

**Minutes of Meeting
High Voltage Circuit Breaker Subcommittee**

Fall 2022

Hilton Burlington Lake Champlain, Burlington, VT

October 19, 2022 from 3:45 to 5:30 in Adirondack AB

Chair called the meeting to order at 3:45.

Introduction of all participants including members and officers.

57 participants in attendance

34 of 55 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 spring 2022 meeting minutes.

Motion: Neil Hutchins

Second: Terry Woodyard

Discussion: None

Approved by unanimous consent

Chairman's report:

- **Requested working group chairs to email their meeting minutes to the subcommittee secretary no later than October 31. daniel.schiffbauer@toshiba.com**
- Neil Hutchins is taking a new position and will not be returning to the switchgear committee. The chair recognized Neil for his contributions.

External reports:

Technical paper reviews (Kirk Smith):

One paper was submitted for review. The topic was vacuum circuit breakers. Several reviewers submitted comments. These were sent to the authors with instructions to make revisions and resubmit the paper within 6 weeks. The paper was never resubmitted – possibly withdrawn.

Accredited Standards Committee C37 power switchgear (John Webb):

- C37.54 Indoor AC HVCB applied as removable elements in metal-enclosed switchgear – conformance test procedures. Out for ballot until November 03, 2022.
- C37.57 under revision and currently in comment resolution.

ADSCOM and other working group, study group and taskforce reports:

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

- No quorum
- Making progress on several technical topics
- Virtual meetings over winter
- PAR expires 12/2024

Taskforce to review shunt reactor switching (inductive load switching) (Sushil Shinde):

- Met with quorum
- Working group voted to disband the working group. The intention is to apply any completed work to a revision of C37.015.
- Motion to disband the working group – Luke Collette
 - Second – Mike Crawford
 - Discussion
 - C37.09 treats inductive load switching as optional. Therefore, C37.015 should continue to not be a standard. Both C37.04 and C37.09 intend to continue in this manner.
 - Motion approved by consensus

C37.122.10 Guide for handling non-SF6 gas mixtures for HV equipment (George Becker):

- 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 and mitigation of switching transients induced by transformers, switching device and system interactions (David Caverly):

- No report

Technology and Innovation Subcommittee reports:

No reports

CIGRE Reports:

Refer to main committee minutes

Old Business:

None

New Business:

Thursday Technical presentation - Three (3) Vermont Electric Co Events/Projects:

- Failure of Phase Shifting Transformer and Possible Different Technologies for Future

- Protection Relay Mis-Operation Due to Hi-Penetration of Inverter Resources Into a Fault
- Electro Magnetic Pulse (EMP) Proofing of a Data Center

62271-37-082-2012 Standard for Sound Pressure Levels in Switchgear

Chair: **Leslie Falkingham**

Secretary: **Carl Schuetz**

- Intent is for IEEE to go to ballot for reaffirmation and a new stability date. The new stability date would then be approved at the plenary meeting of IEC SC 17A in San Francisco at the end of October 2022.
- The process outlined above has been reviewed with IEC and is correct.
- The working group voted to go to ballot as a reaffirmation.
- Procedural review by HVCB is completed.

C37.01 Standard for HVDC Circuit Breakers

Chair: **Joanne Hu**

Secretary: **Steven Chen**

- Met twice on Monday, October 17 – no quorum
- Discussion of several technical topics
- More volunteers are needed
- PAR expires 2024

C37.04a 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

C37.09a 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
- Discussion and progress made on several technical topics
- PAR expires 2025

C37.010 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**

- Met with quorum
- Next meeting is virtual in January

- Chair requested working group officers identified on the switchgear committee website be updated to reflect reality

C37.012 IEEE Application Guide for Capacitance Current Switching for AC High-Voltage Circuit Breakers

Chair: **Roy Alexander**

Secretary: **Luke Collette**

- Submitted to RevCom and approved
- Awaiting the results of IEEE editorial review

C37.016 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

C37.10 IEEE Guide for Investigation, Analysis, and Reporting of Power Circuit Breaker Failures

Chair: **Todd Irwin**

Secretary: **Jeff Ward**

- Met with quorum
- Next meeting will be virtual in December
- Neil Hutchins made a motion to ask for a PAR revision that would change C37.10 from a guide to a recommended practice.
 - Second – Andy Keels
 - Discussion
 - The motion is supported given the style of the text
 - The motion passed by consensus

C37.11 Standard Requirements for Electrical Control for AC High-Voltage (>1000V) Circuit Breakers

Chair: **John Webb**

Secretary: **Tony Ricciuti**

- Met with quorum
- Ballot has 100% approval and no comments
- Document has been submitted to RevCom
- PAR expires 2024

C37.122.2 IEEE Guide for the Application of Gas-Insulated Substations Rated 1 kV to 52 kV

Chair: **Eldridge Byron**

Co-secretaries: **Terry Woodyard and Nicholas Matone**

- No meeting
- Document is submitted to RevCom and is on the October agenda

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

Chair: **Billy Lao**

Vice Chair: **Dave Giegel** (outgoing)

Secretary: **Arnaud Ficheux**

- No report

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

Chair: **Billy Lao**

Vice Chair: **Arnaud Ficheux**

Secretary: **Jorge Marquez**

- No report

General discussion:

- Future study groups
 - C37.12 and C37.12.1 were identified as two guides that expire in 2028 but could be reaffirmed relatively quickly to free up resources for documents that require more effort.
 - A member suggested to initiate a PAR for both C37.12 and C37.12.1 and go directly to ballot to determine what, if any, comments are received.
 - Todd Irwin accepted appointment as chair of C37.12.
 - Sam Zaharko accepted appointment as chair of C37.12.1. Mike Crawford is secretary.

Motion to adjourn – Andy Keels

Second – Jeff Ward

Attendance:

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

| Family Name | Given Name | Affiliation | 10/19/2022 |
|-------------|------------|------------------------------------|------------|
| Adanur | Mehmet | Southern Company Services | |
| Adigwu | John Paul | Southern California Edison | |
| 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 | |
| Bane | William | Nashville Electric Service | |
| Barnett | Robert | Tennessee Valley Authority | |
| Baskin | Jerry | Federal Pacific | |
| Becker | George | POWER Engineers Inc. | X |
| Becker | Michael | ENMAX Power Corp. | |
| Berenguela | Diego | Google | |

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|------------|-------------|--|----|
| Bergman | W.J. (Bill) | Bergman& Associates Ltd. | |
| Billings | Stan | | |
| Bisewski | Bruno | RBJ Engineering Corp | |
| 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 | |
| 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 | |
| Caverly | David | Trench Ltd. | EA |
| Ceatham | Jonathan | GE | |
| Chen | Steven | Eaton Corporation | X |
| Chiodo | Vincent | HICO | |
| Chovanec | Andrew | G&W Electric | 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 | |

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|------------|-----------|--|---|
| 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 | X |
| Di Lillo | Patrick | Consolidated Edison Co. of NY, Inc. | X |
| Di Michele | Federico | KEMA | X |
| Door | Jeffrey | The H-J Family of Companies | |
| 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 | |
| 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 | |
| Fennell | Howard | Nashville Electric Service | |
| Fentress | Philip | Memphis Light, Gas & Water Div | |
| Fernihough | William | FMEA Technical Services Ltd | |
| Ficheux | Arnaud | AREVA T&D | |
| Figuroa | Hernan | Hubbell Power Systems | |
| Fink | William | Powell Industries | |
| 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 | |

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|-------------|-------------------|--|----|
| Groves | David | SMC Electrical Products | |
| Hall | John | Tennessee Valley Authority | |
| Hand | Charles | Southern California Edison | |
| Hanna | Robert | JST Power | X |
| Harley | John | FirstPower Group LLC | |
| Hasnaoui | Nadia | GE Grid Solutions | X |
| 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 | X |
| 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 | EA |
| Huang | Fang | | |
| Hunter | Jennifer | Mitsubishi Electric Power Products, Inc. | X |
| Hurst | Bill | GE | |
| Hutchins | Neil | Georgia Power Company | X |
| 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 | EA |
| Kausek | Joe | FirstEnergy | |
| Keels | Thomas (Andy) | kEElectric Engineering | X |
| 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 | |
| Kohler | Thomas | Ameren | |
| Kollar | Alan | FirstEnergy | |
| Kosakada | Masayuki | Toshiba | |

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| Kulkarni | Sandeep | CG | |
| Kuntz | Robert | HICO AMERICA | |
| Kurinko | Carl | ABB Inc. | X |
| 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 | |
| Lavrino | Benedict | Kinectrics | |
| Lawrence | Matthew | Doble Engineering | |
| Leccia | Brad | Eaton | X |
| Leclerc | Marc | Hydro-Quebec Research Institute | |
| LEE | CHANG HOON | HYOSUNG Heavy industries | |
| 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 | X |
| Lizardo 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 | |
| Mains | Jess | ABB Inc | |
| Majeed | Kamran | ENMAX Power Corporation | |
| Mannarino | Antonio | PSE&G | |
| Mapp | Peter | GE Grid Solutions | X |
| Marshall | Vincent | Southern Company Services | X |
| Martin | Gary | Entergy | |
| Martinez | Ricardo | CFE-LAPEM | |
| Marzec | Peter | S&C Electric Co. | |
| Mason | Douglas | ComEd | |
| Matsko | Joseph | Eaton Corp | |
| May | Steven | Southern Company | X |
| McBride | James | JMX Services, Inc. | |

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| 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. | |
| Orosz | Miklos | CBT&S, Myers Power Products | X |
| Osorio | Luis | The H-J Family of Companies | |
| Owens | John | 3M | |
| Pal | Summit | Schneider Electric | X |
| Palazzo | Mirko | Hitachi Energy | |
| Palmer | Justin | ELECTRONSYSTEM MD | |
| Parker | Donald | Alabama Power Company | |
| Parthasarathi | Raghunath | Bechtel Power | |
| Patel | Amit | GE | |
| Pattison | Mark | H-J Family of Companies | |
| Pellerito | Thomas | DTE Energy | |
| Perrin | Damian | Entergy Services, LLC | |
| Peterson | Alan | Utility Service Corporation | |
| Peterson | Andrew | ABB | |
| Peterson | Mark | Xcel Energy | |
| 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. | |
| Polk | Matt | | |
| Profir | Iulian | Rockwell Automation | |
| Qasem | Ahmad | Bechtel | |
| Quinones | Jose | Mitsubishi Electric Power Products INC | |
| Rahman | Syed | The United Illuminating Company | |

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| Raymond | Russell | Northeast Utilities | |
| Reddy | Samala Santosh | Powell Industries | |
| 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 | |
| Rogers | Jon | Siemens Energy, Inc | |
| Ross | Hugh | Ross Engineering Corporation | |
| Rostron | Joe | Retired | |
| Salinas | Alex | Doble | |
| Santos | Leonel | Schneider Electric | X |
| Sauls | Roderick | Southern Company Services | |
| Sauro | Fabrizio | Eaton | |
| Savulyak | Victor | DNV GL KEMA Laboratory | 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 | |
| Sharma | Harish | Southern Company | |
| Sharma | Devki | Entergy | |
| Shen | Zheng | Illinois Institute of Technology | |
| Shinde | Sushil | Hitachi Energy | EA |
| 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 | X |
| Smith | Zachary | Mitsubishi Electric Power Products, Inc. | |
| Snider | Jordan | Pacific Gas & Electric Co. | |
| Song | Hongbiao | Bechtel | |
| Spiewak | Erin | IEEE | |

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|-------------|-----------|--|----|
| Stacy | James | Schneider Electric | |
| Stage | James | Dominion Energy | |
| Staley | Bradley | Salt River Project | |
| Starcevic | Kresimir | KEMA-Powertest, LLC | |
| Steigerwalt | Don | Duke Energy | |
| 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 | 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 | |
| Wallace | Keith | Southern Company | |
| Ward | Jeffrey | Doble Engineering Company | X |
| Wear | Jonathan | JST Power | |
| Webb | John | ABB | X |
| Weeks | Casey | Siemens Energy | X |
| Weishuhn | William | ABB | |
| Weisker | Jan | Siemens AG | EA |
| Wen | Jerry | BC Hydro | |
| Westerdale | Matt | Bureau of Reclamation | |
| 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 |

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|---------|-------|--|---|
| Yu | Li | EATON | |
| Zaharko | Sam | Mitsubishi Electric Power Products, Inc. | X |
| Zehnder | Lukas | ABB Power Grids Switzerland Ltd. | |
| Zhang | Wei | Southern Company | |
| Zhong | Jim | American Transmission Company | |

Attendees: 57

Attachments:

HVCB Meeting Agenda:

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

Welcome, Introductions

2) **IEEE Patent and Copyright Policy**
Review patent & copyright policy requirements

<https://standards.ieee.org/wp-content/uploads/import/documents/other/Participant-Behavior-Individual-Method.pdf>

Quorum check.

3) **Approval of Minutes of Previous Meeting**

Approval of Minutes of S22 meeting. Sent to all members via e-mail.

motion for approval:

~~second.~~

4) **Membership**

| | ROLE AS MEMBERS | ROLE AS NON-MEMBER (GUEST) | EXCUSED | REQUIRED* FOR QUORUM COUNT | TOTAL |
|-----------------------|-----------------|----------------------------|---------|---|-------|
| HVCB Committee Roster | 55 | | 7 | ≥ 50% membership at meeting (> 26members) | |

*Quorum Count includes: Members, Chair, Secretary but not excused members

Excused members (7): Joanne Hu, Eldridge Byron, Dave Caverly, Jeff Nelson, Anne Bosma, Sushil Shinde, Jan Weisker

5) **Chairman's Report**

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

- WG chairs need to email minutes of their WG meetings to the subcommittee secretary no later than Wednesday, November 2.
- Please do not include personal contact information of working group attendees in the meeting minutes – only name and affiliation.
- Recognition of retirees
(Any person that has, or will retire before the spring meeting in Clearwater, FL)
- Recognition of past chair

6) Reports of External Working Groups

- a) **Technical Paper Reviews**
- b) **ASC C37 Power Switchgear Report**

Kirk Smith
John Webb

c) HVCB Document Status

| Document | Title | Subcommittee | WG Chair | PAR | Document Status | Comments |
|-------------------|---|--------------|-----------------|-------------------------|------------------------|------------------------------|
| PC37.01 | Standard for High Voltage Direct Current Circuit Breakers Above 3200 Vdc | HVCB | Joanne Hu | PAR approved 5/15/2020 | PAR expires 12/31/2024 | 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 | Stephen Cary | | Active | Published on May 31, 2019. |
| C37.04-2018 Cor 1 | Standard for Ratings and Requirements for AC High Voltage Circuit Breakers with Rated Maximum Voltage above 1000 V | HVCB | John Webb | | Active | Published on Sept. 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 | John Webb | PAR approved 12/8/2021 | PAR expires 12/31/2025 | |
| C37.06.-2009 ANSI | IEEE Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis - Preferred Ratings and Related Required Capabilities for Voltages Above 1000 V | HVCB | | | Inactive | Incorporated into C37.04 |
| 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 | Sushil Shinde | | Active | Published in 2018 |
| C37.09-2018 | IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis | HVCB | Xi Zhu | | Active | Published on April 11, 2019. |
| C37.09-2018 Cor 1 | IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis | HVCB | Jan Weisker | | Active | Published on June 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 | Jan Weisker | PAR approved 12/8/2021 | PAR expires 12/31/2025 | |
| PC37.010 | Application Guide for AC High-Voltage Circuit Breakers > 1000 Vac Rated on a Symmetrical Current Basis | HVCB | Andy Keels | PAR approved 12/8/2021 | PAR expires 12/31/2025 | |
| C37.011-2018 | IEEE Guide for the Application of Transient Recovery Voltage for AC High-Voltage Circuit Breakers | HVCB | Denis Dufournet | | Active | Published in 2019. |
| PC37.012-2014 | IEEE Application Guide for Capacitance Current Switching for AC High-Voltage Circuit Breakers | HVCB | Roy Alexander | PAR approved 03/24/2022 | PAR expires 12/31/2024 | Approved by REVCOM |

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|------------------------|--|---------------------------------|-------------------|-------------------------|------------------------|------------------------------|
| C37.012a | IEEE Application Guide for Capacitance Current Switching for AC High-Voltage Circuit Breakers | HVCB | Roy Alexander | | Active | Published on Aug. 7, 2020 |
| IEEE/IEC 62271-37-013 | Standard for AC High Voltage (rated above 1000 V) Generator Circuit Breakers for Use With Generators Rated 10 MVA or More | HVCB | Mirko Palazzo | | Active | Published 10/19/2021 |
| 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 | Leslie Falkingham | PAR approved 12/8/2021 | PAR expires 12/31/2025 | |
| C37.015-2018 | IEEE Guide for the Application of Shunt Reactor Switching | HVCB | Anne Bosma | | Active | Published on Mar.15, 2018 |
| PC37.016 | Standard for AC High Voltage Circuit Switchers Rated 15.5kV through 245kV | HVCB | Neil McCord | PAR approved 12/8/2021 | PAR expires 12/31/2025 | |
| C37.016-2018 Cor 1 | Standard for AC High Voltage Circuit Switchers Rated 15.5kV through 245kV | HVCB | Neil McCord | | Active | |
| C37.017-2010 | IEEE Standard for Bushings for High-Voltage [over 1000 V (ac)] Circuit Breakers and Gas-Insulated Switchgear | HVCB-GIS | Devki Sharma | | Active | Published on Jan. 29, 2021 |
| PC37.10-2011 | IEEE Guide for Investigation, Analysis, and Reporting of Power Circuit Breaker Failures | HVCB | Neil Hutchins | PAR approved 12/3/2020 | PAR expires 12/31/2024 | |
| C37.10.1-2018 | IEEE Guide for the Selection of Monitoring for Circuit Breakers | HVCB | Dave Mitchell | | Active | Document published in 2018. |
| PC37.11-2014 | Standard Requirements for Electrical Control for AC High-Voltage (>1000V) Circuit Breakers | HVCB | John Webb | PAR approved 02/08/2019 | PAR expires 12/31/2023 | |
| C37.12-2018 | IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 Volts) | HVCB | John Webb | | Active | Published in 2018 |
| C37.12.1-2018 | IEEE Guide for High Voltage (>1000V) Recommended Practice for Circuit Breaker Instruction Manual Content | HVCB | Ken Edwards | | Active | Published in 2018 |
| C37.20.6-2015 | 4.76 kV to 38 kV Rated Grounding and Testing Devices Used in Enclosures | ADSCOM joint HVCB/SA | T. W. Olsen | | Active | Published in 2015 |
| C37.59-2018 | Requirements for Conversion of Power Switchgear Equipment | ADSCOM joint HVCB, SA, and LVSD | Dean Sigmon | | Active | |
| C37.122-2010 | Standard for High Voltage Gas-Insulated Substations Rated above 52 kV | Joint SUB/SWG HVCB | Ryan Stone | | Active | Published on August 25, 2021 |

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|-----------------|---|--------------------|----------------|-------------------------|---|---|
| PC37.122.2-2011 | Guide for the Application of Gas-Insulated Substations Rated 1 kV to 52 kV | Joint SUB/SWG HVCB | Eldridge Byron | PAR approved 06/03/2019 | Document expires 12/31/2021 PAR expires 12/31/2023 | Sent to REVCOM and on 10/14/22 agenda. |
| PC37.122.3-2011 | IEEE Guide for Sulphur Hexafluoride (SF6) Gas Handling for High-Voltage (over 1000 Vac) Equipment | Joint SUB/SWG HVCB | Billy Lao | PAR approved 09/05/2019 | PAR expires 12/31/2023 | PAR revised to show co-sponsored with Substation Committee. |
| PC37.122.10 | Guide for Handling Non-Sulphur Hexafluoride (SF6) Gas Mixtures for High Voltage Equipment | Joint SUB/SWG HVCB | Billy Lao | PAR approved 06/03/2019 | PAR expires 12/31/2023 | Co-sponsored with Substation Committee. |

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

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|---|---------------|
| C37.100.1 Common Requirements for High Voltage Power Switchgear Rated Above 1000 V | John Webb |
| TF to review Shunt Reactor (inductive load) Switching | Luke Collette |
| C37.122.10 Guide for Handling Non-SF6 Gas Mixtures for HV Equipment | Billy Lao |
| C57.16: IEEE Standard for Requirements, Terminology and Test Code for Dry-Type Air-Core Series Connected Reactors | David Caverly |
| C57.142: Guide to Describe the Occurrence & Mitigation of Switching Transients Induced by Transformers, Switching Device, & System Interactions Jointly sponsored by TRFCOM and SWGCOM. Report to Subcommittee. | David Caverly |
| Technology and Innovation Subcommittee | Alex Cochran |

8) CIGRE Reports

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| Report to Subcommittee | Nenad Uzelac |
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9) Old Business

10) New Business

a) Thursday Technical presentation

Three (3) Vermont Electric Co Events/Projects:

- Failure of Phase Shifting Transformer and Possible Different Technologies for Future
- Protection Relay Mis-Operation Due to Hi-Penetration of Inverter Resources Into a Fault
- Electro Magnetic Pulse (EMP) Proofing of a Data Center

b) Documents Approved by RevCom or Published since last meeting

- 62271-37-013 Standard for AC High Voltage (rated above 1000 V) Generator Circuit Breakers for Use With Generators Rated 10 MVA or More
Published 10/2021
Chair: Lukas Zehnder for Mirko Palazzo
Secretary: Matt Westerdale

- c) 62271-37-082-2012 Standard for Sound Pressure Levels in Switchgear
Chair: Carl Schuetz for Leslie Falkingham
Secretary: Carl Schuetz

- d) C37.01 Standard for HVDC Circuit Breakers
Chair: Steven Chen for Joanne Hu
Secretary: Steven Chen

- e) C37.04a 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

- f) C37.09a 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

- g) C37.010 Application Guide for AC High-Voltage Circuit Breakers > 1000 Vac Rated on a Symmetrical Current Basis
Chair: Andy Keels
Secretary: Jeremy Hensberger

- h) C37.012. IEEE Application Guide for Capacitance Current Switching for AC High-Voltage Circuit Breakers
Chair: Luke Collette for Roy Alexander
Secretary: Luke Collette

- i) C37.015. IEEE Guide for the Application of Shunt Reactor Switching – PAR study group S23
Chair: Mike Crawford
Secretary: Luke Collette

- j) C37.016 IEEE Standard for AC High Voltage Circuit Switchers Rated 15.5kV through 245kV
Chair: Neil McCord
Vice Chair: Luke Collette
Secretary: Scott Lanning

- k) C37.10 IEEE Guide for Investigation, Analysis, and Reporting of Power Circuit Breaker Failures
Chair: Neil Hutchins

Secretary: Todd Irwin

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

- m) C37.122.2 IEEE Guide for the Application of Gas-Insulated Substations Rated 1 kV to 52 kV
Chair: Eldridge Byron
Co-secretaries: Terry Woodyard and Nicholas Matone
Sent to REVCOM and is on the October 14 agenda with 97% approval, 91% return.

- n) C37.122.3 IEEE Guide for Sulphur Hexafluoride (SF6) Gas Handling for High-Voltage (over 1000 Vac) Equipment
Chair: Billy Lao
Vice Chair: Dave Giegel (outgoing)
Secretary: Arnaud Ficheux

- o) C37.122.10 IEEE Guide for Handling Non-Sulphur Hexafluoride (SF6) Gas Mixtures for High Voltage Equipment
Chair: Billy Lao
Vice Chair: Arnaud Ficheaux
Secretary: Jorge Marquez

- p) C37.12 and C37.12.1 – PAR study groups?

Future Meetings

- a) Spring 2023: Clearwater, FL
- b) Fall 2023: San Diego, CA
- c) Spring 2024: St. Petersburg, FL

11) Adjourn

Motion:

Second: