

**Minutes of Meeting**  
**C37.100.7 Performance Evaluation of SF<sub>6</sub> Alternatives**

**7<sup>th</sup> Meeting, Online, Fall 2021, October 12<sup>th</sup>, 2021**

**Chair: Daniel Schiffbauer**  
**Vice Chair: George Becker**  
**Secretary: Victor Hermosillo**

**Attendance**

Attendance: 54  
Members, corresponding members: 35  
Guests: 19

Quorum reached 35 out of 57 members

**Introductions**

Introductions were made through the chat box.

**Motion to Approve Agenda**

Motion to approve agenda: Michael Crawford  
Second: Richard York  
Approved by consensus

**Review of IEEE Patent and Copyright slides.**

**Motion to Approve Spring 2021 Meeting Minutes**

Motion to approve agenda: Caryn Riley  
Second: George Becker  
Approved by consensus

**Outlook**

The project schedule was presented. Guide has been restructured with a guide format, rather than technical report. Document draft early 2022, start ballot & comment resolution process. PAR expires December 2022.

**Discussion of Contents**

- Previous revision Chapter 11 moved mostly into Chapter 4.
- Javier Mantilla reviewed Chapter 7 (see slides).
  - Question on why composition is set at room temperature and not at minimum.

- Dan Schiffbauer reviewed Chapter 4 Gas Characteristics
  - Reviewed basic summary of chapter, with only one question of reference
- Li Yu reviewed Chapter 8 on behalf of Sushil Shinde. Content from Task Force (TF) for CIGRE D1.67
  - Discussed the ratio of Power Frequency (PF) vs. ±Lightning Impulse (LI) from the report. Several charts shown with PF/LI ratio of dielectric withstand of SF<sub>6</sub> vs alternative gases. Voltage-Time (V-T) characteristics 3 μs vs. 2 μs chopped wave behavior. All gases appear to maintain validation with only 2 μs chopped wave as currently required by IEEE standards C37.04, C37.09.
  - Qualitative plot presented for pressurized dry-air showing higher degradation of withstand from 2 μs to 3 μs chopped wave than SF<sub>6</sub>, to be removed or replaced by quantitative assessment.
  - Alternative gas can have different PD behavior than SF<sub>6</sub>.
- Li Yu reviewed Chapter 6 Environmental Health and Safety (with contributions from John Owens and Justin Palmer)
  - REACH was discussed for the European toxic gas governmental group
  - It was mentioned that the decomposition, decomposition rate, byproduct toxicity, etc. vary depending on specific design and gas composition.
- Carl Kurinko reviewed Chapter 9 Continuous Current Performance
  - CIGRE TB 802 information to be added to this chapter.
  - Chapter to discuss how different materials and finishes could degrade during continuous current testing (contacts, coatings, greases, etc.),
  - Complexity may not be simulated during tests with only high temperature, without current flowing.
  - Intent is not to confirm or change temperature rise limits but to give guidance on the R&D tests leading to material selection which will operate continuously within the existing limits.
- Mike Crawford reviewed the needs for Chapter 10 Low Temperature Performance
  - Gas recovery from low temperature condition to be associated with dielectric performance.
  - Rahul Jain and Victor Hermosillo volunteered to contribute.

### **General Topics:**

- Dan Schiffbauer asked for help for technical editing of the guide
  - Terry Woodyard, Victor Hermosillo, Li Yu and Henning Milnikel volunteered.

### **Motion to Adjourn Meeting**

Motion: Pat DeLillo

Second: Mike Crawford

Meeting was adjourned by the Chair.

JM Javier Mantilla 8:57 AM  
Javier Mantilla, Hyundai Electric, CH

HM Milnikel, Henning (SI DS R&D GIS SD 1) 8:59 AM  
Henning Milnikel  
Siemens AG  
Frankfurt, Germany

AR Ricciuti, Anthony T 8:59 AM  
Tony Ricciuti, Eaton, Pittsburgh PA

AB Arben Bufi (Guest) 8:59 AM  
Arben Bufi, Meiden America Switchgear, Inc.

9:00 AM  
Mike Crawford Mitsubishi Electric Warrendale PA

RJ Jain, Rahul 9:00 AM  
Rahul Jain - S&C Electric Company - Chicago, IL

BR Brian Roberts 9:01 AM  
Brian Roberts, Southern States, Atlanta, GA

Hensberger, Jeremy 9:01 AM  
Jeremy Hensberger, Mitsubishi Electric, Warrendale PA

MA Mauricio Aristizabal 9:01 AM  
Mauricio Aristizabal, Hitachi Energy, Pittsburgh, PA

AC Chovanec, Andrew (GE Renewable Energy) 9:01 AM  
Andy Chovanec, GE Grid Solutions, Charleroi, PA

MW Westerdale, Matthew J 9:01 AM  
Matt Westerdale, Bureau of Reclamation, Denver, CO

LY Yu, Li 9:01 AM  
Li Yu, Eaton, Charlotte, NC

BG Gerzeny, Brian 9:01 AM  
Brian Gerzeny Powell Industries

FT Francois TRICHON 9:01 AM  
Francois Trichon, Schneider Electric, France

CS Slattery, Christopher R 9:01 AM  
Chris Slattery, FirstEnergy, Akron Ohio

CS Slattery, Christopher R 9:01 AM  
Chris Slattery, FirstEnergy, Akron Ohio

KT Trost, Karla L 9:01 AM  
Karla Trost, G&W Electric, Bolingbrook, IL

TW Woodyard, Terry (RC-US SI DS PLM) 9:02 AM  
Terry Woodyard, Siemens Industry

CR Riley, Caryn 9:02 AM  
Caryn Riley, Georgia Tech/NEETDAP Atlanta GA  
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CK Carl R. Kurinko 9:02 AM  
Carl Kurinko, Hitachi Energy, Mt. Pleasant, PA

NU Uzelac, Nenad 9:02 AM  
Nenad Uzelac, G&W electric

EA Edwin Almeida 9:02 AM  
Edwin Almeida, Southern California Edison — Long Beach, CA

AL Laso, Andres 9:03 AM  
Andres Laso, G&W Electric, IL, US

CF French, Chris 9:03 AM  
Chris French, Eaton, Greenwood SC

KD Darko, Kennedy 9:03 AM  
Kennedy Darko G&W Electric Co. Bolingbrook IL

EW Wilkie, Eddie 9:03 AM  
Eddie Wilkie, Eaton - Asheville, NC

Hunter, Jennifer 9:04 AM  
Jennifer Hunter, MEPEI, Warrendale PA

JW Weisker, Jan (SE GP T SP PRO R&D TC HP) 9:05 AM  
Jan Weisker, Siemens Energy, Berlin, Germany

MT Tefferi, Mattewos 9:05 AM  
Mattewos Tefferi, G&W Electric


G Guest 9:05 AM  
Mike Skidmore, AEP, New Albany, Ohio

**LL** Lopez, Leo 9:06 AM  
Leo Lopez, WIKA, Lawrenceville, GA

**ZB** Zack Beecher 9:07 AM  
Zack Beecher, Southern States LLC, Hampton, GA

**SB** Byreddy, Sudarshan 9:07 AM  
Sudarshan Byreddy, Burns & McDonnell, Dallas, TX

**VH** Hermosillo, Victor (GE Renewable Energy) 9:08 AM  
Victor Hermosillo, GE Grid Solutions, Charleroi, PA

 York, Richard 9:14 AM  
Rich York, Mitsubishi Electric, Pittsburgh PA

**CF** Frazier, Curtiss C 9:15 AM  
Curtiss Frazier Ameren St. Louis MO

**LS** Leonel Santos 9:16 AM  
Leonel Santos-Schneider Electric, Nashville TN

**TJ** Johnson, Travis N 9:18 AM  
Travis Johnson - Xcel Energy - Denver, CO, USA

**HL** Hua Liu 9:19 AM  
Hua Liu - Southern California Edison, Los Angeles, CA