick up pace to meet the expected timeframe. Monthly web meetings have been proposed and will be pursued by the WG leadership.

Future meetings are:

- January 9-12, 2022
 - Garden Grove, LA
- May 9-12, 2022
 - Reno, NV

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

C Matt Black - Sargent & Lundy
VC Craig Preuss, Black & Veatch
S Shane Haveron - AMETEK
G Adi Mulawarman - Xcel

G Garcia, Rafael
G Hura Masroor
G Joshua Hughes
G Laurel H Brandt
G Madhab Paudel
G Malia Zaman (IEEE SA)
G Miguel Rios (SOCO)

G Ramakrishna Gokaraju
G Thai Li
G Yi
M Anthony Johnson (SCE)
M Charles Sufana
M Dean Ouellette (RTDS)
M Dustin Tessier

M Eric Thibodeau
M Jay Anderson - ComEd
M Jim Bougie
M Jun Verzosa

M Konstantin Gerasimov
M Michael Cunningham
M Nirmal Nair
M Steve Klecker

M Xiangyu Ding
H Subcommittee Host

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.

Short-Summary of minutes:

- H47 met on Tuesday – 30 attendees, with 14 members
- IEC TC95 WG 3 questions on collaborations/engagement
 - Jörg Blumschein to be a liaison between both working groups to share section-2
- Presentations
 - Sampled value aspects with real-time digital simulation environment by Shane Jin & Dean Ouellette
 - Initial view on Sources of discrepancies – PTP & SV by Nicholas Kraemer
- Dean Ouellette and Shane Jin presented Enhanced IEC 61850 Sampled Values Communication using RTDS Simulator & GTFPGA; and agreed to contribute a section in the report
- Continue avoid conflict with H45, C40

- H47 report assignment updates

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

Chair: TBD
Vice Chair: I. Voloh
Secretary: L. Erichsen
Output: Report
Completion:
Current Revision:

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

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

Minutes: The WG met on Wednesday 9/22/2021 via virtual meeting, with 25 attendees (10 members and 15 guests).

1. Attendee introductions were skipped. Attendance list was determined from WebEx Attendance records after the meeting.
2. Gary Stoedter is no longer attending PSRC and stepping down as a chair.
3. Slide covering Guidelines for IEEE WG meetings and Patent Claims were reviewed.
4. Mau WG meeting minutes were reviewed. Motion to approve minutes as written – Tom Dahlin. 10 votes to approve. No objections. Motion carries.
5. Tim Phillippe (GE) gave presentation “Fundamentals of MPLS technology” followed by discussion
6. Ken Fodero (SEL) gave presentation “Channel Performance Considerations for Ethernet Circuits Applied to Teleprotection” followed by discussion
7. Group started discussion on the content of the report. Preliminary proposed content is:
 - a. Teleprotection requirements
 - b. Introduction of the packet-switched technology (high-level)
 - c. Considerations for design of TP over packet-switched network, including PSN technology
 - d. Industry experiences of the TP over PSN implementation
 - e. Commissioning and testing
 - f. Outage processes and procedures
 - g. Experiences & Lessons learned
8. The goal for the next meeting is to have presentation from any working group members with utility experience implementing packet-switched communications for teleprotection.
9. For the next meeting: WebEx Virtual Meeting. Single session.
10. Motion to adjourn – Ken Fodero. Meeting adjourned.

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.

Webex Meeting 22 September 2021, 11:30 – 12:30 CDT [16:30 – 17:30 GMT]. All working group officers were not present. The chair presided over the meeting and Rich Hunt recorded minutes.

A call to order of the meeting was made with 31 in attendance of which 8 are members. Attendance will be recorded in 123Signup.

A quorum was not achieved with 8 out of 20 members present.

Patent slides and Copyright policies were shown and all participants asked to speak up about any patent claims at this time. No claims were offered.

Minutes from the May meeting were not approved and will be emailed for approval.

Presentations:

none

Old Business

The Scope and Assignment was reviewed.

New Business

Submissions to the Document were discussed.

Work was continued reviewing writing assignments, contributors were reminded of their unfinished Assignments.

Review of comments on Draft 1.3b:

- Added some abbreviations
- Open question - NTP: should we include as a reference?
- Added reference to IEEE P1952 Standard for Resilient Positioning, Navigation and Timing (PNT) User Equipment
- Quick review of input for 3.2.

Old writing assignments:

- Inputs to clocks: Jay Anderson - Submitted
- Outputs: The section received from Nicholas Kraemer was reviewed and accepted
- Ya-Shian Li-Baboud contributed to sections 3 and 5 but was not reviewed
- Jeff Dagle contributed to Applications but was not reviewed

Action Items:

- Steve Klecker would like to join the Working Group
- Dean / Jay to consolidate all inputs, make a clean copy, and post in iMeet.

The following writing assignments are in progress (note: from last Minutes).

- Security: Tony Johnson
- Event Logging & Monitoring: Aaron Martin, Jay Anderson, Ya-Shian Li-Baboud
- Testing: Rich Hunt will finish assignment in 2 weeks

New writing assignments:

- Nicholas Kraemer, Ya-Shian Li-Baboud: add a table to list metadata contained in time signals for various protocols in Section 3.1.
- Bharat Nalla – will contribute to open items.
- Revise “some method of communicating configuration” as per Chris Huntley suggestion. Chris will provide content.
- Steve Klecker would like to join the Working Group
- Dean / Jay to consolidate all inputs, make a clean copy, and post in iMeet.

The Draft will be rev'd to 1.4b.

Meeting was adjourned at the scheduled time. Motion to adjourn by Rich Hunt; second by Nicholas Kraemer.

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

<https://ieee-sa.imeetcentral.com/psrcc-h50/folder/WzlwLDEyNTQ5NTk4XQ>

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

Chair: Mark Adamiak

Vice Chair: Pierre Martin

Output: Standard Revision
Completion Date: December 2021
Current Revision: 2010

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

The WG met with 10 members and one observer with the purpose of revising the IEEE C37.239-2010 COMFEDE standard.

Members were:

Mark Adamiak – Chair

Herb Falk

Dan Sabin

Eric Thibodeau

Jean Sebastian Gagnon

Jun Verzosa

Shane Haveron

Thomas Rudolph

Yujie Yin

Zach Makki

Malia Zaman (IEEE Standards - observer)

Discussion focused on suggested changes to the subject standard. The first identified change was to update the referenced standards. With the release of the meeting minutes, a volunteer is hereby requested to perform this task. The second discussion was to define an “optional” file authentication mechanism. This proposal was accepted by all WG members. By copy of these minutes to Amir Makki – chair of C37.249 Guide for Cyber Security for Protection Related Data Files – recommendations from the C37.249 WG are requested for inclusion in COMFEDE as to how to perform this function.

The rest of the discussion focused on a proposal to change the logging of event information from an XML text tag value to a reference number – the reason being that this construct would reduce the size of the file. A follow-up meeting will be scheduled in November to further discuss this proposal.

Given the proposed changes, the chairman changed the completion date of the standard to December 2022.

Mark Adamiak

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

Chair: Amir Makki

Output: Revision of an Existing Standard

Established: September 2021

Expected Completion Date: December 2024

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

September 2021, Meeting Minutes:

The WG met on time, for the first time, with 7 colleagues in attendance. The Chair provided a high level overview of the needed revisions to the standard including use for naming folders and allowing underscore delimiters.

The WG discussed and agreed that the first step is to prepare a PAR to revise the existing standard. A motion to submit a PAR to revise the standard was provided to the SC and approved by the MC.

The WG also agreed to begin advertizing H52 in order to attract membership and officers. The WG plans to meet again at the next PSRCC meeting.

Respectfully Submitted,
Amir Makki

H53 Working Group –Use Guide for Smart Distribution Applications P1854

Chair: Xiangyu Ding

Vice Chair:

Output: Standard Revision

Completion Date: December 2021

Current Revision: 2010

Assignment:

Attendance: 3 Members and 7 Guests

Officer Presiding: Xiangyu Ding

Officer Recording Minutes: Xiangyu Ding

Title: P1854 - Guide for Smart Distribution Applications

Introductions

Call for Patents

Summary of Activities and Discussions

Xiangyu provided joint nature of the working group between H53, P16, and T&D.

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

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

The existing trial use guide document was reviewed with the working group.

Craig explained that joining H53 or P16 does not mean becoming member of the T&D working group, but everyone interested are welcomed to join the T&D working group meetings.

A block diagram created during T&D working group meetings was shared to explain proposed new layout of the revised guide.

Craig explained some of the changes that he proposed to the T&D working group, which does not match the block diagram.

When asked about interest level, three attendees express interests in joining the development of the guide. Two others expressed interest to review the guide.

Future Meetings:

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

Adjourn

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

Meeting Attendees:

- Mark Adamiak
- Amir Makki
- Daniel Sabin
- Deepak Maragal
- Emmoji Vundekari
- Eric Thibodeau
- Aaron Martin
- Jean-Sebastien Gagnon
- Jeff Dagle
- Jun Verzosa
- Kamal Garg
- Murty Yalla
- Shane Haveron
- Yuchen Lu
- Zach Makki

Meeting Proceedings:

The Task Force goal is to review and revise the 2013 COMTRADE PAR for work on a revision to the IEEE C37.118-2013 COMTRADE standard. It was noted that COMTRADE is a dual-logo standard (with the IEC) and that this will be a joint working group with IEC TC95 - which will have to issue a New Work Item Proposal (NWIP) to launch work on a revision. What is unclear is how the IEEE PAR and the IEC NWIP will be coordinated. The relevant chairmen (Adamiak and Yalla) will discuss.

Discussion of the draft PAR Scope and Purpose resulted in the following edited versions:

Scope: (GREEN highlights are additions; YELLOW are deletions)

This standard defines a format for files containing transient waveform and event data collected from power systems power system models, or IEC 61850 Process Bus. The format is intended to provide an easily interpretable form for use in exchanging data. An XML-based format is defined with backward compatibility with the existing formats. Changes have been made in COMTRADE to keep pace with changing technology. As such, it does not make use of the economies available from data encoding and compression that proprietary formats depend upon for competitive advantage. The standard is for time-sequenced data files stored on physical media digital and cloud storage. It is not a standard for transferring data files over communication networks.

5.4 Purpose:

This standard defines a common format for the data files **and exchange medium** needed for the interchange of various types of **fault, event, test,** and simulation data. The rapid evolution and implementation of digital devices for fault and transient data recording, **power quality,** -and testing in the electric utility industry have generated the need for **a changes to the** standard format for the exchange of data. These data are being used with various devices to enhance and automate the analysis, testing, evaluation, and simulation of power systems and related protection schemes during **fault and disturbance conditions triggered or periodic conditions.** Since each source of data may use a different proprietary format, a common data format is necessary to facilitate the exchange of such data between applications. **This will facilitate the use of proprietary data in diverse applications and allow users of one proprietary system to use digital data from other systems.**

There was overall agreement on the above Scope and Purpose. A follow-up meeting will be held in November to get final TF approval on the above and which will also review the Need and Explanatory Notes sections.

The Chair noted that once the PAR was approved and the revision WG formed, the PES TR90/PSRC report on possible upgrades to COMTRADE will be an input document from which the WG could consider change elements.

It was noted that the existing COMTRADE standard will expire (Dec 2023) before the revision is finished. There was a recommendation to re-affirm the current standard and then star the new WG to address revisions. Malia Zaman – IEEE Standards – indicated that the standard would not be abandoned but just listed as out of date. By copy to Malia Zaman, official guidance from IEEE on this point is requested.

Meeting Adjourned.

Action Items:

- Chair will post PAR document which was edited during meeting to WG iMeetCentral
- WG members to review document (Scope and Purpose included in Minutes) and provide comments
- AD-Hoc meeting to be scheduled sometime between now and the January PSRC meetings.

List of Attendees to the H SC Meeting on Thursday September 23, 2021 @ 8AM CST

Aaron Martin (Chair)
Hugo Monterrubio (Vice
Chair)
Dan Nordell
Daniel Reckerd
Charles Sufana
Dennis Holstein

Chris Huntley
BYUNGTAE JANG
Tom Dahlin
Kamal Garg
Jim Bougie
H Subcommittee Host
Theo Laughner

Abu Bapary
Scott Mix
H Subcommittee Host
Jalal Gohari
PSCC2 Host
Safet Pepeljak
Arun Shrestha

Ken Fodero
Shane Haveron
Jim Michaelis - CAI
Jose Ruiz
Gayle Nelms
Deepak Maragal
Alex Apostolov
J Subcommittee Host
Amir Makki
Anthony Johnson
Thomas Rudolph
Jay Anderson
Benton Vandiver
Matt Black - Sargent & Lundy
Dean Ouellette
James Formea
Emmoji Vundekari
DAVID DOLEZILEK
Erin Jessup
Murty Yalla
Randy Hamilton
Jun Verzosa
Wayne Pawley
Craig Hiemenz

Dinesh Gurusinghe
Karen Wyszczelski
daqing hou
Mark Adamiak
Priyanka Nadkar
Tony BELL
Xiangyu Ding
Roger Ray
T W Cease
Ilia VOLOH
Craig Palmer
Craig Preuss
Didier Giarratano, FR
Jörg Blumschein
mital kanabar
Mario Capuozzo
Andre Smit
Galina Antonova
Eric Udren
Eric Thibodeau
Jay Herman
Jean-Sebastien Gagnon
Roger Ray
Ratan Das

Juan Placid
Eugenio Carvalheira
Phillip Langston
Eugenio Carvalheira
Yi Hu
Malia Zaman
thaichong Li
Daniel Sabin
Allen Goldstein
Jack Wilson
André Melo
Luke Erichsen (MEC)
Eric Allen
Motaz Elshafi
Fernando Calero
Jeff Dagle
Marcel Geor
Miguel Rios
Steve Klecker
Faris Elhaj
Gustavo Brunello
Jim van de Ligt


I: RELAYING PRACTICES SUBCOMMITTEE

Chair: Jim Niemira

Vice Chair: Robert Frye

I SC – 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."

1. Welcome and Webex guidelines for meeting
2. Thank guests for attending
3. Many thanks to former members of the I-SC:
 - a. (no new retirements)
4. Welcome to new members of the I-SC:
 - a. (no new members)
5. Clarify some commonly confused issues: Quorum, Majority, Passing a Motion.
6. Determine a Quorum (**34 members** total in I SC)
 - a. Attendance: 28 (min 18 for quorum; YES X or NO)
7. Approval of Minutes of the May 6, 2021 on-line meeting
 - a. Motion entered by: Dood
 - b. Motion seconded by: Uribe
 - c. Motion carried unanimously.
8. Coordination & Advisory Committee Meetings Items of Interest
 - a. Subcommittee Members' status and incoming Officers for September 2021
 - b. Attendees information
 - . 413 Registered for PSRC and PSCCC including ~50 newcomers
 - i. 266 for PSRC plus some for Both

- c. *Future Meetings - all plans subject to change:*
 - . *Trying to get back to In Person meetings.*
 - i. *Jan 2022 – JTCM – Garden Grove, CA – presently planned HYBRID in person and on line*
 - ii. *May 2022 – Reno, NV – in person, possibly Hybrid*
 - iii. *Sept 2022 – Orlando, FL*
 - iv. *May 2023 – Las Vegas, NV*
 - d. Policies and Procedures for: Power System Relaying and Control Committee Working Group – see PSRC Knowledge Base
 - . Three officers: Chair, Vice-Chair, Secretary
 - i. **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.
 - i. 123Signup is still active but could go away at any time. Expected to remain available through end of 2021 until new system in place. PLEASE CONTINUE TO USE 123Signup, BUT KEEP A BACKUP. <https://www.123signup.com/> also there is a navigation link on the PSRC website. Use BCC on email correspondence to maintain confidentiality of user contact information. Attendance roster should contain name and affiliation, but not email addresses, phone numbers, or other contact information.
 - f. For PAR related work, please present the new patent slides and *record in your minutes* whether essential patent claims exist. If there are none, please write this into the minutes. **Do this at every working group meeting.** New **JUNE 2021** slides available and are at <http://standards.ieee.org/about/sasb/patcom/materials.html>.
 - g. Looking for Webinars to publicize our PSRC work products as part of Global Outreach
 - . Availability of WebEx for presentations by IEEE. Every WG that has completed their work is encouraged to present it to the IEEE community through WebEx which will project our work. Please contact Cathy Dalton, Chair of Publicity group or Murty Yalla, Michael Thompson, or Gene Henneberg.
 - h. Looking for presentations for future Main Committee meetings – please contact Jim Niemira.
 - i. The PSRC Committee is international and open to anyone who cares to attend. A protective relaying group has formed in China – 800+ membership – and may in future have a liaison with PSRC. This group had contemplated becoming a regional affiliate of PSRC.
9. Administrative Items
- a. From IEEE-SA: WG/TF Agendas and Minutes: **“The 14-calendar-day rule” – the Standards Association requirement in O&P**
 - b. Procedure for PARs:
 - . All PAR related activities must be approved by the PSRC Main Committee members, although certain activities are now delegated to the Subcommittee
 - i. See examples provided of how to request at the Main Committee – a Working Group Chair makes a motion at the Subcommittee meeting for the SC Chair to create a slide and then send it to the Main Committee Officers for inclusion on the slide set at the Main Committee meeting. The SC Chair reads the motion (s)
- 

PAR Committee
motion_2020-6-18.p
- ii. Create new PAR for new standard – MC
 - iii. Create new PAR for existing standard without major changes to scope – SC; with changes to scope – MC
 - iv. Approval to proceed to IEEE-SA for creation of a balloting body or to proceed to sponsor ballot – SC
 - v. Minor changes to statements of PAR title, scope and/or purpose without change of scope – SC; Changes to PAR scope - MC

- vii. Working group submits to the Subcommittee the new or revised PAR, scope, purpose, minutes of their meeting, attendees, their affiliations, any disagreements are noted in the minutes.
- viii. Actions at SC level (i.e. motions approved or disapproved) are reported to MC; motions requiring action of the full MC are brought to the MC floor by the SC Chair.
- ix. The Subcommittee reviews it, and then the SC Chair **submits the PAR/name/ID number and reason for approval to the Main Committee Secretary to put in the slide deck. The slide is displayed while the SC Chair reads the request to the Main Committee members. A vote is then taken.**
- x. Motion to approve the new or modified PAR is done at the Main Committee meeting (or if done at the SC, will be reported to the MC by the SC Chair).
- xi. PSRC Committee is the Sponsor
- xii. myProject™ Volunteer User Guide – good stuff
https://mentor.ieee.org/etools_documentation/dcn/11/etools_documentation-11-0014-MYPR-myproject-user-guide.pdf
- 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 Robert Frye 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 *January 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 Robert Frye ***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 Robert Frye at: rmfrye@tva.gov – **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.

- i. Awards Ceremony will be at Monday night reception dinner for all future PSRC Meetings in May and September. Please consider this when making travel arrangements. Don't miss the opportunity to recognize your colleagues or to be recognized yourself!
- m. Reports/Paper Final Output – To be considered for PES level award the output of all Working Groups with a Technical Output including Technical Reports, Transactions / Journal and conference papers must be completed in PES Format and submitted and posted in the PES Resource Center. Final Draft of PSRC Reports, without PES Resource publication number or cover will also be posted to PSRC Website.
- n. Links to PES:
- PES Technical Resource Center: <http://resourcecenter.ieee-pes.org/>
 - PES Technical Activities Resources and templates: <https://www.ieee-pes.org/technical-activities/committees/resources>
 - PES - Technical Report Template: https://www.ieee-pes.org/images/files/doc/tech-council/PES-Technical-Report-Template_Jan_2019.docx
 - PES - Technical Paper Template: <https://www.ieee-pes.org/templates-and-sample-of-pes-technical-papers>
 - PES Resource Center Submission Checklist with instructions on how to get your report or Paper submitted please use this link: http://ieee-pes.org/images/files/doc/tech-council/Submission_Checklist_PES_Resource_Center.docx

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

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

WG/TF #	Name	Spokesperson
I2	Terminology Review	Mal Swanson
I4	International Standards Development	Eric Udren
I26	Review and Expand Transaction Paper on Mathematical Models of Current, Voltage, and Coupling Capacitive Voltage Transformers	Mike Meisinger
I29	PC37.110 - IEEE Draft Guide for the Application of Current Transformers Used for Protective Relaying Purposes -- Revision of C37.110-2007	Michael Higginson
I30	PC37.235 - IEEE Draft Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes -- Revision of C37.235-2007	Robert Frye
I31	P1613 - Standard for Environmental and Testing Requirements for Devices with Communications Functions used with Electric Power Apparatus -- Revision of 1613-2009	Brian Mugalian Jerry Ramie
I32	A Survey of Protective System Test Practices	Andre Uribe
I33	Review of Relay Testing Terms	Scott Cooper
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
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.	Brian Mugalian
I47	Review and revise: IEEE C37.231-2006 - IEEE Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control.	Amir Makki
ITF48	Review and determine need of revision for: C37.103-2015 - IEEE Guide for Differential and Polarizing Relay Circuit Testing.	Mohit Sharma

I2: Terminology Review

Chair: Mal Swanson

Vice Chair/Secretary: Fred Friend

Output: Terminology recommendations to working groups

Established Date: circa 1995

Expected Completion Date: on-going

Draft: N/A

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

The virtual WebEx meeting was called to order by Mal Swanson, Chair at 4:40 pm (Central Time) on September 22, 2021 with Fred Friend, Vice-Chair recording minutes with 16 in attendance. Quorum was achieved with 9 of 12 members present. The minutes from May 2021 were reviewed with no corrections provided, Claire Patti motioned for approval and was seconded by Alla Deronja, and unanimous approval was given. The agenda was approved.

Updates were given on of each of the assignments. The working group discussed a few definitions from C37.104 and C37.300. Discussion regarding which standard developed the definition when multiple definitions exist. Mal suggested it would generally would be the oldest one.

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

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

Words from approved Standards and Guides with a Section 3 (Definitions) have been incorporated into the IEEE database. An alphabetical listing of the words not in the database, but useful to the PSRC is posted on the web site under "TERMS" link under the "Knowledge Base" tab.
The meeting was adjourned at 5:35 pm (Central Time)

I4: International Standards Development Working Group

Chair: Eric A. Udren

Vice Chair: Normann Fischer

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

Established Date: 1990

Expected Completion Date: Meetings are continuing.

Assignment: Develop comments and votes for USNC of IEC on TC 95 (Measuring Relays and Protection Systems) standards projects and drafts. Report to PSRC on IEC Standards development. Chair Eric Udren called the virtual meeting to order at 3:30 PM CST on May 6, 2021 using PSRC WebEx platform. A total of 17 attended the meeting, including 8 members.

- May 2021 minutes were reviewed with no comments or changes.
- The Chair gave an update on SC 8A/89/CD, IEC TR 63401-4 ED1: *Behaviour of Inverter-Based Resources in Response to Bulk Grid Faults*. We had developed USNC comments with P2800 leader Manish Patel and submitted on 9/10. Further discussions with SC 8A USNC leaders showed that there has been substantial US participation and contribution to this large-scale document led by a Chinese secretariat, but that continuing input from US experts will be beneficial and that there are still gaps in this early draft. Ryan Quint of NERC is an SC 8A participant. There will be more opportunities for commenting in upcoming drafts.
- TC 95 was seeking experts for new project for Part 216-3: *Digital Interface - Requirements for protection data exchange interfaces*, aimed at teleprotection data interfaces beyond IEEE C37.94 which is a SONET starting point but needs more channels and layers. The proposal to the National Committees was questionably worded. The required 5 nations had supported the project, but not enough proposed experts, and Canada had voted negatively due to the wording of the proposal. This vote failed, but the US and Canadian representatives (Eric Udren, and Gustavo Brunello with Dustin Tessier for Canada) are to work with the Austrian convenor to fix the project description so that a new voting cycle can be conducted. The US and Canada are to offer experts to participate in this next round of NP project initiation voting.
- A new TC 95 Ad Hoc WG is starting for HVDC protection – US had nominated 4 participants. Geraint Chaffey (BE) has been approved as the convenor and Yang Yi (CN) as co-convenor. More experts are sought.
- A new TC 95 Ad Hoc WG is starting for traveling wave protection and fault location – US had nominated 4 participants. Dr. Xinzhou Dong (CN), an expert known to US participants, has been approved as convenor for AHG 4. More experts are sought.
- TC 95 wants to start the JWG for the 60244-24/C37.111 IEC-IEEE dual-logo COMTRADE revision. The H35 report proposing the new technical requirements is being supplied as part of the joint project initiation.
- TC 95 WG for 60255-216-1 – *Requirements for relays with digital I/O* – the IEC WG had proposed joint work with PSRC H47 on the same topic. The PSRC WG has designated Jeorg Blumschein as Liaison and the groups are developing one common document section, per H47 Chair Mital Kanabar.
- 95/410/RVC 60255-187-1 Functional requirements for differential protection – *Restrained and unrestrained differential protection of motors, generators and transformers*– FDIS has been accepted and this standard is being published. The US had multiple inputs on drafts.
- 60255-187-2 – *Functional standard for busbar differential relays* – still in early stages of drafting; no forecast for first CD yet.
- 60255-187-3 – *Functional standard for line differential relays* – CD is under development with PSRC inputs. Normann Fischer reports some pandemic-induced development delay.

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: 2012

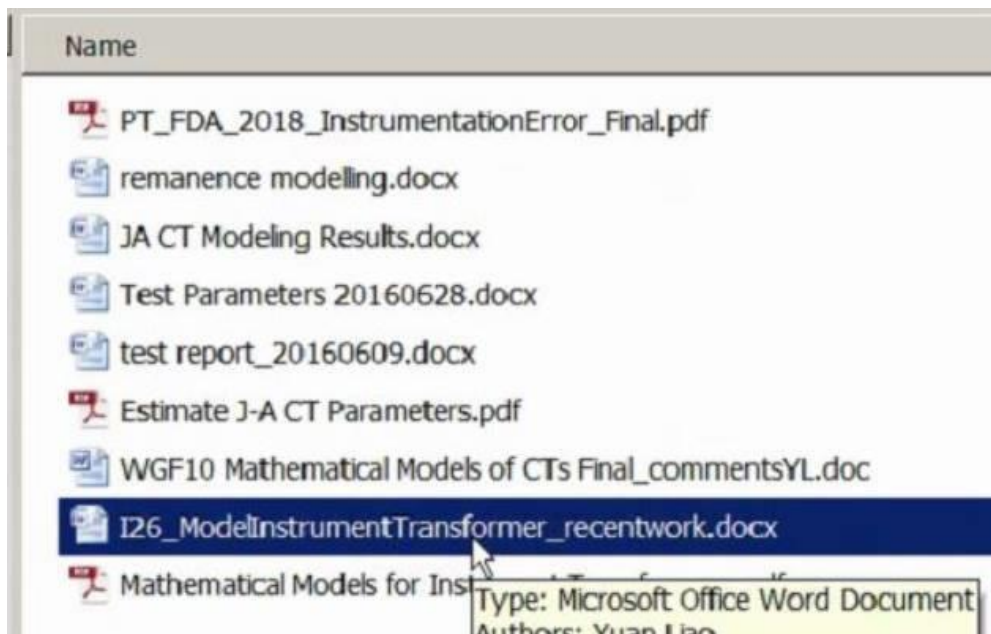
Expected Completion Date: 2022

Draft: 2

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

- r) Officer presiding – Mike Meisinger
- s) Officer recording minutes – Steve Turner
- t) Call to order – Mike Meisinger
- u) Chair's remarks – Begin the report.
- v) Results of call for quorum – Not applicable
- w) Approval of Agenda – Not applicable
- x) Approval of Minutes of previous meeting – Not applicable
- y) Begin drafting the report.
- z) Action Items:

Amir has sent the documents to Mike and Mike has placed them in a share file site on the IEEE PSRC website. Instructions are provided below how to access these documents.



Writing assignments have been tasked as follows: steven.turner@aps.com

- JA CT Modeling Results – Jim Van De Ligt
- Recent Work - Federico Lopez
- Remanence Modeling & Mathematical Models – Steve Turner
- JA Model Parameter Estimation - Athula Dayanart Rajapaske
- Test Report – Amir Makki
- Instrumentation Error – Professor Sakis Meliopoulos
- Mathematical Models of CTs Final Comments - Steve Turner

Still to be assigned:

- Annexes -
- Test Parameters -

Steve Turner will reach out to past participants to see if they are willing to accept the two remaining writing tasks and contact those not present who have volunteered for writing assignments (names appear above in red).

HOW TO ACCESS DOCUMENTS

Go to IEEE PRSC website (<https://www.pes-psrc.org/>)

Go to Knowledge Base (top right of home page):



Power System Relaying and Control Committee



Home Meetings Subcommittees Membership Knowledge Base

Scroll down to PSRC Sharefile Site and click on the link to the page:

PSRC Sharefile Site

File sharing site for non-PAR related needs.

PSRC Sharefile Page

There is a video about the Sharefile Page

Short video about the PSRC Sharefile

Scroll down to the link to the external PSRC Sharefile site:

Link to external PSRC Sharefile site

PSRC Sharefile Link

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

Michael Higginson presided over this meeting and recorded the minutes. The meeting was called to order on Tuesday, May 4, 2021 at 9:10 AM CDT. The meeting was conducted via WebEx. The meeting had 27 attendees, including 6 members and 21 guests. The working group did achieve quorum. The meeting minutes for our September 2020 meeting were reviewed. Will Knapek moved to approve the minutes, and Jim Niemira seconded the motion. The September 2020 minutes were approved without objection. The meeting minutes for our May 2021 meeting were reviewed. Will Knapek moved to approve the minutes, and Jim Niemira seconded the motion. The May 2021 minutes were approved without objection.

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

The working group PAR is through December 2021. Considering our status, the working group voted to request an extension for one additional year. Mal Swanson made a motion to extend the PAR, and Will Knapek seconded the motion. The motion passed with no objections.

Michael provided an update to the working group on the status of our work and planned next steps.

Since the May 2021 meeting, Michael has completed integrating everyone's technical ballot comment resolutions in the spreadsheet and resolved most open editorial comments.

The working group discussed ballot comment resolution.

- The definition of "Accuracy" was removed, as aligning with the IEEE dictionary required a non-application-specific definition and we have a dedicated section on accuracy.
- Duplicate content between 6.2.4 and 8.2.4 were eliminated, with references added.
- Word usage, particularly of the words "should" and "must" were discussed. Michael Higginson will address this in follow up discussions with Jim Niemira and Don Lukach.
- The use of a caution box in section 5.5. was discussed. Jim Niemira volunteered to edit the proposed revisions.
- WG leadership will reach out to Malia about IEEE SA support for figure and equation clarity as well as document template work

The above action items are requested **within the coming four weeks.**

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

Jim Niemira motioned to adjourn, and Mal Swanson seconded the motion. The working group adjourned at approximately 10:10 AM CDT.

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

No meeting was held. The document is in the final IEEE approval process.

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

Chair: Brian Mugalian

Vice Chair: Jerry Ramie

Secretary: Craig Preuss

Output: Standard

Established Date: 05-Feb-2016 (PAR approval date)

Meeting Date: September 21, 2021

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

Draft: 2.1

Assignment: Revise 1613

- a) Officer presiding: Brian Mugalian
- b) Officer recording minutes: Craig Preuss
- c) Call to order, approximately 8 am central time
- d) Chair's remarks, general welcome
- e) Results of call for quorum: 8 of 16 members in attendance
- f) Approval of Agenda: N/A
- g) Approval of Minutes of previous meetings: no quorum
- h) Patent slides were shown, no claims were made.
- i) Copyright slides were shown.

- j) Results of the electronic vote on draft 2.0, only 6 affirmative votes received. Action item: chair to contact members to let them know the vote did not achieve more than half of members responding.
- k) Comments from votes were added to the draft and updated to 2.1.
- l) Hani requested membership. Action item: chair to convene an officer meeting to review voting membership.
- m) Bi-weekly work sessions will be set up from Oct 5 – Nov 2 to go through comments and resolved them. Action item: secretary to set up work sessions.
- n) Draft 2.0 was reviewed and updated to draft 2.1.
- o) No items reported out of executive session
- p) Recesses and time of final adjournment, approximately 9 am central time.
- q) 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
Chris Huntley	Schweitzer Engineering Laboratories, Inc.	Guest
Claire Patti	Portland General Electric	Voting Member
Craig Palmer	PowerComm Solutions	Guest
Craig Preuss	Black & Veatch	Secretary
Eric Udren	Quanta Technology, LLC	Guest
Gerald Ramie	ARC Technical Resources	Vice-Chair
Hani Al-Yousef	Eaton Corporation	Guest
James Niemira	S&C Electric Company	Guest
Jay Anderson	ComEd - Exelon Corp.	Voting Member
Jay Herman	Electric Power Research Institute	Guest
Jeffrey Pond	National Grid	Guest
Louis Garavaglia	G&W Electric Co.	Guest
Malia Zaman	IEEE	Guest
Michael Dood	Schweitzer Engineering Labs	Voting Member
Michael Meisinger	S&C Electric	Voting Member
Roger Ray	PowerComm Solutions, LLC	Guest
Thomas Rudolph	Schneider Electric GmbH	Voting Member
Travis Mooney	SEL	Guest
Zitao Wang	S&C Electric Company	Guest
Byungtae Jang, KR		Guest
dervis tekin	Hubbell Power Systems	Guest
Marcel Geor	Tekron	Guest

I32: A Survey of Protective System Test Practices

Chair: Andre Uribe

Vice Chair: Will Knapek

Secretary:

Output: Report

Established: 05/2015

Expected Completion Date: 01/2023

Assignment: To review report prepared by working group I11 in 2001 called “Survey of Relaying Test Practices” and update the survey accordingly to today’s industry environment.

Draft: Ver 1.0

- a) Officer presiding: Andre Uribe, Vice Chair
- b) Officer recording minutes: Will Knapek, Vice Chair
- c) Call to order. 1:10pm
- d) Chair's remarks
- e) Agenda items: Reviewed four "qualifying questions" with our members and guest for final approval.
 - a. Are you employed by an electrical utility or a supplier/contractor entity?
 - i. Continue or disqualified
 - b. Is your employer located within North America?
 - i. Continue or disqualified
 - c. What State or Province is your electrical utility system located in?
 - i. Drop down selection
 - d. Are you able to represent your utility relay protection department?
 - i. Continue or disqualified
 - e. If disqualified: A thank you message will be illustrated along with a request to forward the survey to a utility person that can represent the utility relay protection department.
- f) Recesses and time of final adjournment: 1:25pm Central
- g) Next meeting date and location: TBD

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: 9/21

Draft: 2.0

Assignment: Review the various definitions of relay testing terms and develop a Report with formal definitions in order to help eliminate any confusion. The Report will also be used by I2 for inclusion in the IEEE dictionary.

- a) Officer presiding-Scott Cooper
- b) Officer recording minutes-Scott Cooper
- c) Call to order- 09/20/2021 12:30 EDT
- d) Chair's remarks- Current membership adjusted to reflect members voting on the latest draft. Review of project status.
- e) Results of call for quorum: 7 guests, 3/5 members present
- f) Approval of Agenda (motion and second)-NA
- g) Approval of Minutes of previous meetings (motion and second)-NA
- h) Summary of discussions and conclusions including any motions
 - a. Reviewed procedure for submittal of the draft to the I-Subcommittee for approval
- i) Action items
 - a. Submit report final draft to members via email for approval
 - b. Respond to any action items from the committee
- j) Items reported out of executive session (if such sessions have occurred)-NA
- k) Recesses and time of final adjournment (if different from our published face-to-face meeting agenda) 04/29/2031 12:50 EDT
- l) Next meeting date and location (if different from our published face-to-face meeting schedule) January 2022, TBD

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

Chair: Mike Dood

Vice Chair: Marc Lacroix

Output: Standard

Established Date: January 2016

Expected Completion Date: September 2021

Draft: 0.7

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

The working group did not meet.

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

Output: Standard

Established (month/year): September 2017

Expected completion date (month/year): December 2022

Date and Location of Meeting: September 22, 2021, WebEx, The World Wide Web

Chair (or Presiding Officer): Chase Lockhart

Recording Secretary (usually, the Vice Chair): Mat Garver (absent)

Meeting Participants:

<u>Name</u>	<u>Affiliation</u>	<u>Voting Status</u> (voting member, non-voting member, guest)
Chase Lockhart	Leidos	Chair
Gerald (Jerry) Ramie	ARC Technical Resources Inc.	Voting Member
Hani Al-Yousef	Eaton	Guest
Suresh Channarasappa	Westinghouse Electric	Guest
Tapan Manna	Burns and McDonnell	Guest
Roger Ray	Power Comm Solutions	Voting Member
Tony Bell	Ametek	Voting Member
Malia Zaman	IEEE SA	Guest
Peiman Dadkhah	NuGrid Power	Guest
Craig Palmer	Power Comm Solutions	Voting Member
Brian Mugalian	S&C Electric Company	Guest
Thomas Rudolph	Schneider Electric GmbH	Guest
R. Ramos	Southern Company	Guest
Jeff Pond	National Grid	Voting Member
James Niemira	S&C Electric Company	Guest
Andre Smit	Siemens	Guest
Dervis Tekin	Hubbel	Guest
Louis Garavaglia	G&W Electric Co.	Guest
Matt Black	S&L	Guest
Roger Whittaker	Self Affiliated	Guest

Time called to Order and Chair's remarks: The meeting was called to order at 12:30 Eastern Time and introductions were made.

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

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

With 4 members in attendance, quorum was achieved.

Approve minutes of previous meeting: May 2021 minutes

Motion by Tony Bell Second by: Jerry Ramie. Approved by all, motion carried
Approve the meeting Agenda:

Motion by Tony Bell Second by: Jerry Ramie. Approved by all, motion carried

Topics discussed:

- Opened invitation for balloting pool
- Submitted final draft for mandatory editorial review
- Submitted for PAR extension for 2 years

Times of any recesses and time of final adjournment: Motion to adjourn at 12:54 first by Tony Bell, 2nd by Jerry Ramie. Approved by all, meeting adjourned.

Date, time, and location of next meeting: January, 2022

I-37: PC37.90, Standard for Relays, Relay Systems, and Control Devices used for Protection and Control of Electric Power Apparatus – General Requirements and Tests

Chair: Marilyn Ramirez

Vice Chair: NA

Output: Standard

Established Date: 2018

Expected Completion Date: 2021

Draft: 2.0

Assignment: Revision of C37.90 Standard for withdrawn in 2021. PAR Expiration 31-Dec-2022

Meeting Participants: Name	Affiliation	Voting Status
Marilyn Ramirez	Qualus Power Services	Chair
Todd Martin	Basler	Voting Member
Angelo Tempone	Duke Energy	Voting Member
Brian Mugalian	S&C Electric	Guest
Jeffrey Pond	National Grid	Guest
Jim Niemira	S&C Electric	Guest
Dolly Villasmil	Power Grid Engineering	New Voting Member
Hani Al-Yousef	Eaton	New Voting Member
Vaidy Ramasethu	Guest	
Travis Mooney	SEL	New Voting Member
Roger Whittaker	Guest	
Tony Bell	Ametek	Voting Member
Craig Palmer	Power Com Solutions	Guest
Malia Zaman	IEEE SA	Guest

- Officer presiding: Marilyn Ramirez
- Officer recording minutes: Marilyn Ramirez
- Chair's remarks, general welcome
- The meeting had 4 members (out of 7) and 10 guests in attendance. Quorum was met.
 - September 2020, January 2021 & May 2021 Meeting Minutes were sent via email and approved at the meeting.
 - Three new members joined the WG.
- Patent Slides were shown, no claims were made. Copyright slides were shown.
- Approval of Agenda: N/A
- Latest draft with proposed changes, including updates to harmonize with IEC were reviewed.
 - Members will re-visit and review the latest draft and will advise of any other input.
- New Assignments
 - Travis – Table 2 & Editing Support
 - Todd – Table 7 & 8 Input
 - Hani – Review draft and share input

- Marilyn – Follow up with Dave – Table 4 (not in attendance)
- Final adjournment, approximately 10:10 am Central Time. Motion by: Tony Bell; Second by: Todd Martin

I38: IEEE Standard PC37.92 IEEE Draft Standard for Analog Inputs to Protective Relays From Electronic Voltage and Current Transducers

Chair: Ritwik Chowdhury

Vice Chair: Eric A. Udren

Output: Standard

Established Date: January 2019

Expected Completion Date: September 2022

Draft: 4.2

Assignment: To revise and update C37.92

WG I38 met on September 22, 2021 at 8 AM CDT by PSRC WebEx virtual platform.

The Chair and Vice Chair introduced themselves. 6 members were identified to comprise a quorum. The Chair reviewed IEEE standard patent slides, meeting participation rules, and copyright slide.

Rich Hunt moved to approve May minutes; Hugo Monterrubio seconded.

Ritwik began a review of Draft 4.2 with latest additions. Specific review highlights:

- Ritwik pointed out new switchgear application figure replacing previous borrowed vendor figure.
- The new document title – Draft Standard for Low-Energy Analog Interfaces between Protective Relays and Power System Signal Sources - will need PAR revision that the WG needs for scope and schedule reasons as well.
- Eric Udren volunteered to edit 1.2 Purpose – tighten wording.
- The new term for source devices to be used throughout the draft is *Low Power Instrument Transformer or LPIT*, as given in IEC TC 38 Glossary 61869-99 (2021).
- Peiman Dudkhah volunteered to review for other terms in 61869-99 (2021) Glossary for instrument transformers. Hugo Monterrubio will help.
- Eric will generate a straw man draft for Clause 5.9 on Physical Length (of interconnections for various applications).
- Eric, Veselin Skendzic, Mat, and Hugo are to discuss offline the Clause 5 HZ client device input impedance value of 2 Mohm that appears in existing IEC TC 38 standards vs. 1 Mohm or 10 Mohm as widely used in North American practice. An idea not yet accepted is to make 2 Mohms normative with other region-specific values permissible with a statement of the non-standard value from manufacturer.
- Eric is to clarify the confusing wording in Clause 5.4 explaining required common-mode rejection ratio (CMRR) required level.
- Veselin and Peiman are to clarify requirements in Clause 5.6 on bandwidth and transient response.
- In Clause 5.6, the rated frequency range of 45 to 65 Hz should be changed to rated frequency plus or minus 5 Hz, so a product specifically for 50 Hz or for 60 Hz need not maintain specifications over a 20 H range.

WG I38 will start with on-line meetings between PSRC sessions to accelerate development.

I40: IEEE Std. 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

Chair: Roger Whittaker

Vice Chair: Todd Martin

Established: September 2018

Output: Review for revision IEEE C37.90.1

Expected Completion date: Dec 31, 2022

Assignment: To determine if IEEE C37.90.1 – Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus should be revised.

Task Force I40 met on Wednesday, September 22n at 1:10 pm central time in a single session. A quorum was achieved with 9 of 13 voting members present. Additionally 21 non-voting members and guests were in attendance.

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

The agenda was reviewed and approved. The motion was made Jerry Ramie and seconded by Suresh Channarasappa

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

A motion was to add 100Khz repetition rate to the Fast Transient Test. The motion was made by Jerry Ramie and seconded by Suresh Channarasappa. There was considerable discussion.

Discussion for included:

- Fast transient type threats in real world includes up to and beyond 100khz
- Modern test equipment is easily capable of doing this test
- IEC 61000-4-4 identifies
- Some felt this is not much additional work

Discussion against included:

- No evidence that lack of test is resulting in problems in power system equipment now
- IEC 60255-26 does not require test
- IEC only requires it as an "OR", not an "AND"
- Testing will add cost to products
- Environmental testing is expensive now. Adding more without identified issue a concern.

Motion was put to a vote. Nine voting members present, 5 voted in favor, 3 against, and 1 abstain. Motion was passed. The 100khz repetition rate will be added.

Jerry Ramie made a motion to change PAR so that "Surge Withstand Capability (SWC)" was changed to "Surge(Switch) Withstand Capability (SWC)". A couple of minutes was given and no second was made to the motion. The motion was not move forward and no further discussion about it was held.

Todd Martin will update section 4 for 100khz addition. Todd will also confirm section 5 and annex B is ok as is.

Roger identified that he has not received clause 7. He will follow up with David M.

Roger identified that he has not received clauses 8,9, or 10. Travis said these were completed, and thought they had been submitted. He will be following up.

Section 9 may have changes coming. Steve Turner will be calling a meeting to work towards harmonizing acceptance criteria

Annex F has been updated

Annex G and H included in existing form with no changes needed

Hani voiced concern again about the addition of 100khz. Since it had been voted on and passed by working group no further discussion was had.

Jerry made motion to adjourn meeting.

Meeting was adjourned.

I41: IEEE Std PC37.90.3 - Draft Standard for Electrostatic Discharge Tests for Protective Relays

Chair: Steve Turner

Vice Chair: Dan Ransom, PE

Secretary: (open)

Output: Standard

Established Date: September 22, 2020

Expected Completion Date: January, 2022

Draft: 1

Assignment: Revise and update C37.90.3, IEEE Standard Electrostatic Discharge Tests for Protective Relays

1. Officer presiding

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

2. Officer recording minutes

Chair Steve Turner recorded the minutes in this document.

3. Call to order

Chair Turner called the meeting to order at 10:20 a.m., Central Daylight Time, on September 21, 2021.

4. Chair's remarks

Chair Turner welcomed all to the online meeting, hosted by Mr. Frye. Chair Turner mentioned that we need to update I-41 to match IEC 16.13.

5. Results of call for quorum

The quorum check established that a quorum was present.

6. Approval of Agenda (motion and second)

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

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

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

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

Chair Turner stated that the work will go to ballot soon. The voting needs to show at least 75 percent approval.

The standard should stipulate that tests are in both plus and minus polarities, at the voltages specified in Table 1—Test levels, for both contact-discharge and air-discharge test voltages. Then the standard will be similar to IEC 61000-4-2.

Important points in harmonizing the standard include the following:

During the test:

- No erroneous output or loss of output shall occur
- No system reset or time out of watchdog timer is allowed
- Transient false operation of output contacts or alarm contacts for any duration is not acceptable
- Transient false operation by indicators is acceptable

After the test:

- The equipment shall comply with the relevant performance specifications
- No component failures are allowed

Various working groups will reconcile acceptance criteria (discuss with other WG chairs in an upcoming meeting)

9. Action items

AI4: Chair and Vice Chair to attend reconciliation meeting and report.

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

There was no executive session.

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

Chair Turner adjourned the meeting at 11:20 a.m. Central Daylight Time.

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

The next meeting will be in January 2022 at the JTCM.

I-43: Investigate Response to USA Executive Order Regarding EMP Protection

Chair: Angelo Tempone (Presiding)

Vice Chair: Art Buanno

Secretary: Dolly Villasmil

Output: Report

Established Date: May 11, 2020

Expected Completion Date: 2023

Draft: None yet

Assignment: Write a report to, (1) Investigate and describe EMPs and their likely effects on protection and control apparatus, and (2) Determine and describe strategies generation, transmission, and distribution utilities can utilize to mitigate the effects of EMPs on their equipment.

The meeting was called to order at 14:10 CST on Tuesday, September 21, 2021

1. Introductions

The chair introduced himself and the other working group officers. The meeting opened with 16 members and 27 guests.

2. Quorum verification

A quorum was obtained since 16 members attended the meeting (over 50%).

The previous meeting minutes were approved. (Rey Ramos, Don Ware).

Meeting agenda was approved (William Radasky, Tapan Manna).

3. Review received contributions (sections 2 & 4)

It was suggested that due to the length of section 4 (Assessment: Modeling & Testing of HEMP on Power Systems' Substations) that authors will review this section and see if any edits are needed. Dr. Bill Radasky, Dr. Tapan Manna, and Steve Ladd volunteered to review section 4.

Section 2 (Acronyms, Abbreviations and Definitions) was initially drafted. Dr. Radasky, and Dr. Manna will review and supplement as needed.

4. Status update on Section 3 or re-assign pending contributions

Dr. Radasky, and Dr. Manna will work on section 3 (Background). A new draft can be provided in 30 days.

Section 5 was first provided in May 2021. Dr. Radasky was hoping to get more information on CTs and VTs. It was decided to remove the discussion on this subject but instead add reference to work accessible to EPRI members.

Section 6 is not ready for review. It is mainly an outline at this time. It could be ready in about 60 days for review.

Dr. Radasky mentioned that a new set of HEMP waveform information has been made available this year from the Department of Energy (DOE). The following is a link to release from the DOE:

https://www.energy.gov/sites/default/files/2021/01/f82/FINAL%20HEMP%20MEMO_1.12.21_508.pdf

5. Adjourn

The meeting was adjourned at 14:50 CST (Dr. Radasky & Jim Campbell).

Our next meeting will be TBD in January of 2022 (time TBD).

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

Chair: Andre Uribe

Vice Chair: Mike Dood

Secretary:

Output: Report

Established: 01/2020

Expected Completion Date: 01/2023

Assignment: Create report on Skills Beneficial to Program, Commission, Test, and Maintain IEC-61850 and other Ethernet Based Protection, Automation, and Control (PAC) Systems.

Draft: Ver 1.0

Assignment: Create report on Skills Beneficial to Program, Commission, Test, and Maintain IEC-61850 and other Ethernet Based Protection, Automation, and Control (PAC) Systems

- a) Officer presiding: Andre Uribe, Chair
- b) Officer recording minutes: Mike Dood, Vice Chair
- c) Call to order at 11:30pm
- d) Agenda Items:
 - a. Chair's remarks – The title on the I-subcommittee agenda needs to be updated to “*Skills Required to Program, Commission, Test, and Maintain Ethernet Based PAC Systems*”
 - b. Reviewed reports 17 topics and several guest and members volunteered to contribute.
 - i. Karen Leggett volunteered to write introduction
 - ii. Galina volunteered for Network/Communications to review
 - iii. Fernando volunteered to review commissioning section
 - iv. Bharat Nalla volunteered to look at Cyber Security
 - v. Yujie Yin will look at section 6 & 7
- e) Need to provide members with share file instructions to access the report
- f) Recesses and time of final adjournment: 12:18pm Central
- g) Next meeting date and location: TBD

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

Chair: Adrian Zvarych

Vice Chair: ???

Secretary: ???

Output: Report to the I-Subcommittee

Established Date: ???

Expected Completion Date: ???

Draft:

Assignment: The purpose of the WG is to develop a Technical Report reviewing grounding and bonding of circuits associated with instrumentation, protective relaying, communications, power supplies, and other electric facilities in substations. The report will review existing practices and standards, identify where conflicts or omissions exist, and address means of reconciling conflicts.

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

- a) Officer presiding – Robert Frye
- b) Officer recording minutes – Adrian Zvarych
- c) Call to order – Robert Frye
- d) Chair's remarks
- e) Results of call for quorum – n/a
- f) Approval of Agenda (motion and second)
- g) Approval of Minutes of previous meetings (motion and second) -
- h) Brief summary of discussions and conclusions including any motions.
 - a. Report to the I—Subcommittee. Including observations, how to perform grounding and bonding in a substation as a whole. How can we all work together to accomplish a unified goal.
 - b. Don Ware comment – we have 24 participants.
 - c. Question regarding scope of this Task Force, should we restrict the scope to just communication cables or CT/PT/Control Cable shielding and grounding/bonding?

- d. Robert Frye – how do we meet NEC and other standards in the control house, regardless of whether the cables are CT/PT/Controls or communication cables.
- e. Jean Hindenburg (Sp?) – NV Energy – supports developing a document that will define or recommend grounding/bonding practices.
- f. Should this be a joint effort between PSRC and PSCCC?
- g. Steve Conrad – instead of a report to a Subcommittee, consider developing a report to the Main Committee. Jean H agrees that a higher level report could be generated.
- h. Scope to include
- i. Gustav – control, instrumentation, low voltage power cables – should these be included?
 - i. Do we want to consider how to separate cables to minimize interaction? The main purpose of this TF is grounding and bonding, though. Might be worth a mention within the Report.
- j. Jeff – should we include case grounding, for secondary circuits? C57.13.3 – covers instrument transformers.
 - i. Overall approach would be to clearly define what grounding & bonding needs to be in the CEE, then see what other standards might need to be modified to support the CEE, where we “need” to have everything working reliability.
 - ii. Every standard is “right” within its’ own perspective, but we want to be able have a homing document...
- k. Steve Conrad – develop an assignment to develop a report to the Subcommittee.
- i) Action items
 - a. Assignment Statement - ‘the purpose of this Subcommittee is to develop a Technical Report clarifying grounding and bonding of instrumentation, protective relaying, communication, power supply, and other facilities within other electric facilities (such as control buildings, outside control cabinets, etc..).
 - b. Include conflicts or omissions in existing standards
- j) Items reported out of executive session n/a
- k) Recesses and time of final adjournment n/a
- l) Next meeting date and location = next IEEE PSRC meeting January, TBA.

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

Chair: Brian Mugalian

Vice Chair:

Secretary: Brian Mugalian (recording of minutes)

Virtual Meeting/WebEx: 20 September 2021, 1:10 – 2:10 PM CDT

Output: Revise IEEE C57.13.3-2014

Established Date: September 2021

Expected Completion Date: January 2024

Draft:

Assignment: Revise and prepare PAR for IEEE C57.13.3-2014

- a) IEEE Housekeeping & Moderators: Jim Niemira and Robert Frye
- b) Call to order – Brian Mugalian, 1:10 PM CDT
- c) Chair’s greeting & remarks, 16 attendees were present, 10 became members, 6 are guests
- d) Agenda was presented and reviewed
- 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) The Task Force reviewed the 2014 edition of C57.13.3. Comments from the May 2021 attendees are summarized below:
 - a. Review the word “safety” and how it is used in the Guide
 - b. Coordinate with I45 as they are writing a report where our Guide will be referenced
 - c. General review of figures in the Guide

- d. NEC versus NESC in the text of the Guide needs review
- e. Annex B needs update to convert the IEC 60044 standards to the new IEC 61869 standards
- f. Add new examples to Annex C
- h) PAR needs work, purpose and scope. Brian Mugalian will contact Malia Zaman on wording to use so that a draft of the PAR can be sent to the working group members for a WebEx meeting in October.
- i) Because we do not have an approved PAR, we will not request approval at the I Subcommittee at this September meeting.
- j) Meeting adjourned at 2:10 PM CDT

<u>Name</u>	<u>Affiliation</u>	<u>Voting Status</u> (voting member, non-voting member, guest)
Brian Mugalian	S&C Electric	Chair – 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
Alla Deronja	American Transmission Company	Guest
Dane Minder	Basler Electric	Guest
Dragan Tabakovic	Hubbell	Guest
Henry Ovalle	Westinghouse Electric	Guest
Raymond Phillips	Westinghouse Electric	Guest
Robert Frye	TVA	Guest

I47 IEEE Standard C37.231– Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control

Chair: Amir Makki

Vice Chair:

Secretary: Amir Makki

Meeting Date/Time: Webex Monday Sept 20, 2021, 2:20 Central Time

Output: Revision of C37.231 - 2006

Established: September 2021

Expected Completion Date: December 2025

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.

Draft:

May 2021, Meeting Minutes:

The WG met on time, for the first time, with 21 colleagues in attendance. The Chair provided a high level overview of the needed revisions and proceeded to recruit volunteers for membership and officers.

12 out of the 21 colleagues in attendance volunteered to be members of the WG, and 4 out of the 12 volunteers expressed interest in serving as officers.

The WG plans to meet again at the next PSRCC meeting. The meeting objectives are to formalize the officers and membership, and to prepare the PAR for the revision of the Standard.

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

Chair: Mohit Sharma

Output: Recommendation to either revise the IEEE standard or let it expire

Assignment: IEEE Std C37.103-2015, IEEE Guide for Differential and Polarizing Relay Circuit Testing
ITF 48 Task Force met online instead of in-person meeting due to COVID-19 on Tuesday, September 21, 2021 at 4:40 PM with 7 attendees.

Jim helped Mohit in reviewing the IEEE Patent Policy and Copyright Policy slides. No one raised an issue on possible patents.

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

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

Due to lack of attendees, we plan to meet again during the next meeting, get more inputs for improvement of the standard and formulate a plan to recommend I sub-committee in forming a Working Group.

Meeting was adjourned at 5:35 PM.

11. Liaison Reports

- a. Instrument Transformer Subcommittee – (Wil Knapek)
Transformer Subcommittee rescheduled their meeting to October. Therefore, there is nothing to report. In addition, Wil Knapek will be stepping down and the Subcommittee is looking for a new liaison.

12. Old Business

- a. IEEE P1854 - Guide for Smart Distribution Applications – PSRC is Co-Sponsor. WG should be formed in H-SC. Participate in that WG if you are interested.

13. New Business

- a. PAR Extensions for WG nearing PAR expiration:

Motion 1 to extend PAR for PC37.110 IEEE Draft Guide for the Application of Current Transformers Used for Protective Relaying Purposes

Working Group I29 moves to extend the PAR for PC37.110 IEEE Draft Guide for the Application of Current Transformers Used for Protective Relaying Purposes for 2 years.

Motion by: Michael Higginson, Second by: Amir Makki

Justification: The WG has revised and updated the standard with significant revisions since the initial ballot. The COVID-19 pandemic delayed the WG in developing the next draft. Due to the significant changes, rebalot will be required. This extension will allow time for necessary rebalot, any additional revisions, and working through the process of SA approval and publication.

MOTION 1 APPROVED unanimously

Motion 2 to extend PAR for PC37.235 IEEE Draft Guide for the Application of Rogowski Coils Used for Protective Relaying Purposes

Working Group I30 moves to extend the PAR for PC37.235 IEEE Draft Guide for the

Application of Rogowski Coils Used for Protective Relaying Purposes for 1 year.
Motion by: Frye, Second by: Lockhart
Justification: The WG has completed ballots and revisions and final draft has been submitted to IEEE SA. A short PAR extension is requested to assure that the PAR will not expire as the document works its way through the final IEEE SA approval and publication steps.

MOTION 2 APPROVED unanimously

Motion 3 to extend PAR for 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 Working Group I36 moves to extend the PAR for 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 for 2 years.

Motion by: Lockhart, Second by: Pond

Justification: The WG has revised and completed the initial draft for initial ballot and is ready to begin the balloting process. It has taken significant time to reconcile with the other IEEE C37.90.x documents and IEEE 1613 which are all also presently being revised. This extension will allow time for balloting, comment resolution, any necessary rebalot and additional revisions, and working through the process of SA approval and publication.

MOTION 3 APPROVED unanimously

b. Any additional new motions or new business?

Jeff Pond mentioned he is not receiving Agendas and would like the files to be in .pdf format. It was mentioned that this may be due to cloud service issues.

14. Other announcements?

15. Motion to Adjourn, by _Dood____, second by _Pond_

Adjourn time: __10:17 AM____

Next meeting will be at IEEE/PES JTCM, January 2022, presently planned as in-person meeting in Garden Grove, CA. I hope you stay well and look to meeting with you soon!

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.

- a) Officer presiding
- b) Officer recording minutes
- c) Call to order
- d) Chair's remarks
- e) Results of call for quorum
- f) Approval of Agenda (motion and second)

- g) Approval of Minutes of previous meetings (motion and second)
- h) Brief summary of discussions and conclusions including any motions.
- i) Action items
- j) Items reported out of executive session (if such sessions have occurred)
- k) Recesses and time of final adjournment (if different from our published face-to-face meeting agenda)
- l) Next meeting date and location (if different from our published face-to-face meeting schedule)

Additional notes:

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

Proposal for New TF or WG

Date:

Definition of the Problem

What is happening?

What should be happening?

Proposal for Task Force

Submitted by:

J Rotating Machinery Protection Subcommittee

Chair: Gary Kobet

Vice Chair: Will English

Scope: Evaluate and report on protective relaying concepts and practices applicable to generators, motors, synchronous condensers, associated auxiliary systems, and performance of plant protective systems. Develop and maintain related relaying standards.

J SC met Thursday September 23, 2021 at 9:30 AM CST with 21 out of 33 members and 22 guests, reaching quorum.

A motion to approve the May 2021 J SC meeting minutes was made by Jason Eruneo and seconded by Dale Finney. The minutes were approved unanimously.

Working Group Reports:

J13: Modeling of Generator Controls for Coordinating Generator Relays

(1) Chair: Juan Gers

Vice Chair: Phil Tatro

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

WG Report

The working group met in one session with 9 members and 21 guests present. A quorum was achieved.

The working group approved minutes of the May 4, 2021 meeting.

Juan Gers provided a high level overview of comments received and how they have been addressed. There are a few comments remaining and a final revised report addressing all comments will be circulated to the working group by the end of October. Mike Thompson noted in some places the report may overemphasize the need for transient stability studies and asked that as the working group addresses comments, we should consider language that avoids giving a reader the impression that protection engineers are not qualified to set generator relays. The working group agreed with this approach.

Juan Gers provided a preliminary framework for a PowerPoint presentation for the January 2022 Main Committee meeting. The 20-minute presentation will provide an overview of the paper with a target to condense the report into 20-25 slides. The working group agreed to focus on a few key items to create interest in the report among PSRC members, rather than trying to cover every aspect of the report. Charlie Henville agreed to prepare a slide covering Chapter 6 and Jim van de Ligt agreed to prepare slides covering the report conclusions. Juan Gers will ask Mike Basler to prepare slides for his report sections. Juan Gers and Phil Tatro will address the remaining chapters and consolidate all contributions. A draft presentation will be circulated to the working group by the end of October.

A last session of the working group is planned to take place at the January 2022 meeting to provide information about the final status of the overall work of the group, and gather any comment prior to presenting the PowerPoint file in the plenary session. It will be also a good opportunity to thank everyone for the work in these several years, and then officially disband the group.

Next Meeting:

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

J14: Plant Protection Issues Associated with Black Starting of Generators

Chair: Chris Ruckman

V Chair: Zeeky Bukhala

Established: May 2014

Output: Report to Subcommittee

Expected Completion: January 2017

Status: 17th Meeting

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

WG Report

This Working Group did not meet. Subcommittee Chair requested status update on addressing PSRC Officer comments. Those comments have not yet been addressed. Zeeky Bukhala to follow up with Chris Ruckman and edit as necessary.

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 8C)

Status: 19th Meeting (9-21-21)

Assignment:

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

WG Report

Activity:

1. The Working Group (WG) met Sept 21, 2021, with 15 members and 10 guests.
2. A motion to approve prior meeting minutes was made by Ryan Carlson and seconded by Tom Beckwith.
3. The WG assignment was reviewed as well as a brief history of WG activities.
4. The WG reviewed Draft Report 8C where several comments, edits, and additions in Sections 3 and 7 were discussed and resolved by the WG.
5. There was discussion on whether or not to move the Section 3, "Overview/Purpose/Scope," to after Section 9 (after al analysis). Resolved that Section 3 remains where it is as a set-up for reading the Report.
6. Dale Finney mentioned that the torque ratio criterion is not a design tool and there was discussion on this topic where it was mentioned that the torque ratio if more of a verification tool. Question was asked, "What is a good number for the torque ratio?"
 - o Tom Beckwith discussed that this report should drive additional research on this topic where these types of questions may gain more clarity, etc. Providing a good value for torque ratio beyond the scope of this Report. WG concurred. Chair added that use of torque ratio helped drive research done in this Report to arrive at conclusions regarding In-Phase and Residual Transfers.

Assignments:

1. Bracy Nesbit will supply a list of motor parameters for the first paragraph of page 9.
2. Tom Beckwith to provide write-up for page 12 discussing for On-Site Generation, not mentioned in C37.96, as a reason for phase angle change once old source CB is opened.
3. Reviewed Section 7 comments including discussion where Dale Finney queried where the 1.33 pu V/Hz criterion had evolved from in the past.
 - a. Post meeting Doug sent Chair and Dale Finney a 1982 IEEE Transactions Paper that briefly discussed the genesis of this 1.33 pu V/Hz criterion. Chair will examine and use as appropriate
4. Dale Finney mentioned that we should somehow pay homage to the work that has been done on this subject in the past; did the best with tools available at the time.
 - o Chair volunteered to pen some proposed text to accomplish this that will be placed in the Introduction section of the report.

Other Business and Adjournment:

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

Next Meeting:

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

Virtual: WebEx or similar from PSRC

J16: PC37.101, Guide for Generator Ground Protection

Chair: Ryan Carlson

Vice Chair: Doug Weisz

Established: 2016

Output: Guide

Status: 12th Meeting

Assignment: Revise C37.101 Guide for Generator Ground Protection

WG Report

The WG met with 12 out of the 24 voting members present. A total of 40 participants joined the Webex meeting. As quorum was achieved, **Ryan** asked if someone would like to make a motion to accept the May meeting minutes. **Surdashan** made a motion to accept May meeting minutes and **Ritwik** seconded so previous meeting minutes were accepted.

Ryan reviewed the patent slides required for IEEE PAR WGs and mentioned that he has submitted a 3 year PAR extension request to IEEE SA where they should review that request this week.

The C37.101 format change was reviewed and the first draft for the guide was reviewed.

- The working group discussed that Table 1 has been removed from the guide and that references and figures in the text will need to be updated.

- **Ryan** agreed to take the lead on updating references within the body of the guide.
- Discussed the overview / introduction section. **Ryan** will reference the PAR to see if the information can be copied directly from that document. **Ryan** recommended waiting until the end to redo the intro section.
- There were a handful of figures that became blurry when inserted into the body of the guide. **Ryan** will reach out to the individual contributors to try and get revised figures.
- The working group discussed the bibliography references and determined that there is no need to review them with the intent of removing references. The working group will simply add to the existing references.
- Adding information on how to size NGR, NGT, and broken delta ballast resistor was discussed or if we just want to reference where that type of information may be obtained. **Alla** mentioned that C37.234 has information on sizing a broken delta ballast resistor.
- Discussed if figures needed to be added to the grounding method section to replace the information lost in Table 1. The consensus was that this is not required if sufficient figures are provided specific in the text below. We will have to ensure all information contained in that Table is either reproduced or revised and included in this new draft.
- Discussed tripping modes that have been indicated in this document e.g. complete shutdown, etc. **Surdashan & Ryan** volunteered to look at the J12 improved ground detection methods and C37.102 Clause 7 to make sure C37.101 is in alignment with those documents for tripping modes.
- **Raju** offered to provide a summarized write up for the injection schemes section to be included in the guide and to reference the Appendix that Nader wrote.
- Discussed the accidental ground fault scheme with a single CT directly behind the star point of the generator used to detect a fault that bypasses the high impedance grounding device. **Ryan** will incorporate this into the high impedance grounding section. Existing C37.101 should be reviewed to see if a primary neutral CT is discussed on high impedance grounded machines.
- **Ryan** proposed adding a new section for multiple gens on common bus.
- **Ritwik** offered to provide a write up on ground protection schemes for multiple high impedance grounded generators on a single bus. We discussed that there are several methods to accomplish this (multiple high impedance ground points, switching neutrals, grounding transformers etc.). This is a significant gap in the existing guide.

Ritwik made motion to adjourn meeting and **Steven Mueller** seconded.

Next Meeting:

The WG requests a single WebEx session for 50 people the January 2022 meeting. If the working group meets in person please provide a room for 30 people and a projector. 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: 5.1

Established: May 2017

Status: 14th meeting, Sep 2021 (virtual)

Expected completion date: -

PAR Expiration: Dec 2021 (extension requested)

Assignment: Revise C37.102 Guide for AC Generator Protection

WG Report

WG met on Sep 20, 2021 virtually via Webex for a double session with attendance recorded from 20 members and 45 guests. Quorum was achieved. The May 2021 minutes were approved (motion by Chowdhury, second by Conrad).

Patent slides were presented, no claims were made.

The Chair shared results of WG ballot which was successfully completed with over 2/3 approval. The Chair also shared that an MEC review by IEEE-SA was completed, and also that a PAR extension has been requested for 1 year.

The WG is in the process of addressing as many ballot comments as is reasonably possible. A specific list of comments were discussed during this meeting:

- Comments 35 & 115: Subclauses 4.3.3.1.2 and 4.3.3.1.3. Remove para on ground fault neutralizer to emphasize action should be trip instead of just alarm. Ritwik to provide a paragraph on use of 67Q for protection against series fault, which WG agreed belongs in this guide.
- Comment 122: Subclause 4.5.1.3 change title to “transient studies”. Comment withdrawn after discussion.
- Comment 131: Subclause 4.5.2 Add a row in table to match content in C50.13 table. Accepted.
- Comment 133: Revise figure 54 to move CT location to gen neutral side (vs line). Accepted.
- Comment 146: For consistency update language on causes of excessive V/Hz. Accepted.
- Comment 148: Patent claim: Chair will initiate contact with Patent Committee
- Comment 150: Change 4.5.8.3 Underfreq range 50%-90% to 10%-90% for consistency with J19. Accepted.
- Comment 167: Subclause 5.2.1.1 statement rewording proposed. Ritwik to provide new verbiage
 - “In the past, electromechanical relays were often applied with a voltage balance scheme to detect a blown fuse condition. Some microprocessor relays with sufficient number of voltage inputs can also be used to apply the voltage balance scheme.”
 - Also rename the subclause title (the one that comes after) to: ... using voltage and current (instead of Micro-processor based) as Gary Kobet suggested
- Comment 215 & 274: Final sentence in 4.3.2.5.3/67Q is unclear, and Fig 26 doesn't show 67Q. Ritwik to provide additional verbiage. Update Fig 26.
- Comment 240: Add additional clarifying statement re the offset and diameter in SSSL calc. Accepted.
- Comment 244: Updated figure title to say applies for “directly” cooled cylindrical rotor generator. Accepted
- Comment 250: Blocking considerations for V/Hz. Ritwik to provide J19 verbiage for consistency.
- Comment 253: Subclause 3.3 Excitation Systems. Is there a more current source for content. Check with J13.
- Comment 254, Subclause 3.3.4. Consider removing Fig 6 and add to discussion of Fig 5. Bracy Nesbit states his company uses similar excitation systems shown in Fig 6. Contact authors of this section.
- Comment 255: Remove statement on gen overload tied to CTG air inlet temp, which is unclear. Accepted.
- Comment 273: Remove/reword statement saying scheme is “an inexpensive method”. Accepted.
- Comment 279: Modify statement that says duplicate differential scheme rarely used; state use of dual primary (or redundant systems per C37.120) is now common. Accepted.
- Comment 280: Modify statement to say use of dual primary (or redundant systems per C37.120) is now common. Accepted.
- Comment 302: Add sections that talk about Admittance and PQ plane LOF protection schemes. Ritwik will provide verbiage. Accepted.
- Comments 303, 305, 306: Discussion about continued use of single zone LOF on legacy schemes. Consider separating this discussion into a new para.
- Comment 311: Add to existing statement “if the scheme requires timers”. Accepted.

I2 liaison Yuan Liao has checked the present draft and found no new terms.

Additional virtual meetings have been scheduled on 10/8, 10/22 and 11/5 to continue to discuss and resolve the ballot comments. Invites have been sent to the voting membership.

Next Meeting:

Request a double session for January 2022 with space for 40 people and a computer projector.
The WG also requests no conflict with other J meetings, especially J16 (C37.101) and J19 (C37.106).

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

CHAIR: Normann Fischer
VICE CHAIR: Jared Mraz

Output: Report

Established: September 2017

Status: WG

Assignment:

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

WG Report**Attendance:**

Total 48

Overview:

- No comments provided on May minutes
- Presentation by Romulo Bainy “Screening Studies for Susceptibility to Subsynchronous Control Interaction (SSCI) using EMTP”
 - Presentation provided a summary of the modelling and simulation work that J18 has performed to date:
 - Overview of subsynchronous oscillations
 - Brief description of real-world events in Texas
 - Overview of EMTP model used for studies
 - Presentation of results of parametric analysis
 - Comparison of the “average” vs. “detailed” WTG model in EMTP
 - Copy of presentation will be made available on share file site
- Presentation discussion and questions
 - Group discussed the differences between the “average” and “detailed” models.
 - The models should behave similarly at low frequencies, but they do not.
 - It is not clear if this is a modeling issue, or an issue with the EMTP component. The WG is working with EMPT to troubleshoot.
 - The models perform differently under both steady-state and transient conditions.
 - Yanfeng Gong mentioned that the WTG models provided by the manufacturers may not reflect what is installed/implemented in the field. These are just a vendor’s best approximation.
 - There is a need for more accurate WTG models from the vendors.
- Sukumar Kamalasadnan provided three technical papers that will be uploaded to the share file site.
 - “Transient Stability Enhancement of Power Grid With Integrated Wide Area Control of Wind Farms and Synchronous Generators”
 - “Parametrically Robust Identification Based Sensorless Control Approach for Doubly Fed Induction Generator”
 - “Doubly Fed Induction Generator (DFIG)-Based Wind Farm Control Framework for Primary Frequency and Inertial Response Application”
- Several WG members have had trouble reaching the share file site. Link is below:
 - <https://psrc.sharefile.com/d-s6d4a6d6255df41a3889c4c9c11cf157c> [psrc.sharefile.com]

Next meeting:

For the next meeting, if it is not held virtually, J18 will need a room for 60 and an overhead projector. Avoid conflicts with D29, D34, I4

J19 PC37.106 Guide for Abnormal Frequency Protection for Power Generating Units

Chair: Ritwik Chowdhury

Vice Chair: Jason Eruneo

Output: Guide

Draft: 9.1

Established: January 2019

Status: 13th WG meeting, Virtual – September, 2021

Expected Completion Date: December 2021

PAR Expiration Date: December 2022

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

WG Report

10 members in attendance, we did not meet quorum.

- Comment C16
 - Overspeeding induces additional stresses that are not seen at normal speed
 - The WG believes that the current language is sufficient
- Comment C34
 - Added turbine valve status for use in logic language
- Comment C17
 - WG decided to remove the language since it is vague, and we do not believe it adds value to the document
- Comment C18
 - WG decided to delete language in section 7.3 about effects of underfrequency on plant performance since there are other guidelines dedicated to nuclear plants
- Comment C20
 - Added language further clarifying that the coordination is for transmission level faults and transmission level protection
- Comment C53
 - Removed reference to WECC underfrequency guideline since that only pertains to one region and does not include all possible users

Session 2:

- Several other comments addressed.
- Ritwik will figure out adding IEEE C37.117 note to refer for load shedding schemes.
- Quorum was still not met so we will have to resort to online voting. A majority vote is required to pass the motion for the scope.
- Murty will help with Section 4.4.3. Ritwik will send him the document to verify language.

We will have one intermediate meeting to resolve remaining comments prior to IEEE-SA WG ballot.

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

Motion: Working Group J19 motions to revise the scope of IEEE Standard PC37.106 Guide for Abnormal Frequency Protection for Power Generating Units as follows:

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

Guidance is provided to help meet requirements from ~~regional entities and~~ regulatory bodies. ~~The recommendations made pertain to typical synchronous generator installations but does not displace manufacturer guidance.~~ The protective functions discussed in this guide may be implemented with a multifunction microprocessor-based protection system.

Subcommittee approval of the motion is pending Working Group approval.

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

Motion: Working Group J19 motions to submit IEEE Standard PC37.106 Guide for Abnormal Frequency Protection for Power Generating Units, Draft 10 to the IEEE-SA for Sponsor ballot. Subcommittee approval of the motion is pending Working Group approval.

Next meeting:

Double session. If virtual, capacity for 40. If physical, a room for 25 and a projector.
Request no conflict with I38, J20 and C45.

J20 Practices for Generator Synchronizing Systems

CHAIR: Jason Eruneo

VICE-CHAIR: Luis Polanco

Output: Report

Established: January 2019

Status: 7th WG Meeting, Virtual September 22, 2021

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

WG Report

- The WG met with 9 members in attendance
- WG did not meet quorum; therefore, the chair will send out an email for approval of the meeting minutes from May
- The Chair discussed the possible need to replace the Vice chair position
 - A request was made for volunteers, but we did not receive any volunteers for the vice chair position
- The WG discussed Section 7 Synchronization Failure Protection Schemes and Section 8 Post Out-of-Phase Closure Action
 - The chair asked the WG if they still believed these sections should be included in the report
 - The WG expressed support for inclusion in the report and there were volunteers to complete write-ups for these sections
- The chair expressed the potential desire to assign volunteers to review each section of the report
 - Some WG members identified a misalignment with the location of sections within the report.
 - Upon further discussion, it was decided that the WG would postpone review of the document until a full draft review is ready.
- The WG discussed comments from Draft 3.3
 - The chair asked if anyone in the WG had pictures of real-life damage from an OOPS event to include in the report. Members provided a possible contact for the chair to reach out too.
 - The WG discussed the initial intent of section 4.2 and the desire to add language differences between a LV breaker and a HV breaker for synchronization. Also, the difference between a HV synchronizing breaker and a transmission line breaker that an entity may keep in stock.
 - The WG discussed whether we should include any language for the synchronization of nuclear power plants. It was deemed that there was not much difference between the synchronization of a steam unit and a nuclear unit. A concern was expressed that since nuclear units tend to be large in magnitude, that an Out-of-Phase Synchronization event would have a more detrimental impact on the interconnecting system.
 - WG decided to add logic diagram figures for some of the protection scheme recommended in the report
 - WG discussed if there is a need to an outline describing hoe to perform a breaker closure timing test. An example has been provided in the report and a recommendation was made to explain the figures in further detail. There was also a recommendation to add language recommending that usage of relay records/oscillography reports to obtain an accurate measure of the breaker closure time.

Next meeting:

Single session. With room for 30 and a projector.

Request no conflict with J17, J19, J25, C38, C45 and KTF31.

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 (4th meeting 20210922)

WG report

- 8 members and 13 guests were in attendance.
- Chair reviewed previous meeting minutes.
- Outstanding assignments were reviewed:
 - Several working group members gave updates on their assignments.
 - Chair to contact individual working group members to encourage completion before next meeting.
- Coordination with J22 (revision of C37.96) discussed
 - J21 and J22 chairs to coordinate efforts.
- Chair has a file sharing site set up and is to distribute link before next meeting.
 - Chair discussed uploading files needed for the working group to the site. Working group members are to send files for upload directly to the Chair.
- Reminder was made by Tom B. on utilizing feeder material from J15 when their report is completed.
- Tom B. suggested to invite his contacts in the Petro-chemical field to participate and provide input into the tutorial.
- Gary K. stressed the importance of all working group members to read through C37.96 completely to aid the progress of the working group.
- JC Theron suggested review of IEEE 3004.8 by the working group members.

Next meeting:

A single session is requested with room for 30 and a projector for the January 2022 meeting. Also request no conflict with J15 and 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 2

Expected Completion Date: TBD

PAR Expiration Date:

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

WG Report

The Working Group held its second meeting on Wednesday, September 22, 2021. There were 24 attendees with 14 members.

- I. Welcome/Introduction
 - a. The Vice Chair kicked off the meeting at 9:10am CDT and welcomed members and guests to the working group's second meeting.
- II. Quorum Check
 - a. The Vice Chair checked for Quorum with the assistance of the J Subcommittee Vice Chair. There are 25 members of the working group. Quorum was met.
- III. Approve the May 5th Meeting Minutes
 - a. The Chair/Vice chair will send out an email with a motion to approve the May 2021 meeting minutes, and will update the result at the next meeting.
- IV. Patent, Copyright, Pre-PAR Slides
 - a. Patent, Copyright, and Pre-PAR Slides were discussed with the working group. No issues were raised.
- V. Status of PAR
 - a. Section 3.1 & 3.2 require edits to change the contact names listed in the PAR. Instructions were sent after the meeting to the Chair and Vice Chair on how to do this by the J Subcommittee Chair.
- VI. Assignments

- a. Writing Assignments were discussed. There were open sections for Section 2, 3, Annex A, and Annex B. Volunteers were found for Section 2, Annex A, and Annex B. Dale Finney had the previous final document in Word format and shared it with the Vice Chair. Discussion was had on how to handle edits to the main document. The most popular suggestion was to distribute the document to the working group members and then have them only change their section and then send it back to the Chair for edits to the master document.
- b. A deadline for the first assignments was discussed for October 29th. Not all members felt that every assignment could be completed by this time due to the length of all assignments and dependency of material from the J21 working group.
- c. Discussion was had in trying to include a liaison from the IEC and IAS to gain inputs on section 5.7, Abnormal Power Supply conditions was discussed.
- d. The following sections are assigned for review:
 - i. Section 2 – Sunil Kabra
 - ii. Section 3 - Open
 - iii. Section 4 – Will English, Jalar Gohari
 - iv. Section 5
 - 5.1-5.5 – Derrick Haas, Jason Eruneo
 - 5.6-5.8 – Nabil El-Halabi
 - 5.9 – Hasnain Ashrafi
 - v. Section 6
 - 6.1-6.2, 6.5 – Andy Kunze
 - 6.3 – JC Theron
 - 6.4 – JC Theron, Tom Beckwith
 - vi. Section 7 – Jason Buneo, Nabil El-Halab
 - vii. Section 8 – Zeeky Bukhala
 - viii. Annex A – Dale Finney
 - ix. Annex B – Sunil Kabra

VII. Next Steps

- a. Chair will check on status of PAR. Chair will distribute the word document to the working group members for writing assignments. Next meeting will be virtual and held in Mid-November.
- b. Meeting Adjourned at 9:55am CDT.

Next meeting:

Single session with accommodations for 40 people and a projector is requested.
Also request no conflict with J15 and J21.

J23: Generator Condition Monitoring

Chair: Steve Turner

Vice Chair: Open

Secretary: Open

Output: Report

Established Date: May 2021

Expected Completion Date: Open

Draft:

Assignment:

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

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

- Work with other technical committees as necessary.

WG report

Presentation was given by Steven Turner covering several generator trips that occurred this past summer. It was demonstrated how to optimize existing protection settings by reviewing oscillography recorded by the numerical generator protection relays for these events. The presentation included a follow up on monitoring rotor ground fault resistance.

Chairman will contact members to work on developing writing assignments.

Next meeting:

Single session with accommodations for 25 people is requested.

JTF2: Investigate the Need for a Disturbance Recording WG

Chair: Dennis Tierney

Vice Chair: Shane Haveron

Secretary: open

Output: Proposed assignment of working group under J-SC

Established Date: 9-22-2020

Expected Completion Date: September 2023

Draft: -

Assignment: Investigate the need for a working group to develop a document on disturbance recording as applied to rotating machinery

WG Report

The task force met on 09/20/2021 at 11:30 a.m. CDT with 30 people in attendance.

The Chair would like to thank the J-SC Chair and TF Vice-Chair Shane Haveron for stepping in and running the May 4th meeting in the Chair's absence.

The Chair, Dennis Tierney, announced his retirement by March of 2023. Should the Task Force become a Working Group, the TF Chair would like to pass the WG Chair position to another individual. TF Vice-Chair Shane Haveron offered to step into the position if no other volunteer can be found.

The TF agreed there is a need to develop a document on disturbance recording as applied to rotating machinery. However, the document will be limited to synchronous generators. The Chair and Vice-Chair led a discussion on developing a WG assignment, the result of which is given below.

Proposed assignment: Establish a working group to publish a document on the use of disturbance recording for synchronous generators 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.

Rich Bauer from NERC mentioned that the recently published report covering a disturbance in Texas highlighted the lack of availability of high-resolution recorded data which significantly hampered analysis. He suggested that the need for disturbance recording should also address IBR. J-SC Chair stated that this is a good suggestion but is beyond the scope of the J subcommittee and recommended that this is brought up at the B10 IBR Steering WG meeting.

J-SC Chair reminded the participants that an action item is to read the C5 report on considerations for use of disturbance recorders (<https://www.pes-psrc.org/kb/published/reports/C5-Final%20Report.pdf>). The Chair said that the report is well written and easy to read and all future WG participants should become familiar with it.

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

Motion: Working Group JTF2 motions to approve the following working group assignment.

- **Proposed WG 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.

The Working Group will be designated J24.

Next meeting:

Single session with accommodations for 30 people is requested.
Please avoid conflicts with H46, PSCC S15 and HTF54.

JTF25: Investigate the Need for a Synchronous Condenser Protection WG

Chair: Jason Eruneo

Vice Chair: open

Secretary: open

Output: Proposed assignment of working group under J-SC

Established Date: May 6, 2021

Expected Completion Date: September 2021

Draft: -

Assignment: Investigate the need for a Working Group to develop a report on protection of Synchronous Condensers

WG Report

The task force met on September 20, 2021 and was chaired by Jason Eruneo.

- Gary Kobet provided the background for the request of this Task Force. Initially, there was a question posed by the industry as to the need for out-of-step protection on a synchronous condenser. In addition, as many synchronous generators are being retired, it has been expressed that there may be additional need for synchronous condensers to provide rotating mass inertia and short circuit strength.
- The TF discussed the type of out a potential WG would produce. It was decided that a report would be the best possible output document.
- The proposed assignment was discussed and modified
- TF approved motion to accept the assignment
- Preliminary table of contents and report format were discussed as a starting point for the potential WG
- The TF would like to propose the approved assignment for the J subcommittee approval

In the J Subcommittee meeting the following motion was made by Jason Eruneo, and seconded by Normann Fischer. The motion was approved unanimously.

Motion: Working Group JTF25 motions to approve the following working group assignment.

- **Proposed WG 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.

Notes:

- This could be a feeder document into a future revision of C37.102 since a synchronous condenser may fall under the category of a synchronous generator.

The Working Group will be designated J25.

Next meeting:

Single session. With room for 30 and a projector.
Request no conflict with J17, J19, J20, C38 and KTF31.

Liaison Reports:

Electric Machinery Committee – M. Yalla – No report

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

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

Old Business:

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

123 Signup – WG Officers were informed September WG attendance is to be recorded in 123signup, noting that new September PSRC attendees will not be in 123signup and if a new attendee has become a WG member the individual will need to create an account. 123signup is planned to be in use until year end.

New Business:

None.

Adjournment:

Motion to adjourn was made by Ritwik Chowdhury and seconded by Wayne Hartman. Meeting was adjourned at 10:43 AM CST.

K Substation Protection Subcommittee, September 23, 2021, 9:30 – 10:45 CDT - Webex

Chair: Jeff Barsch

Vice-Chair: Adi Mulawarman

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

- Introductions
- Check for quorum (22 out of 35 members, need 18 for quorum)
- Approval of agenda (Sebastien motioned, Ben Kazimier seconded, approved unanimously)
- Approval of previous meeting minutes (Stephen Conrad motioned, Pat Carroll seconded, approved unanimously)
- Advisory Committee items of interest
 - 413 registrants
 - 31 1st time attendees
 - Future meetings Jan 22 JTCM in Garden Grove.

- **Working Group Reports:**

K10SCC21 Distributed Resources Standard Coordination

Chair: R. Benjamin Kazimier

Vice Chair: Wayne Stec

Secretary : Matt Garver

Established, 1999

Output: Standard through the SCC 21

Expected Completion Date: 20xx

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

K10 met Monday from 11:30am to 12:30pm by web meeting. There were 6 Members and 26 guests present. Benjamin Kazimier chaired and presided over the meeting. Wayne Stec served his role as vice-chair and Mat Garver and recorded the minutes.

Wayne Stec presented updates on 1547.2 which is slated to go to ballot later next month. The PAR for 1547.2 has been extended because it will not be complete in 2021. The next meeting is Oct 12th.

Tony Johnson provided an update on 1547.3/PSCC S13. The next meeting of 1547.3 is concurrent with 1547.2 and will take place on Oct. 13th and 14th. The working group expects to have a ballot ready draft by the conclusion of the next working group meeting.

A ballot pool has been formed and the invitation closed for 1547.9.

The registration link for the 1547 activities mentioned above is: <https://cvent.me/qMOeeN>

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.

Regarding the revision to P2030, subgroups have been formed and writing assignments have been given. Ballot is expected in late 2022 or early 2023. This will yield an expected standard gap of 12-24 months after the existing standard expires.

P2030.4 is meeting monthly and a stable draft is expected in Sept. or Oct.

The SCC21 study group for the consideration of revision to 1547-2018 has made significant progress. An update will be provided at the next PSRC 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

K16: Revision of C37.91 Guide for Protecting Power Transformers

Chair: Will English

Vice Chair: Steve Conrad

Secretary: Steve Conrad

Output: Guide

Established Date: May 2014

Expected Completion Date: January 2021

Draft: 17

Assignment: To revise and update C37.91, IEEE Guide for Protecting Power Transformers to correct errors and address additional protection related topics.

The WG did not meet. Steve Conrad made a motion to disband; Gene seconded, approved unanimously; WG disbanded Sep 2021

K22: C37.234, IEEE Guide for Protective Relay Applications to Power System Busses

Chair: Abu Bapary

Vice Chair: Alla Deronja

Secretary: Alla Deronja

Output: Guide for Protective Relay applications to Power System Busses

Established Date: January 2017

Expected Completion Date: December 2021

Draft: 9

Assignment: Revise and ballot IEEE Standard C37.234 prior to its expiration in 2019

The WG did not meet.

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

Chair: Meyer Kao

Vice Chair: Rick Gamble

Secretary: NA

Output: Guide

Established Date: January 2019

Expected Completion Date: 2023

Draft: 1.3

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

Formalities:

- The WG met via Webex Meetings on 9/22/2021 from 2:20 to 3:20 PM CDT.
- Officer presiding – Meyer Kao
- Officer recording minutes – Rick Gamble
- The meeting was called to order by the Chair
- The Webex Meeting was attended by 13 members out of 24 and several guests. Quorum was met.
- The Chair noted that the January 2021 minutes were approved via email, with 15 responses out of 26 members
- Hillmon Ladner moved to approve the 5/5 minutes, Steve Conrad seconds
- Pratap Mysore moved to approve the 9/22 meeting agenda, Steve Klecker seconds
- The Chair reviewed the patent copyright slides
-

Meeting Summary:

The Chair noted the need to revise the unbalance protection section 8. The unfused bank section 8.7 will be removed from the document, but major points will be retained in other sections.

Work of the mini-task-force indicated the desire to use an analytical method in place of the tabular calculations in section 8. The suggestion is to have simple calculations for practical relaying quantities only. The annex will house the existing tables and a more in depth example calculation. The example in depth analytical calculation used by one company was discussed. One idea is to develop the simplified analytical method in brief as an annex, or a report, and leave the tables as they exist in the current document. The consensus of the WG is that the simplified analytical method needs more industry exploration before including the concepts in a guide. A conversation is needed to be had within the K subcommittee to determine whether or not a tutorial type document would be prudent for these alternative methods.

Steve Conrad moved to adjourn the meeting, Dean Sorensen seconds.

K26: C37.109 IEEE Guide for the protection of Shunt Reactors

Chair: Kamal Garg

Vice Chair: Ilia Voloh

Output: Guide

Established Date: Aug 2019

Expected Completion Date: 2023

Draft: V 2.3, Sep 2021

K26: C37.109 IEEE Guide for the protection of Shunt Reactors

Chair: Kamal Garg

Vice Chair: Ilia Voloh

Output: Guide

Established Date: Aug 2019

Expected Completion Date: 2023

9. Introduction and agenda (37 participants and 14 members). Reached Quorum. (Total WG members 20).
10. Approved previous meetings-May 4, 2021. (Rafael and Nabil)
11. Patent and copyright slides were presented.
12. Kamal gave progress update. Discussed the outline for line reactor, tertiary reactors, and Annex with informative.
13. Offshore windfarms and shunt reactor protection presentation by Orsted Denmark. Good discussion and questions on reactor protection and CT performance.
14. Resolution on Dean's comments on opening reactor breaker for line faults, Pratap explained what is done in Excel energy.
15. Kamal presented on tertiary reactor protection section and TVA experience for ungrounded tertiary bus faults and concerns. These sections will send out for members review in next two three months.
16. Ilia presented Annex A and protection Tables. Good discussion and minor adjustments were made in the table for the Turn to Turn. Mike Thompson provided some examples. Ilia and Kamal to take this and review with working group members.
17. Ilia presented on Normative references and definitions. Based upon discussion and feedback from Alla and Claire, Ilia and Kamal will send new definitions will be send to WG members for approval, before I2 approval.

Adjourn

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

Chair: Paul Elkin

Vice Chair: Hillmon Ladner

Secretary: NA

Output: Guide

Established Date: January 2020

Expected Completion Date: TBD

Draft: 0

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

1. Welcome
2. Patent Slides - <https://mentor.ieee.org/myproject/Public/mytools/mob/slideset.pdf>
3. Quorum
 - 13 members out of 26
 - Quorum achieved
4. Approve Agenda
 - No opposition to the proposed agenda
5. Approval Minutes
 - May 2021 Meeting Minutes
 - Motion
 - Steve Conrad
 - Second
 - Brandon Davies
 - No one opposed, motion carried
 - July 2021
 - Motion
 - Jeff Barsch
 - Second
 - Steve Conrad
 - No one opposed, motion carried
6. Administrative Announcements
 - 123 signup – more to come
 - For now if anyone is okay with the WG leadership or others from working group reaching out directly let Hillmon know
 - IMeet central has latest documents, if any WG members do not have access please let Hillmon know so he can add you to the IMeet work space
7. Follow up on Assignments Received
 - 8.4.3 Edits – Joshua Watson
 - Not in attendance, skipped for this meeting
 - Hot Transfer and 4.3.11 - Dean Miller
 - Joined later in the meeting, skipped for this meeting
 - Section 9 - Lubo
 - Highlighting was not intended as a comment and can be removed
 - Comment 76 – Accepted suggested edit
 - Comment 77 – changed language
 - Comment 79 – Duplicate sections 9.2.2-9.2.4
 - Group discussed removing the duplicate sections and reference applicable sections in 9.1.#. Group decided to removing sections 9.2.2-9.2.4 and add a few sentences to 9.2.1 discussing that the considerations for protection of the transformer, feeder and low side bus are similar to those

in section 9.1. The remaining section in 9.2 will discuss only what is new or different from section 9.1.

- Lubo Sevov to update section
- Gopal Gajjar to review updated language
- Comment 81 – MOD rating concern
 - How do you close the MOD? Is it rated for load? Is the substation de-energized during MOD switching?
 - MOD's can be rated to pickup load but not interrupt it. Discussion in section is related to
- Comment 82 – Figure 20 bus schemes
 - Steve Conrad shared discussion related to this figure from last revision of the standard. This showed both schemes to show options for how these low side busses can be protected.
 - The team discussed if it would be appropriate to add more language or an additional figure to better explain the history on this and reasons for application of partial diff vs. full bus differential protection.
 - Steve Conrad to suggest edits to this section to address the comment.
- Comment 83 – Language updates – “Should” and “need” throughout section
 - Hillmon suggested that we have one person go through the whole
- Juan Piñeros – question on transformer backup protection
 - Regional differences regarding required clearing times and protection selection as it relates to possible clearing time and coordination with feeder and other relays.
 - Hillmon asked if last sentence in clause 9 cover this need? Juan felt that additional considerations to clearing time could be covered.
 - Juan Piñero to suggest a few sentences to address this concern.
- Figures – Steve Conrad and Steve Klecker
 - Not reviewed this meeting
- Section 7 – Gopal Gajjar
 - Not reviewed this meeting
- 8. Continue Guide Editing
 - Hillmon to send out assignment reminders for any outstanding assignments
- 9. Motion to Adjourn
 - Motion
 - Angelo Tempone
 - Second
 - Abu Zahid

K28 WG: Transaction Paper on GMD Impacts on Protection Systems

Chair: Qun Qiu

Vice Chair: Steve Klecker

Secretary: Steve Klecker

Established: 2019

Output: Transaction Paper

Expected Completion Date: 2020

Assignment: This paper provides background and historical events of Geomagnetic Disturbances (GMD), and reviews GMD impacts on power systems equipment, and associated protection and control systems, mitigating measures, and Geomagnetic Induced Current (GIC) monitoring methods. This paper is a summary of the IEEE

PES-TR72 report, titled, GMD Impacts on Protection Systems, which is prepared by the Working Group “GMD Impacts on Protection Systems”, the Substation Committee of the Power System Relaying Control committee.

The WG did not meet. Steve Klecker made a motion to disband; Adi seconded, approved unanimously; WG disbanded Sep 2021

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

Chair: Sebastien Billaut

Vice Chair: Mohamed Zedh

Secretary: Lalitha Devarakonda

Established: 2019

Output: Recommendation to K SC

Expected Completion Date: 2020

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

K29 met Monday Sept 20th at 15:30CT with 37 attendees, via the virtual online Webex.

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

9 of the 24 voting members were present so quorum was not reached.

Decision was made to approve the May 21 meeting minute electronically.

10 attendees were new to the group.

3 requested to become voting members.

We will be reviewing membership to remove members not attending regularly.

The chair presented a list of comments from the Subcommittee Leadership regarding the new topic. Some of the new topics do not appear to fall exactly within the scope of the K Subcommittee.

The group accepted the proposal to decide on two options for each of the topics, to either:

1. Proceed with no detail but point to external reference
2. Proceed with detail and establish a liaison with the Committee that is in scope.

The Subgroup’s goal will be to reach a decision by the end of October 2021.

A few new attendees volunteered to be added to the current assignments.

Swagata mentioned that many topics are covered in C37.230.

KTF30 : Provide recommendation to K Subcommittee whether or not to form a working group to create a summary paper and presentation for C37.108 IEEE Guide for Protection of Secondary Network Systems.

Chair : Adi Mulawarman

There was no interest in the meeting to change the task force to WG working on summary paper and presentation. Adi made a motion to disband; Martin Best seconded, approved unanimously; TF disbanded Sep 2021

KTF31 : Provide recommendation to K Subcommittee whether or not to form a working group to revise C37.119 IEEE Guide for Breaker Failure Protection of Power Circuit Breakers.

Chair : Jeff Barsch

Vice Chair : Brandon Davies

1. Approval of agenda
 - a. Motion - Vahid Madani
 - b. Second – Qun Qiu

2. Review IEEE copyright and patent slides

- a. Patent slides were reviewed and no essential patent claims were identified during the meeting.

3. Review assignment and output of task force

- a. No comments were made on the assignment.

4. Review existing scope and purpose of C37.119-2016

- a. Scope and outline of existing guide were reviewed.

5. Discuss possible material for revision of guide

- a. Jeff Dagle raised a question regarding use of Zone 3 for remote breaker failure, however many utilities are moving away from the practice due to concerns about cascading failure. Roger Whittaker mentioned that there is some discussion of this topic in the existing document (Section 3.1). Mike Thompson suggesting talking about the complementary nature of remote backup to the BFP scheme.
- b. Vahid Madani raised a question if the guide should discuss BF related to RAS schemes? Should coordinate with ongoing work on C37.250. There may be considerations related to breaker failure to interrupt faults as is typical for conventional BF schemes compared to failure to interrupt load.
- c. Alla Deronja suggested that there may be additional considerations for BF schemes for systems close to IBR? This may already be covered as part of the breaker status type schemes for applications with low fault current but should be reviewed and considered in the revision.
- d. Mike Thompson commented that every time we open a document, we add new stuff and do not take anything out. Is there anything we can reduce that is not used? Could we streamline some of the one-off schemes by generally discussing each piece of these applications.
- e. Alla Deronja suggested that we should we ask for a copy of any outstanding ballot comments. Working group chair to make this request.
- f. Vahid Madani suggested that we may be able to expand the Breaker Failure to Close schemes. This section is specific to generators, but other applications such as series capacitor bypass breakers may use similar schemes. Possibly add a new clause related to other applications for breaker failure to close? Per discussion there are several typical schemes applied for series capacitor bypass breakers.
- g. Adi Mulawarman mentioned section 6.3 on breaker failure schemes for dual breaker arrangement. He has seen misoperations related to what is discussed in this section. He suggested that this section could be updated and expanded to offer possible solutions to the issues related to this scheme.
- h. General comment that Section 7 has a lot of examples. This was added based on user feedback received during one of the last rounds of revisions.
- i. Alla Deronja suggested that the WG could discuss low SF6 no-trip protection scheme and whether or not to bypass the BF timer (two methods).
- j. Alla Deronja also suggested that the WG could discuss the location of a stand-alone BF relay. There have been issues when it was in series with the 87L relay, and when the 87L relay was tested, the BF relay misoperated.

6. Discuss formation of new WG

- a. Interest in and attendees were polled to gauge their interest in being involved in a working group; 12 out of 17 attendees were interested in being involved.
- b. Alla Deronja moved to form a working group. Roger Whittaker seconded the motion. 15 of 17 approved, none opposed.

- c. Jeff proposed a working group assignment, “Revise C37.119-2016 IEEE Guide for Breaker Failure Protection of Power Circuit Breakers”

Adjourn

Vahid Madani made a motion to create a WG; Gene H. seconded; approved unanimously; KTF31 converted to K31 WG

Liaison Reports:

T&D Committee, Capacitor Subcommittee, **Pratap Mysore**,
<http://grouper.ieee.org/groups/td/cap/>
IEEE 18 under revision.

Transformers Committee, **Will Knappek**
<http://www.transformerscommittee.org/>

____ No report.

Old Business

None

New Business

Items of General Interest

Jeff shared the Points of Confusion document that summarize and provide examples on what is quorum, majority, examples.

This is Jeff's last meeting.

New K Sub Chair – Adi Mulawarman

New K Vice Chair – Brandon Davies

Adjourn

Stephen Conrad motion to adjourn; Abu Bapary seconded.