Minutes of Meeting
High Voltage Circuit Breaker Subcommittee

Spring 2023
Sheraton Sand Key, Clearwater, FL
Wednesday, April 19, 2023 from 3:45 to 5:30

The chair called the meeting to order at 3:45.

Introduction of all participants including members and officers.
77 participants in attendance
38 of 56 members present – **quorum OK**.

Chair reviewed IEEE patent slides and asked for participants to report any essential patent claims – none reported.
Chair reviewed IEEE copyright slides and asked participants to report any need for copyright permissions – none reported.
Chair notified participants of the IEEE participant behavior requirements.

Chair asked for a motion to approve the fall 2022 meeting minutes.
Motion: L. Falkingham
Second: D. Mitchell
Discussion: None
The motion was approved by unanimous consent.

Chairman's report:

- **Requested working group chairs to email their meeting minutes to the subcommittee secretary no later than May 3.** daniel.schiffbauer@ieee.org
- Reminder to please not include personal contact information of working group attendees in the meeting minutes – only name and affiliation.
- Please sign up for the new Committee Management System (CMS) at: https://ieee.memberplanet.com/v2app/#/member-registration/join
- The chair recognized 5 new HVCB members.
    - Koustubh Ashtekar
    - Michael Christian
    - Federico di Michele
    - Leonel Santos
    - Casey Weeks
- Recognition of Anne Bosma who will retire at the end of June.
- New participation opportunities are available:
    - HVDC circuit breaker and related equipment experience (IEC/ACTAD)
    - Extreme service conditions (IEC)
    - IEEE 1861-2014: Guide for On-Site Acceptance Tests of Electrical Equipment and System Commissioning of 1000 kV AC and Above (revision)

  Contact the HVCB chair if you are interested in any of these opportunities.

External reports:

Technical paper reviews (Kirk Smith):
There were no papers to review on the IEEE papers reviewer site for Transactions on Power Delivery.

Accredited Standards Committee C37 power switchgear (John Webb):

- ANSI C37.54 Indoor AC HVCB applied as removable elements in metal-enclosed switchgear – conformance test procedures. Balloting in process. One to two months to complete.
- ANSI C37.57 Switchgear – Metal Enclosed Interrupter Switchgear Assemblies – Conformance Testing. Not yet balloted pending completion of C37.20.3.

C37.20.6 IEEE Standard for 4.76kV to 38 kV Rated Ground and Test Devices Used in Enclosures (Ron Hartzel):

- No report

C37.100.1 Common requirements for HV power switchgear rated above 1000 V (John Webb):

- No quorum (third time in a row)
- Virtual meetings over the summer 2023
- Planned spring 2024 ballot
- PAR expires 12/2024 – likely need extension

C37.122.2 IEEE Guide for the Application of Gas-Insulated Substations Rated 1 kV to 52 kV (Eldridge Byron):

- With IEEE editors – expect document to be published before fall 2023

C37.122.3 IEEE Guide for Sulphur Hexafluoride (SF6) Gas Handling for High-Voltage (over 1000 Vac) Equipment (Billy Lao)

- No report

C37.122.10 IEEE Guide for Handling Non-Sulphur Hexafluoride (SF6) Gas Mixtures for High Voltage Equipment (Billy Lao)

- No report

C57.16: IEEE Standard for Requirements, Terminology and Test Code for Dry-Type Air-Core Series Connected Reactors (David Caverly)

- No report

C57.142: Guide to Describe the Occurrence & Mitigation of Switching Transients Induced by Transformers, Switching Devices and System Interactions (David Caverly, jointly sponsored by TRFCOM and SWGCOM)

- Final stages of comment resolution and recirculation

Technology and Innovation Subcommittee (Alex Cochran)

- No report

CIGRÉ Reports:

- Refer to main committee minutes

Old Business:
None

New Business:

Thursday Technical presentations:

- Protection and Switchgear Standards: Arc Flash, Monitoring and Relaying Applications (Stephen Cary)
- Current Interruption in SF6-free Switchgear (Dave Johnson and Dan Schiffbauer)

PC37.01 Standard for HVDC Circuit Breakers
Chair: Joanne Hu
Secretary: Steven Chen

- Met twice on Monday, April 17
- Discussion of several technical topics
- More volunteers are needed
- PAR expires 2024

PC37.04a Standard for Ratings and Requirements for AC High Voltage Circuit Breakers with Rated Maximum Voltage above 1000 V
Amendment: Changes to construction requirements and clarification of certain related required capabilities
Chair: John Webb
Secretary: Marcus Young

- Met with quorum
- Discussion and progress made on several technical topics
- PAR expires 2025 – extension not expected

PC37.09a IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis
Amendment: Modifications to test procedures
Chair: Jan Weisker
Secretary: Chris Jarnigan

- Met with quorum
- Volunteers needed, several technical topics closed
- PAR expires 2025 – extension not expected

PC37.010 Application Guide for AC High-Voltage Circuit Breakers > 1000 Vac Rated on a Symmetrical Current Basis
Chair: Andy Keels
Vice Chair: Luke Collette
Secretary: Jeremy Hensberger

- Virtual meeting of the working group next Wednesday, April 26.
- Project on schedule

PC37.012 IEEE Application Guide for Capacitance Current Switching for AC High-Voltage Circuit Breakers
Chair: Roy Alexander
Secretary: Luke Collette

- Published
- Motion to disband the working group – Luke Collette, second – Mike Crawford, no discussion, motion passed by consensus.
- **ACTION - HVCB chair to notify the standards coordinator**

P62271-37-013 International Standard for High-Voltage Switchgear and Controlgear – Part 37-013: Alternating Current Generator Circuit-Breakers

- Corrigendum 1 has an approved PAR
- There was discussion about the need for an errata vs. a corrigendum. Errata is permitted for publishing errors while a corrigendum is required for errors committed by the working group.

C37.015 IEEE Guide for the Application of Shunt Reactor Switching – PAR Study Group
Chair: Mike Crawford
Secretary: Luke Collette

- Study group met and voted to approve the scope and purpose of a PAR to revise the document.
- Motion to submit the PAR and form a working group – Mike Crawford, second – Dave Mitchell, no discussion, motion passed by consensus.
- **ACTION – HVCB chair to notify the standards coordinator**

PC37.016 IEEE Standard for AC High Voltage Circuit Switchers Rated 15.5kV through 245kV
Chair: Neil McCord
Secretary: Luke Collette

- Met with quorum
- Schedule OK
- PAR expires 2025

P62271-37-082 Standard for Sound Pressure Levels in Switchgear
Chair: Leslie Falkingham
Secretary: Carl Schuetz

- Met w/o quorum
- No changes to the document
- Two ballot cycles – IEEE then IEC
- On schedule

C37.10 IEEE Guide for Investigation, Analysis, and Reporting of Power Circuit Breaker Failures
Chair: Todd Irwin
Secretary: Jeff Ward

- Met with quorum
- PAR approved – expires 2024
- Draft near completion
- Comment resolution group formed and will meet in June
- Motion for approval to ballot pending working group approval – Todd Irwin, second – Dave Mitchell, no discussion, motion passed by consensus.

C37.11 Standard Requirements for Electrical Control for AC High-Voltage (>1000V) Circuit Breakers
Chair: John Webb
Secretary: Tony Ricciuti

- No further work
- Motion to disband the working group – John Webb, second – Dave Mitchell, no discussion, motion passed by consensus.
- **ACTION – HVCB chair to notify the standards coordinator**

C37.12 Guide for Specifications of High-Voltage Circuit Breakers (over 1000 V) – PAR Study Group
Chair: Todd Irwin
Secretary: Andy Beckel

- Scope, purpose and need approved by the study group (see attachment)
- Motion to submit the PAR as approved and form a working group – Todd Irwin, second – Jeff Ward.
- Discussion – There is no switcher specification guide yet, C37.016 will discuss a switcher specification guide internally. C37.12 will not incorporate switcher specification guidance.
- The motion passed by consensus.
- **ACTION – HVCB chair to notify the standards coordinator**

C37.12.1 IEEE Guide for High-Voltage (> 1000 V) Circuit Breaker Instruction Manual Content – PAR Study Group
Chair: Sam Zaharko
Secretary: Mike Crawford

- Met Monday - scope purpose and need approved by the study group (see attachment)
- Additional content proposed to cover circuit switchers
- Motion to submit the PAR as approved and form a working group – Sam Zaharko, second – Luke Collette, no discussion, motion passed by consensus.
- **ACTION – HVCB chair to notify the standards coordinator**

Motion to adjourn – Dave Mitchell
Second – George Becker

Attendance:

Family Name	Given Name	Affiliation	4/19/2023
Adanur	Mehmet	Southern Company Services	
Adigwu	John Paul	Southern California Edison	
Akhunov	Anatoly	HICO America	X
Alexander	Roy	RWA Engineering	
Alvarado	Natasha	IEEE Standards Association	
Aristizabal	Mauricio	Hitachi Energy	X
Armstrong	Brad	Meramec Instrument Transformer Co.	
Ashtekar	Koustubh	JST Power	X
Atiq	Aasim	Siemens Industry	
Auguste	Georges	Ameren MO	
Ayers	Roy	Nashville Electric Service	

Family Name	Given Name	Affiliation	4/19/2023
Bane	William	Nashville Electric Service	
Barnett	Robert	Tennessee Valley Authority	
Bartels	Andreas	Powell Industries	X
Baskin	Jerry	Federal Pacific	
Beckel	Andy	Xcel Energy	X
Becker	George	POWER Engineers Inc.	X
Becker	Michael	ENMAX Power Corp.	
Behl	Robert	JST Power	X
Berenguela	Diego	Google	
Bergman	W.J. (Bill)	Bergman& Associates Ltd.	
Berner	Brian	Power Grid Components	X
Billings	Stan		
Bisewski	Bruno	RBJ Engineering Corp	
Bolar	Sanket	Oncor	X
Bonner	Marcus	GE	
Booth	Dave	Exiscan	
Bosma	Anne	Hitachi Energy	EA
Bottarelli	Alessandro	ABB	
Boulus	Michael	PSE&G	
Bray	Elizabeth	Southern Company	
Brehm	Cody		
Brignac	Andrew	Entergy	
Brogdon	Jeffrey	Georgia Transmission	X
Brooks	Adam	Duke Energy	X
Brown	Steven	Allen & Hoshall	
Browning	Raymond	FirstEnergy Corp.	
Brunke	John	Dr. John H. Brunke, P.E.	
Bryant	Craig	Duke Energy	X
Bufi	Arben	Meiden America Switchgear, Inc.	X
Burge	Richard	Southern States LLC	
Burns	Dave	Shell Projects & Technology - Innovation R&D	
Burse	Ted	Powell Industries, Inc	
Burt	Ed	BC Hydro	
Byreddy	Sudarshan		
Byron	Eldridge	Schneider Electric	EA
Calderon	Fernando	AC Electric Systems	
Cannady	Michael	Southern Company Services	
Cantrelle	Donald	Georgia Power	
Carmona	Gilbert	Southern California Edison	
Cary	Stephen	2-phase solutions	X
Caverly	David	Trench Ltd.	EA
Cheatham	Jonathan	GE	

Family Name	Given Name	Affiliation	4/19/2023
Chen	Steven	Eaton Corporation	X
Chiodo	Vincent	HICO	
Chovanec	Andrew	Power Grid Components	X
Christian	Michael	ABB	X
Ciofani	Roggero	Altalink	
Colesanti	Michael	Google	
Collette	Dave	Mitsubishi Electric	
Collette	Lucas	Duquesne Light	X
Corriveau	Philippe	MindCore Technologies	
Cosby	Bianca	San Diego Gas & Electric	
Cox, Jr.	Lee	Efacec	
Crawford	Michael	Mitsubishi Electric Power Products, Inc.	X
Creach	Randall	AZZ Switchgear Systems	
Cunningham	Jason	Southern States, LLC	X
Curry	Ellis		
Day	Jerod	Vacuum Interrupters, Inc.	
Degen	Wolfgang	Senior Technical Consultant	
Delisi	Steven	Mitsubishi Electric	
Deng	John	BC Hydro	
Di Lillo	Patrick	Consolidated Edison Co. of NY, Inc.	X
Di Michele	Federico	KEMA	X
Door	Jeffrey	The H-J Family of Companies	X
Dotson	Randall	Lakeland Electric, City of Lakeland, FL	
Dufournet	Denis	Retired	
Duncan	Kirk	Hitachi T&D Solutions	
Dwyer	Pete	Dwyer Enterprises	
Earl	Jerry	ABB - Retired	
Eastman	John	ZTZ Services	
Eastman	Maxwell	Black & Veatch	X
Ebbert	Alexander	HICO America	
Edwards	Kenneth	Kittitas PUD	
Edwards	Doug	Siemens Industry, Inc.	
Eftink	Emily	Burns & McDonnell	
Esco	Tanner	Eaton Corporation	
Evans	Aaron	HICO America	
Falkingham	Leslie	Vacuum Interrupters Limited	X
Fennell	Howard	Nashville Electric Service	
Fentress	Philip	Memphis Light, Gas & Water Div	
Fernihough	William	FMEA Technical Services Ltd	
Ficheux	Arnaud	AREVA T&D	
Figueroa	Hernan	Hubbell Power Systems	
Fink	William	Powell Industries	

Family Name	Given Name	Affiliation	4/19/2023
Flack	Michael	Southern Company Services, Inc.	
Flores	Sergio	Schneider Electric Inc. USA	X
Ford	Shane	Nashville Electric Service	
Fox	Paul	Schneider Electric	
Frazier	Raymond	Ameren	
Galicia	David	Ameren	
Gavazza	Rick	Pacific Gas & Electric	
Gettman	Kenneth	NEMA	
Giraud	Douglas	Powell Industries	
Good	Anne	Netshape Technologies, Inc.	
Gray	Keith	None	
Groves	David	SMC Electrical Products	
Hall	John	Tennessee Valley Authority	
Hand	Charles	Southern California Edison	
Hanna	Robert	JST Power	
Harley	John	FirstPower Group LLC	
Hasnaoui	Nadia	GE Grid Solutions	
Heiermeier	Helmut	ABB	
Heintzelman	Travis	Burns & McDonnell	
Hensberger	Jeremy	Mitsubishi Electric Power Products, Inc.	X
Herman	Bryan	Isberg-Nott Company	
Hermosillo	Victor	GE Grid Solutions	EA
Hester	Edward	Entergy	
Hirz	Harold	G&W	
Holloman	Luther	Retired	
House	George	Yaskawa Electric America	
Houston	James	Southern Company Transmission	
Hu	Jingxuan (Joanne)	RBJ Engineering Corporation	
Huang	Fang		
Hunter	Jennifer	Mitsubishi Electric Power Products, Inc.	X
Hurst	Bill	GE	
Hutchins	Neil	Georgia Power Company	
Hutchinson	Scott	Jacobs Engineering	
Hyjek	Katarzyna	DTE	
Irwin	Todd	GE Grid Solutions	X
Isaac	Carlos	Oncor Electric Delivery	
Jackson	Richard	Detroit Edison	
Jarnigan	Christopher	Southern Company Services	X
Jasinski	Joseph	ITC Holdings Corp.	
Johnson	David	HVCB	X
Kausek	Joe	FirstEnergy	
Keels	Thomas (Andy)	kEElectric Engineering	EA

Family Name	Given Name	Affiliation	4/19/2023
Kelly	John	Beureau Of Reclamation	
Khan	Aftab	ABB Inc.	
Khosravi	Amir	BC Hydro	
Kim	Hong Jun	HICO	
Kim	Jinho	HICO America	
kim	jungdae	hyosung	
Kim	SangTae	HICO/HYOSUNG	
Kim	Yunseong	KERI	X
Kohler	Thomas	Ameren	
Kollar	Alan	FirstEnergy	
Kosakada	Masayuki	Toshiba	
Krause	Dwight	Black & Veatch	X
Kulkarni	Sandeep	CG	
Kuntz	Robert	HICO AMERICA	
Kurinko	Carl	ABB Inc.	
Lachimia	Joseph		
Lagerstrom	Thomas	Pedersen Power Products	
LaMantia	William	Mitsubishi Electric Power Products, Inc.	
Lambert	Stephen	Shawnee Power Consulting, LLC	
Lanning	Scott	Eaton	
LaPlace	Carl	GE Industrial Solutions	
Lavrinoff	Benedict	Kinectrics	
Lawrence	Matthew	Doble Engineering	
Leccia	Brad	Eaton	X
Leclerc	Marc	Hydro-Quebec Research Institute	
LEE	CHANG HOON	HYOSUNG Heavy industries	
Lee	Yongwoo	KERI	X
Lemmerman	David	PECO/Exelon	
Lesse	Werner	Siemens AG	
Lester	George	Boston Edison, Retired	
Leufkens	Paul	DNV	
Ling	Yingjie	GE	
Liu	Hua Ying	Southern California Edison	
Liu	Li	Eaton	
Livshitz	Albert	Qualus Services	EA
Cochran	Alex	G&W Electric	
Lofgren	Bjorn	Siemens Energy	
Long	Russell (Bill)	Retired	
Lopez	Adrian	Powell Industries	X
Lopez	Leo	WIKA Instrument, LP	X
Luehring	Elmer	Hi-Voltage Equipment	
Ma	Chunming	Burns and McDonnell	

Family Name	Given Name	Affiliation	4/19/2023
Mains	Jess	ABB Inc	
Majeed	Kamran	ENMAX Power Corporation	
Mannarino	Antonio	PSE&G	
Mapp	Peter	GE Grid Solutions	
Marshall	Vincent	Southern Company Services	X
Martin	Gary	Entergy	
Martinez	Ricardo	CFE-LAPEM	
Marzec	Peter	S&C Electric Co.	
Mason	Douglas	ComEd	
Masterson	Paul	Meiden America Switchgear, Inc.	X
Matsko	Joseph	Eaton Corp	
May	Steven	Southern Company	X
McBride	James	JMX Services, Inc.	
McCord	Neil	KEC Precision	X
McGlown	Kevin	JST Power	X
Meyer	Peter	S&C Electric Company	
Milnikel	Henning	Siemens	
Mitchell	Dave	Mitch and Associates	X
Monahan	Terry	Schneider Electric	
Montano	Oscar	Salt River Project	
Montoya	Stephanie	Southern California Edison	
Moran	Ashley	IEEE Standards Association (IEEE-SA)	
Moser	Darryl	ABB	
Natale	Anthony	HICO America	
Nayar	Raj	Siemens Energy Inc.	
Nelson	Jeffrey	Tennessee Valley Authority	EA
Norfolk	Jeff	RWE INNOGY	
Olsen	T	Retired, formerly with Siemens Industry, Inc.	
Ordein	Fernando	Doninion Energy	X
Orosz	Miklos	CBT&S, Myers Power Products	X
Osorio	Luis	The H-J Family of Companies	
Owens	John	3M	
Pal	Sumitabha	Schneider Electric	X
Palazzo	Mirko	Hitachi Energy	EA
Palmer	Justin	ELECTRONSYSTEM MD	
Parker	Donald	Alabama Power Company	
Parthasarathi	Raghunath	Bechtel Power	
Patel	Amit	GE	
Pattison	Mark	H-J Family of Companies	X
Pellerito	Thomas	DTE Energy	
Perrin	Damian	Entergy Services, LLC	
Peterson	Alan	Utility Service Corporation	

Family Name	Given Name	Affiliation	4/19/2023
Peterson	Andrew	ABB	
Peterson	Mark	Xcel Energy	X
Phan	Lise	Pacific Gas and Electric Company	
Phelps	Kevin	Nashville Electric Service	
Phouminh	John	PEPCO HOLDINGS, INC.	
Pintado	Zachary	Entergy	
Poeltl	Anton	ABB	
Polchinski	Craig	Mitsubishi Electric Power Products, Inc.	EA
Polk	Matt		
Pounders	Isaac	Meiden America Switchgear, Inc.	X
Profir	Iulian	Rockwell Automation	
Qasem	Ahmad	Bechtel	
Quinones	Jose	Mitsubishi Electric Power Products INc	
Rahman	Syed	The United Illuminating Company	
Raymond	Russell	Northeast Utilities	
Reddy	Samala Santosh	Powell Industries	
Rexroad	Aaron	Meiden America Switchgear, Inc.	X
Ricard	Frank	FirstPower Group LLC	
Ricciuti	Anthony	Eaton Corporation	X
Rich	Bobby	Dominion Energy	
Riffe	Dave	Westinghouse Electric Company	
Riley	Caryn	Georgia Tech/NEETRAC	
Riopel	Sebastien	HPS - Electro Composites (2008) ULC	
Roberts	Brian	Southern States, LLC	X
Rogers	Jon	Siemens Energy, Inc	X
Ross	Hugh	Ross Engineering Corporation	
Rostron	Joe	Retired	
Salinas	Alex	Doble/Vanguard	X
Santos	Leonel	Schneider Electric	X
Sauls	Roderick	Southern Company Services	
Sauro	Fabrizio	Eaton	
Savulyak	Victor	DNV GL KEMA Laboratory	
Sax	Ben	Nashville Electric Service	X
Schacherer	Christian	ABB Switzerland Ltd	
Schiffbauer	Daniel	Toshiba International Corporation	X
Schneider	Carl	Schneider Electric	
Schoonenberg	Gerard	Eaton	
Schuetz	Carl	American Transmission Company (ATC)	X
Schumann	Jon	American Transmission Company	
Scott	Jeff	Ameren	X
Shaikh	Moin	Siemens	
Sharifi	Behzad	ABB	

Family Name	Given Name	Affiliation	4/19/2023
Sharma	Harish	Southern Company	
Sharma	Devki	Entergy	X
Shen	Zheng	Illinois Institute of Technology	
Shiller	Paul	First Power Group, LLC	X
Shinde	Sushil	Hitachi Energy	
Shullaw	John	Retired	
Siena	Matthew	Duke Energy	
Sigmon	Dean	Eaton Corporation	
Sippel	Kevin	Eaton Electric	
Skidmore	Michael	AEP	X
Slattery	Christopher	FirstEnergy	
Smith	Robert (Kirk)	Retired	
Smith	Zachary	Mitsubishi Electric Power Products, Inc.	
Snider	Jordan	Pacific Gas & Electric Co.	
Song	Hongbiao	Bechtel	
Spiewak	Erin	IEEE	
Stacy	James	Schneider Electric	
Stage	James	Dominion Energy	
Staley	Bradley	Salt River Project	
Starcevic	Kresimir	KEMA-Powertest, LLC	
Steigerwalt	Don	Duke Energy	X
Stone	David	DTS Technical Services	
Stone	Ryan	Mitsubishi Electric Power Products, Inc.	
Storms	Alan	Storms Advisory Services	
Swing	Donald	Powell Industries	X
Tabakovic	Dragan	Meramec Hubbell Power Systems	
Tariq	Humayun	American Electric Power	
Toney	John	GE	
Toolis	Elizabeth	MEPPI	
Torres	Jean-Marc	EATON	
Toups	Vernon	Siemens Energy	X
Trichon	Francois	Schneider Electric	X
Tsvetanoff	Jordan	First Energy	
Usner	Joseph	AEP	X
van de Ligt	Jim	Spark Power Corp.	
Wagner	Charles	Consultant	
Wahid	Waqar	Mitsubishi Electric Power Products Inc.	
Walgenbach	Jacob	Siemens Industry	X
Wallace	Keith	Southern Company	
Ward	Jeffrey	Doble Engineering Company	X
Wear	Jonathan	JST Power	
Webb	John	ABB	X

Family Name	Given Name	Affiliation	4/19/2023
Weeks	Casey	Siemens Energy	
Weishuhn	William	ABB	
Weisker	Jan	Siemens Energy	X
Wen	Jerry	BC Hydro	
Westerdale	Matt	Bureau of Reclamation	X
Williams	Sharon	Puget Sound Energy	
Williams	Terry	Bureau of Reclamation	
Williford	Matthew	Schneider Electric	
Wirz	Torsten	ABB AG	
Wolfe	Dan	Mitsubishi Electric Power Products, Inc.	X
Woodyard	Terrance	Siemens Industry Inc.	X
Yoon	Dong Sun	HICO America	
York	Richard	Mitsubishi Electric Power Products, Inc.	X
Younce	Colin	Burns & McDonnell	
Young	Marcus	Mitsubishi Electric Power Products, Inc.	X
Yu	Li	EATON	
Zaharko	Sam	Mitsubishi Electric Power Products, Inc.	X
Zehnder	Lukas	ABB Power Grids Switzerland Ltd.	
Zhang	Wei	Southern Company	EA
Zhong	Jim	American Transmission Company	
			77

NOTE 1 – EA, Excused Absence, does not count against continued membership and does not count toward meeting quorum.

Attachments:

HVCB Meeting Agenda:

1) Introduction of Members and Guests — Carl Schuetz / Dan Schiffbauer

Welcome, Introductions

2) IEEE Slides

- Patent slides
- Copyright policy
- Participant behavior

Quorum Check

3) Approval of Minutes of Previous Meeting

Approval of Minutes of F22 meeting. Sent to all members via e-mail.

Motion for approval:
Second:

4) Membership

Committee	Members	Excused Members	Quorum Requirement [a]
HVCB	51	10	> 21 members

a) Quorum Count includes Members, Chair and Secretary but not excused members. Membership at the meeting must be ≥ 50%.

Excused members: Anne Bosma, Eldridge Byron, David Caverly, Victor Hermosillo, Andy Keels, Albert Lizshitz, Jeff Nelson, Mirko Palazzo, Craig Polchinski, Wei Zhang

5) Chairman's Report

Chairman (Carl Schuetz)	carl.schuetz@ieee.org	(262) 506-6962
Secretary (Dan Schiffbauer)	daniel.schiffbauer@ieee.org	(713) 540-2968

- WG chairs need to email minutes of their WG meetings to the subcommittee secretary no later than Wednesday, May 3.
- Please do not include personal contact information of working group attendees in the meeting minutes – only name and affiliation.
- Please sign up for the new Committee Management System (CMS) at https://ieee.memberplanet.com/v2app/#/member-registration/join
- New HVCB members
    - Koustubh Ashtekar
    - Michael Christian

- Federico di Michele
- Leonel Santos
- Casey Weeks

- Recognition of retirees
  (Any person that has, or will retire before the fall meeting in San Diego, CA)
  - Anne Bosma, Hitachi Energy, end of June
- New participation opportunities available:
  - HVDC circuit breaker and related equipment experience (IEC/ACTAD)
  - Extreme service conditions (IEC)
  - IEEE 1861-2014: Guide for On-Site Acceptance Tests of Electrical Equipment and System Commissioning of 1000 kV AC and Above (revision)

6) Reports of External Working Groups

a) **Technical Paper Reviews** Kirk Smith
b) **ASC C37 Power Switchgear Report** John Webb

HVCB Document Status

Document	Title	Subcommittee(s)	Document	Project	Chair	Comments
PC37.01	**Standard for High Voltage Direct Current Circuit Breakers Above 3200 Vdc**	**HVCB**		**New 5/15/2020 12/31/2024**	**Joanne Hu**	**Formerly PAR 2880**
C37.04-2018	Standard for Ratings and Requirements for AC High Voltage Circuit Breakers with Rated Maximum Voltage above 1000 V	HVCB	Active 5/31/2019 12/31/2029			< 6 years
C37.04-2018 Cor 1	Standard for Ratings and Requirements for AC High Voltage Circuit Breakers with Rated Maximum Voltage above 1000 V	HVCB	Published 9/24/2021			
PC37.04a	**Standard for Ratings and Requirements for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V Amendment: Changes to construction requirements and clarification of certain related required capabilities**	**HVCB**		**Amendment 12/8/2021 12/31/2025**	**John Webb**	
C37.06.1-2018	Recommended Practice for Preferred Ratings for High-Voltage (>1000 volts) AC Circuit Breakers Designated Definite Purpose for Fast Transient Recovery Voltage Rise Times	HVCB	Active 2/6/2018 12/31/2028			< 5 years
C37.09-2018	IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis	HVCB	Active 4/11/2019 12/31/2029			< 6 years
C37.09-2018 Cor 1	IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis	HVCB	Published 6/3/2021			
PC37.09a	**Standard Test Procedures for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V Amendment: Modifications to test procedures**	**HVCB**		**Amendment 12/8/2021 12/31/2025**	**Jan Weiske**	
C37.010-2016	IEEE Application Guide for AC High-Voltage Circuit Breakers > 1000 Vac Rated on a Symmetrical Current Basis	HVCB	Active 4/17/2017 12/31/2027			< 4 years
PC37.010	**Application Guide for AC High-Voltage Circuit Breakers > 1000 Vac Rated on a Symmetrical Current Basis**	**HVCB**		**Revision 12/8/2021 12/31/2025**	**Andy Keels**	
C37.011-2018	IEEE Guide for the Application of Transient Recovery Voltage for AC High-Voltage Circuit Breakers	HVCB	Active 5/30/2019 12/31/2029			< 6 years
C37.012-2022	IEEE Application Guide for Capacitance Current Switching for AC High-Voltage Circuit Breakers Above 1000 V	HVCB	Active 1/20/2023 12/31/2033			< 10 years
IEEE/IEC 62271-37-013-2021	Standard for AC High Voltage (rated above 1000 V) Generator Circuit Breakers for Use With Generators Rated 10 MVA or More	HVCB	Active 10/19/2021 12/31/2031			< 8 years
P62271-37-013-2021 Cor 1	**Standard for AC High Voltage (rated above 1000 V) Generator Circuit Breakers for Use With Generators Rated 10 MVA or More**	**HVCB**		**Corrigendum**	**Mirko Palazzo**	

Document	Title	Subcommittee(s)	Document	Project	Chair	Comments
C37.015-2017	IEEE Guide for the Application of Shunt Reactor Switching	HVCB	Active 3/15/2018 12/31/2028			< 5 years
PC37.015	**IEEE Guide for the Application of Shunt Reactor Switching**	**HVCB**		**PAR study group**	**Mike Crawford**	
C37.016-2018	IEEE Standard for AC High Voltage Circuit Switchers Rated 15.5 kV through 245 kV	HVCB	Active 2/14/2019 12/31/2029			< 6 years
C37.016-2018 Cor 1	IEEE Standard for AC High Voltage Circuit Switchers Rated 15.5kV through 245kV	HVCB	Published 2/11/2022			
PC37.016	**IEEE Standard for AC High Voltage Circuit Switchers Rated 15.5kV through 245kV**	**HVCB**		**Revision 12/8/2021 12/31/2025**	**Neil McCord**	
C37.017-2020	IEEE Standard for Bushings for High-Voltage (over 1000 Vac) Circuit Breakers and Gas-Insulated Switchgear	HVCB/GIS	Active 1/29/2021 12/31/31			< 8 years
IEEE/IEC 62271-37-082-2012	High-voltage switchgear and controlgear – Part 37-082: Standard practice for the measurement of sound pressure levels on alternating current circuit-breakers	HVCB	Active 10/22/2012 12/31/2022			
IEEE/IEC P62271-37-082	**High-voltage Switchgear and Controlgear - Part 37-082: Standard Practice for the Measurement of Sound Pressure Levels on Alternating Current Circuit-breakers**	**HVCB**		**Revision 12/8/2021 12/31/2025**	**Leslie Falkingham**	
C37.10-2011	IEEE Guide for Investigation, Analysis, and Reporting of Power Circuit Breaker Failures	HVCB	Inactive-Reserved 12/30/2011 12/31/2021			
PC37.10	**IEEE Guide for Investigation, Analysis, and Reporting of Power Circuit Breaker Failures**	**HVCB**		**Revision 2/15/2023 12/31/2024**	**Todd Irwin**	
C37.10.1-2018	IEEE Guide for the Selection of Monitoring for Circuit Breakers	HVCB	Active 5/9/2019 12/31/2029			< 6 years
C37.11-2014	IEEE Standard Requirements for Electrical Control for AC High-Voltage (>1000 V) Circuit Breakers	HVCB	Active 2/20/2015 12/31/2025			< 2 years
PC37.11	**IEEE Standard for Electrical Control for AC High-Voltage (>1000 V) Circuit Breakers**	**HVCB**		**02/08/2019 12/31/2023**	**John Webb**	**Document approved 12/3/2022 Not published**
C37.12-2018	IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 Volts)	HVCB	Active 4/17/2019 12/31/2029			< 6 years

Document	Title	Subcommittee(s)	Document	Project	Chair	Comments
C37.12	**IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 Volts)**	**HVCB**		**PAR study group**	**Todd Irwin**	
C37.12.1-2018	IEEE Guide for High Voltage (>1000V) Recommended Practice for Circuit Breaker Instruction Manual Content	HVCB	Active 4/16/2019 12/31/2029			< 6 years
C37.12.1	**IEEE Guide for High Voltage (>1000V) Recommended Practice for Circuit Breaker Instruction Manual Content**	**HVCB**		**PAR study group**	**Sam Zakerka**	

7) Reports of ADSCOM and other WG/TF/Study Group

a) C37.20.6 IEEE Standard for 4.76kV to 38 kV Rated Ground and Test Devices Used in Enclosures (Ron Hartzel)

b) C37.100.1 Common Requirements for High Voltage Power Switchgear Rated Above 1000 V (John Webb)

c) C37.122.2 IEEE Guide for the Application of Gas-Insulated Substations Rated 1 kV to 52 kV (Eldridge Byron)

d) C37.122.3 IEEE Guide for Sulphur Hexafluoride (SF6) Gas Handling for High-Voltage (over 1000 Vac) Equipment (Billy Lao)

e) C37.122.10 IEEE Guide for Handling Non-Sulphur Hexafluoride (SF6) Gas Mixtures for High Voltage Equipment (Billy Lao)

f) C57.16: IEEE Standard for Requirements, Terminology and Test Code for Dry-Type Air-Core Series Connected Reactors (David Caverly)

g) C57.142: Guide to Describe the Occurrence & Mitigation of Switching Transients Induced by Transformers, Switching Devices and System Interactions (David Caverly) jointly sponsored by TRFCOM and SWGCOM)

h) Technology and Innovation Subcommittee (Alex Cochran)

8) CIGRÉ Reports

Report to Subcommittee (Nenad Uzelac)

9) Old Business

10) New Business

a) Thursday technical presentations

i) Protection and Switchgear Standards: Arc Flash, Monitoring and Relaying Applications (Stephen Cary)

ii) Current Interruption in SF6-free Switchgear (Dave Johnson and Dan Schiffbauer)

b) Documents Approved by RevCom or Published since the last meeting

i) C37.012 - IEEE Application Guide for Capacitance Current Switching for AC High-Voltage Circuit Breakers Above 1000 V (Roy Alexander, Luke Collette)

Motion to disband the working group.

ii) C37.11 - IEEE Standard for Electrical Control for AC High-Voltage (>1000 V) Circuit Breakers (John Webb, Tony Riccuiti)

Motion to disband the working group.

iii) C37.122.2 - IEEE Guide for the Application of Gas-Insulated Substations Rated 1 kV to 52 kV (Eldridge Byron, Terry Woodyard, Nicholas Matone)

c) HVCB working group reports

i) PC37.01 - Standard for High Voltage Direct Current Circuit Breakers Above 3200 Vdc
Chair: Joanne Hu
Secretary: Steven Chen

ii) PC37.04a - Standard for Ratings and Requirements for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V Amendment: Changes to construction requirements and clarification of certain related required capabilities
Chair: John Webb
Secretary: Marcus Young

iii) PC37.09a - Standard Test Procedures for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V Amendment: Modifications to test procedures
Chair: Jan Weisker
Secretary: Chris Jannigan

iv) PC37.010 - Application Guide for AC High-Voltage Circuit Breakers > 1000 Vac Rated on a Symmetrical Current Basis
Chair: Andy Keels
Secretary: Jeremy Hensberger

v) P62271-37-013 Cor 1 - Standard for AC High Voltage (rated above 1000 V) Generator Circuit Breakers for Use with Generators Rated 10 MVA or More
Chair: Mirko Palazzo
Vice Chair: Anne Bosma

Request to ballot corrigendum 1

vi) C37.015 PAR Study Group - IEEE Guide for the Application of Shunt Reactor Switching
Chair: Mike Crawford
Secretary: Luke Collette

vii) PC37.016 - IEEE Standard for AC High Voltage Circuit Switchers Rated 15.5kV through 245kV
Chair: Neil McCord
Vice Chair: Luke Collette

Secretary: Scott Lanning

viii) P62271-37-082 - High-voltage Switchgear and Controlgear - Part 37-082: Standard Practice for the Measurement of Sound Pressure Levels on Alternating Current Circuit-breakers
Chair: Leslie Falkingham
Secretary: Carl Schuetz

ix) PC37.10 - IEEE Guide for Investigation, Analysis, and Reporting of Power Circuit Breaker Failures
Chair: Todd Irwin
Secretary: TBD

x) C37.12 PAR Study Group - IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 Volts)
Chair: Todd Irwin
Secretary: TBD

xi) C37.12.1 PAR Study Group - IEEE Guide for High Voltage (>1000V) Recommended Practice for Circuit Breaker Instruction Manual Content
Chair: Sam Zaharko
Secretary: Mike Crawford

11) Future Meetings

a) Fall 2023: Catamaran Resort - San Diego, CA
b) Spring 2024: Fort Lauderdale, FL
c) Fall 2024: Oklahoma City, OK
d) Spring 2025: TBD
e) Fall 2025: Reno, NV

12) Adjourn

Motion:
Second:

C37.015 PAR scope, purpose:

PAR Draft

A. Proposed additional content
- Direction on using system studies
- Data received from feedback on shortened survey sent to users of shunt reactors

3. PAR Draft

Proposed Scope and Purpose based on PAR WG Meeting

- **Scope:** This application guide applies to ac high-voltage (> 1000 V) circuit breakers rated for shunt reactor switching. This application guide provides the theoretical background of shunt reactor switching and how information obtained from test results and system studies should be used to predict overvoltages in the field and gives suggestions how to mitigate these overvoltages.

- **Purpose:** This guide is intended for general use in the application of ac high-voltage circuit breakers for shunt reactor current switching. ~~The current to be interrupted is generally less than 300 A rms; however, s~~Shunt reactor switching imposes a unique and severe duty on the connected system and the circuit breaker. Successful interruption is the result of a complex interaction between the circuit breaker and the circuit; this interaction can result in significant overvoltages. The purpose of the guide is to describe, principally for the benefit of the user, the shunt reactor switching duty, the overvoltages generated, and the control of those overvoltages. The guide further details the specification of circuit breakers and procedures to predict field performance based on test data.

C37.12 PAR scope, purpose, need:

Scope Review

IEEE Std C37.12: IEEE Guide for Specifications of AC High Voltage Circuit Breakers (over 1000V)

Scope

- This guide is for development of specifications that apply to all indoor and outdoor types of ac high-voltage circuit breakers rated above 1000 V

Scope Review

Purpose

- This document is intended as a guide for use in developing specifications for ac high-voltage circuit breakers. This guide is for specifications that apply to all indoor and outdoor types of ac high-voltage circuit breakers rated above 1000 V. The imperative mode of the language is illustrative of that used in specifications. It does not imply that this document is anything other than advisory in its scope.

Scope Review

Need for the Project

- The existing document requires updating to be consistent with other related standard(s) revisions including but not limited to IEEE C37.04, IEEE C37.09, IEEE C37.100.5, IEEE C37.010, IEEE C37.011, IEEE C37.012 and IEEE C37.11.

C37.12.1 PAR scope, purpose

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PAR Draft

A. Proposed additional content

– Due to the similarities in the between High-Voltage Circuit Breakers and High-Voltage Circuit Switchers, the discussion during this PAR working group meeting centered around the inclusion of High-Voltage Circuit Switchers in the C37.12.1 Recommended Practice for Instruction Manual Content

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3. PAR Draft

Proposed Scope and Purpose based on PAR WG Meeting

- **Scope:** This recommended practice is intended to identify, organize and summarize information about high -voltage circuit breakers and circuit switchers provided by the manufacturer that knowledgeable users will find useful for the receipt, installation, commissioning, operation and maintenance, and decommissioning of ac high -voltage circuit breakers and circuit switchers above 1000 VAC. This recommended practice recommends categories and an arrangement for the presentation of information in circuit breaker and circuit switcher instruction manuals.
- **Purpose:** The purpose of the document is to provide recommendations for authors and those who specify instruction manuals for ac high -voltage circuit breakers and circuit switchers . Structuring instruction manual content according to a common (standard) format shown herein will allow knowledgeable users a means to effectively and quickly, find the information they need:
  - To receive, install, and commission new high -voltage circuit breakers and circuit switchers.
  - To operate, inspect, maintain, and repair high -voltage circuit breakers and circuit switchers throughout their service life.
  - To decommission the high -voltage circuit breakers and circuit switchers at the end of their service life.

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