

**WG: C37.010 - Circuit breaker application Guide**

**Chair:** Helmut Heiermeier  
**Vice Chair:** Xi Zhu  
**Secretary:** Mike Skidmore

**Location:** Orlando  
**Participants:** 36 members  
25 guests

- 1.) The meeting started with the chair introduction and introductions of the attendees. The chair asked all attendees to sign the roster and provide affiliation if not noted on the roster.
- 2.) The chairman reviewed the minutes of the meeting (MOM) from San Antonio. The MOM from San Antonio was distributed to all committee members and guests of C37.010 on 9-4-13 after the fall meeting. The secretary (Mike Skidmore) also distributed the draft (MOM) on 4-28-14 to all members and guests listed on the committee roster.
- 3.) The chair entertained a motion from Xi Zhu to approve the MOM from San Antonio. Stan Billings seconded the motion. The motion passed unanimously.
- 4.) The chair updated the committee on the status of the working group and the work performed to date. Helmut said he will go over work performed to date, discussion of selected comments, and discussion on the completed document. Helmut said he will discuss comments received from Draft 7 and Draft 8. Draft 8 was only submitted to members of the working group committee for C37.010. John Webb said the draft 8 comments could be entered as “rogue” comments into the IEEE system. Helmut said he will review with Erin (IEEE) to see if this is necessary.
- 5.) The chair said the new PAR was approved and extended until the end of 2015. A purpose was added to the PAR per the San Antonio meeting.
- 6.) The goal is to re-ballot after the Fall 2014 meeting
- 7.) Discussion Topic(s):
  - The chair said there were several comments on the use of “U” or “V” within the document. Some noted that “V” is more commonly used in schools in the USA. After some discussion were it turned out that there is no common rule for this it was agreed that “V” will be used since it seems to be more common in the US
  - The chair discussed 4.2.8-4.2.10 for pollution and if we should just make reference to IEC 60815. Some suggested we should review other IEEE documents for pollution levels and make sure C37.010 matches other IEEE guides such as C37.100.1 and IEEE std 1313.2. Carl Schuetz and Devki Sharma volunteered to review C37.010 and see where appropriate “pollution” references apply or where the document needs to be updated

- The chair asked if all equations need to be numbers within the document. Committee members said this is a requirement per IEEE. The chair said the equations will be numbered within the document.
- The chair asked if sub-clause 5.16, I-695 to make reference to C37.015 (For Shunt Reactor Switching). Shunt reactor switching IEC document needs to be addressed in C37.04 and C37.09 first. This depends on the timing of the release of 04 and 09. For now, we will leave references to C37.015 within C37.010 section 5.16.
- The chair asked if sub-clause 5.19, I-696 should address C37.06.1 (Transformer limited fault (TLF) duties). This section will remain but also depends on status of C37.04, and C37.09. C37.06 will be pulled into C37.04 but C37.06.1 may not be ready in time for C37.04 update. This may be added later.
- The chair said there were comments to “unusual service conditions” such as wind and ice loading. Mike Skidmore said this was his comments and C37.010 should probably have a note saying that 90 MPH (144km/h) and what ice loading are normal and anything above this is considered an “unusual service condition”. Others agreed. Mike Skidmore will provide a corresponding wording to Helmut to add this information into C37.010. Maybe C37.100.1 could be referenced?
- The chair discussed comments to sub clause 5 with regard to M1, M2, E2 tests. This is more of an IEC terminology. Mike Skidmore said that since IEEE was trying to align terminology with IEC, then what is considered “frequent Operations”. Helmut said we can probably make reference to IEC terms but this needs to also be addressed in 04 and 09.
- There was a discussion about wording within the draft C37.010 document and when an IEC annex is referenced. This committee discuss that if an annex to IEC is referred to within the text, then IEEE should also include a “re-written” annex within IEEE. Many individuals do not have access to IEC documents and if the IEC Annex was inserted within the ANSI document then maybe better information is provided and there would be fewer questions. An example is sub clause 5.13 where annex I of 62271-100 is referenced. The chair said he will consider this comment but he believes just a reference is sufficient.
- The chair agreed to move 5.28 (series cap lines) to 5.14.3 which is a better location within the document.
- Several topics were discussed per section 5.10.2 per agenda slide page #9 and #10. The chair said he will continue work to improve this section.
- The chair said that section 5.29 should possibly be modified because it conflicts with a Cigre study. Work in C37.04 needs to address 800% first before it is updated into C37.010 and C37.09. The chair said this section will remain until addressed in C37.04.

- There was discussion about sections (5.27 – circuit breaker resistor energy limitations) and (5.18 controlled switching). Ben Bufi said there are alternative methods to controlling switching surges etc...., instead of just “controlled switching” and C37.010 document (section 5.18) needs to address the use of closing resistors. Some committee members said that one method is (passive – “trying to control the circuit”) and attempts to hit a target and depends on the system where a closing resistor doesn’t depend on hitting a target and closes at random on the “point of wave”. Some said you could target a “point of wave” on the closing resistor to limit energy into the resistor too. The general feeling of the committee was that both (resistors and Point of wave switching) provide similar results but have totally different approaches to solving a problem. Helmut asked Ben to provide wording for the use of closing resistors that could be inserted into C37.010 into a new section. Ben Bufi agreed to provide such wording to Helmut. Some sections may need to be combined and/or moved within C37.010. Charles Henderson said there should be common definitions since he sees “Point of Wave”, “Synchronous Switching”, and “Controlled Switching” used universally and may be confusing to the reader. Where is this defined, C37.100.1?
- There was discussion about adjusting title of 5.14 (Line Closing Switching Surge) and maybe adding a section 5.14.3 per topic above.
- Ken Edwards said that some sections need to be reviewed and adjusted (section 5.18 on). Maybe section 5.19 needs to go into 5.17. Helmut said he will check on the order of the index and move if needed.
- There was discussion about modifying section 5.10.2 and put in “Asymmetrical” method? and add an example of a major and minor loop. Also if  $\frac{1}{4}$  relay cycle is used instead of a  $\frac{1}{2}$  cycle than maybe another example can be inserted into section 5.10.
- Helmut said he needs to review method in 6.1.3 (total current method) with section 5.10.2. This may need to be updated with information provided by Carl Schuetz. Carl to possibly hint into sub clause #6. There was discussion that both method (new 5.10.2 and section 6.1.3) are valid. Roy Alexander said that for section 5.10.2 and table #10, we now need information from manufacturer to be added to the nameplate of the breaker such as (peak current arc duration time). Will such information be provided instead of % DC on nameplate? The chair said that sections 6.1.3 should have a disclaimer that this is a new method more appropriate for newer gas and vacuum circuit breakers. For now, both methods will remain in C37.010 but this will be improved.
- There was more discussion about section 5.29 (800% service capability) and if IEEE will adopt Cigre information on a new study. Mike Crawford said for now C37.04 did not use the new information from Cigre and 800% is still listed. Mike said that draft C37.04 when it goes to ballot one can make a comment at that time about 800%.

8.) The chair plans to re-circulate the document in maybe 2 or 3 months before Fall meeting.

9.) The working group committee agreed to adjourn meeting.

10.) All slides provided at the meeting are included as attachments.

Meeting Roster – Orlando

First Name	Last Name	Role	Company	Orlando Meeting 5/5/2014
Mehmet	Adanur	Guest	Southern Company Services	
Syed Shahab Uddin	Ahmed	Member	Siemens Energy Inc	X
Roy	Alexander	Member	RWA Engineering	X
Michael	Anderson	Member	Retired	
Mauricio	Aristizabal	Member	ABB	X
Roy	Ayers	Guest	Nashville Electric Service	X
William	Bane	Guest	Nashville Electric Service	
Amildo	Barrio	Guest	Parsons	
George	Becker	Member	The United Illuminating Company	X
Robert	Behl	Member	ABB	
W.J. (Bill)	Bergman	Member	PowerNex Associates Inc.	
Stan	Billings	Member	Mitsubishi Electric PP	X
Anne	Bosma	Member	ABB AB	X
Cody	Brehm	Member		
Steven	Brown	Member	Allen & Hoshall	
Raymond	Browning	Guest	FirstEnergy Corp.	X
Arben	Bufi	Member	Hitachi HVB, Inc.	X
Eldridge	Byron	Member	Schneider Electric	X
Donald	Cantrelle	Guest	Georgia Power	X
Gilbert	Carmona	Member	Southern California Edison	X
Stephen	Cary	Member	Eaton Corporation	X
Steven	Chen	Member	Eaton Corporation	
Chih	Chow	Member	PEPCO	X
Michael	Christian	Member	ABB	X
Roggero	Ciofani	Guest	Altalink	
Lucas	Collette	Guest	Mitsubishi Electric	X
Dave	Collette	Guest	Mitsubishi Electric	X
Lee	Cox, Jr.	Guest	Efacec	
Michael	Crawford	Guest	Mitsubishi Electric	X
David	Dart	Guest	NOJAPower	X
Jerod	Day	Guest	Vacuum Interrupters, Inc.	
Patrick	Di Lillo	Member	Consolidated Edison Co. of NY, Inc.	X
Denis	Dufournet	Member	Alstom Grid	X
Edgar	Dullni	Member	ABB	
Carolyn	Durham	Guest	Entergy	
John	Eastman	Member	INCON	X

Ken	Edwards	Member	Bonneville Power Administration	X
Leslie	Falkingham	Member	Vacuum Interrupters Limited	X
Thomas	Field	Member	Entergy	
Lori	Fish	Guest	Entergy	
Shane	Ford	Guest	Nashville Electric Service	
Robert	Foster	Guest	Megger	
Paul	Fox	Guest	Schneider Electric	X
Douglas	Giraud	Guest	Powell Electrical Systems	X
John	Hall	Guest	Tennessee Valley Authority	X
Daryl	Hallmark	Guest	Southern Company Services	
John	Harley	Guest	FirstPower Group LLC	
Helmut	Heiermeier	Chair	ABB	X
Charles	Hendrickson	Guest	Arizona Public Service Company	X
Victor	Hermosillo	Member	Alstom Grid	X
Jingxuan (Joanne)	Hu	Guest	RBJ Engineering Corporation	
Roy	Hutchins	Guest	Southern Company Services	X
Todd	Irwin	Member	Alstom Grid Inc	X
Carlos	Isaac	Guest	Oncor Electric Delivery	
Richard	Jackson	Member	Detroit Edison	
Anton	Janssen	Guest	Liander	
Cory	Johnson	Member	BPA	
Carl	Kurinko	Guest	ABB Inc.	X
Thomas	Lagerstrom	Guest	Pedersen Power Products	
Stephen	Lambert	Member	Shawnee Power Consulting, LLC	
Matthew	Lawrence	Guest	Doble Engineering	X
Wangpei	Li	Guest	Eaton	
Hua Ying	Liu	Member	Southern California Edison	X
Li	Liu	Member	Eaton	
Albert	Livshitz	Member	CE Power Solutions	X
Bjorn	Lofgren	Member	Siemens Energy	X
Russell	Long	Member	Retired	
Jess	Mains	Guest	ABB Inc	
Antonio	Mannarino	Guest	PSE&G	
Vincent	Marshall	Guest	Southern Company Services	X
Gary	Martin	Member	Entergy	X
John	Marzula	Guest	Mitsubishi	
Frank	Mayle	Member	Technibus, Inc.	
Neil	McCord	Guest	Southern States	X
Timothy	McGee	Guest	Siemens Energy	X
Dave	Mitchell	Member	Dominion	X
Georges	Montillet	Member	GFM Consulting LLC	
Stephanie	Montoya	Member	Southern California Edison	
Tom	Mulcahy	Member	Dominion	X

Volney	Naranjo	Guest	Megger	X
Jeffrey	Nelson	Member	Tennessee Valley Authority	
Joe	Nims	Guest	Allen & Hoshall	
Mirko	Palazzo	Member	ABB	
Shawn	Patterson	Member	US Bureau of Reclamation	
Thomas	Pellerito	Member	DTE Energy	X
Alan	Peterson	Guest	Utility Service Corporation	
Lise	Phan	Member	Parcific Gas and Electric Company	
Cornelius	Plath	Guest	Omicron electronics	
Reynaldo	Ramos	Member	Southern Company	
Frank	Ricard	Guest	FirstPower Group LLC	
Anthony	Ricciuti	Member	Eaton Corporation	X
Brian	Roberts	Guest	Southern States, LLC	X
Jon	Rogers	Member	Siemens Energy, Inc	
Ben	Rosenkrans	Guest	Eaton Corporation	X
Charles	Ross	Member	PGH Wong Engineering	
Roderick	Sauls	Member	Southern Company Services	X
Carl	Schuetz	Member	American Transmission Company (ATC)	X
Mike	Seabrook	Guest	GE	X
Devki	Sharma	Member	Consultant	X
Sushil	Shinde	Member	ABB Inc.	X
Sunita	Singh	Guest	Bechtel OG&C	X
Michael	Skidmore	Secretary	AEP	X
Zachary	Smith	Member	Mitsubishi Electric Power Products, Inc.	
Don	Steigerwalt	Member	Duke Energy	X
Donald	Swing	Guest	Powell Industries	
Jey	Thayalan	Guest	Schneider Electric	X
Vernon	Toups	Guest	Siemens	X
Stephen	Tyler	Guest	Dominion	
James	van de Ligt	Member	CANA High Voltage Ltd.	
Steve	Vatterott	Guest	ABB Inc.	
Wes	Wadsworth	Guest	Hitachi HVB, Inc.	
John	Webb	Member	ABB	X
Casey	Weeks	Guest	Siemens Energy	X
Jan	Weisker	Member	Siemens AG	
Oon	Yek	Guest	Pacific Gas & Electric	
Dong Sun	Yoon	Guest	HICO America	
Richard	York	Guest	GE Gigital Energy	
Jiong	Zhang	Member	MEPPI	
Xi	Zhu	Vice-Chair	GE Energy Management	X

“X” - individual was at the meeting in Orlando