

WG: C37.09 - IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers
Rated on a Symmetrical Current Basis (Under Revision)

Chair: Xi Zhu

Location: Galveston

Participants: 43 members
31 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 agenda for the meeting was shown on a projector and the chair reviewed the agenda for the meeting and the expected timeline to be ready for ballot for C37.09.
- 3.) The PAR was submitted in February and approved by NESCOM. The PAR has not been posted yet but should be posted soon.
- 4.) The chairman asked that MOM (Minutes of Meeting) be sent to individuals on the committee roster. The MOM will be posted on the committee website and a notice with link will be sent to attendees when it is posted. The minutes will be posted at:
<http://www.ewh.ieee.org/soc/pes/switchgear> under the “Minutes of Meetings (Archive)”.
- 5.) The chairman reviewed the MOM from San Diego. Since the MOM was not distributed to all Task Force members and guests after the San Diego meeting, the details of the MOM from San Diego were discussed at Galveston.
 - a.) A comment was made that the title for the standard in the submitted PAR did not correspond to the title established in the prior meeting. The PAR needs to be modified to include the title discussed in San Diego (See MOM San Diego). This will be reviewed with Erin Spiewak and Xi.
- 7.) The chair entertained a motion from Mike Crawford to approve the MOM from San Diego. John Webb seconded the motion. The motion passed unanimously.
- 8.) The scheduled was reviewed to ensure document completion by October 2017
 - a.) The Chairman discussed the timeline and decided the target date for ballot should be by the Fall of 2015.
- 10.) The chairman reviewed what work is required and explained what should be incorporated into C37.09. Xi went through each IEEE and ANSI document that needs to be considered while revising C37.09. (See attached PowerPoint slides below)
- 12.) Denis Dufournet asked how we include C37.06.1 if it is still being worked on in another committee. HVCB chair (Mauricio) said there will need to be coordination with the other working group chairs and included if the timing is right and the work is finished.

13.) The chair asked Mauricio his plan on how to incorporate the synthetic testing (C37.081 etc...) into 09. Synthetic testing for IEEE is very outdated and needs updated. Denis said we could possibly make reference to the IEC 62271-101 synthetic testing document.

14.) A question was asked if CT testing (per C57.13), should be included in the scope of C37.09. Per Erin Spiewak, no modification to the PAR is needed if the scope does not have major changes and is not outside already intended work. The chair said that C57.13 needs to be reviewed since it is already included in sections of C37.09.

15.) Mike Crawford will send Xi the list of NEMA SG4 modifications considered in C37.04 that may (should) be considered for C37.09.

16.) The chair will review test procedures of 800% cumulative faults and procedures in C37.09 and IEC to better understand differences in the tests. Additionally, this was assigned to other committee members as listed below.

17.) Denis asked about multi part (TRV) testing and test splitting. He offered to present a brief slide explaining separate testing of the first, second and third pole to clear when single phase testing is performed to demonstrate three-phase testing. A slide was presented to the committee and provided as an attachment to the MOM. With regards to multi-part testing, this procedure is used when a test laboratory cannot produce the complete TRV shape. Therefore, the test is performed in separate parts (Part A or Part B) for the initial and latter TRV shape. Ken Edwards commented that TRV tests with the entire shape are a better representation of the system conditions and may be more difficult for the breaker to pass. He indicated that it is preferable that the breaker be tested with the complete TRV.

18.) "Piecewise" testing was discussed – An example was provided by Ken Edwards; should interrupter tests in a GIS breaker be acceptable in a dead tank GCB, if vessel volumes, supports, and gas flow are different.

19.) Inductive load switching tests are described in IEC 62271-101. IEEE standards describe this type of application but are not specific about the test procedure. This test procedure could be incorporated into C37.09. IEEE – Comments were made about the benefits of the tests. Victor said the testing is beneficial to verify proper coordination between the circuit breaker contact throughout the stroke. In addition, this test establishes the reignition window which is used for controlled opening of shunt reactors and determines the chopping number characteristics of the circuit breaker.

20.) For cold temperature tests, IEC and IEEE standards have different requirements. The existing description of the IEEE test procedure in 4.13.2 is only specific about one rating (-30 degree C) while equipment with various low temperature ratings are available. The description of the test procedure can be improved. John Webb said this applies also to indoor breakers with heaters per the way the standard is today and maybe this should not be included for indoor breakers with heaters.

21.) A comment was made if seismic testing should be considered into C37.09. The chair will review.

22.) The chair asked for volunteers to review documents in the slides and prepare proposal for discussion for the future meetings.

- The committee discussed and agreed that “04a and 04b” will be pulled into C37.04 so C37.09 should only need to reference the items that will already be listed in 04. Additionally, C37.06 will be included in 04 so only references need to be made where applicable. Mike Crawford will take the task to review 04 and help link information into C37.09. Mike may require assistance from others during the review.
- C37.06.1 is still under review in another committee and could possibly be included into 09.
- Parts of C37.09a and 09b should be cut and pasted into 09. Anne Bosma was asked to review where the information needs to be inserted into 09.
- Stan Billings offered to review C37.017 and how to pull references or sections into 09.
- Synthetic testing for C37.081 and 083 were discussed and the HVCB chair (Mauricio) will discuss assignments to better understand the next steps for the information to be included into 09. It was not clear at the time of the meeting who would be assigned this task.
- Gilbert Carmona was assigned NEMA SG4. Mike Crawford will forward information to Xi and pass along to Gilbert.
- Critical currents will be reviewed and discussed by Roy Alexander for additions / modifications into C37.09.
- 800% cumulative fault and associated dielectric testing after 800% was assigned to – Sushil Shinde and John Webb
- Splitting test duties and multipart testing was assigned to Denis Dufournet.
- “Piecewise” testing was assigned to Ken Edwards and Mike Crawford
- Inductive load switching was assigned to Sushil Shinde
- Cold temperature test review was assigned to Victor Hermosillo
- Standard 693 for Seismic tests can be reviewed for C37.09 by Xi.

23.) The Chairman’s goal is to get C37.09 in word format for others to use.

24.) Ben Bufi asked if all documents were accessible and available and that maybe we should consider a SharePoint site or method to share and store documents for this committee since there will be many documents. The chair will review options with Ken Edwards.

25.) Ken asked if a summary of test duties tables at the end of 09 could be included. C37.09 is a complex document to understand and maybe a summary is needed.

26.) Gilbert Carmona asked if we could add an annex or something on tolerances for testing. Others comment this is already in some of the standards such as 081 and standard 4 and maybe this is not needed to be a part of 09.

27.) Two sessions were requested for next meeting.

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

29.) The following PowerPoint slides reviewed during the meeting are attached below:

Meeting Roster

First Name	Last Name	Company	Role	Galveston Meeting 5/1/2013
Ken	Edwards	Bonneville Power Administration	Member	X
Mauricio	Aristizabal	ABB	Member	X
Robert	Smith	Eaton Corporation	Member	X
Xi	Zhu	GE Energy Management	Chair	X
Roy	Alexander	RWA Engineering	Member	
Miklos	Orosz	Schneider Electric	Member	X
Stan	Billings	Mitsubishi Electric PP	Member	X
Doug	Edwards	Siemens Industries, Inc.	Guest	
Albert	Livshitz	Schneider Electric Services	Member	X
Anne	Bosma	ABB AB	Member	X
Denis	Dufournet	Alstom Grid	Member	X
Michael	Sigmon	Eaton Corporation	Member	X
Richard	York	TE Connectivity	Guest	
Chih	Chow	PEPCO	Member	X
Hua Ying	Liu	Southern California Edison	Member	
Michael	Crawford	Mitsubishi Electric	Member	X
Antonio	Mannarino	PSE&G	Guest	
Stephen	Lambert	Shawnee Power Consulting, LLC	Guest	
Iulian	Profir	Rockwell Automation	Member	X
Jingxuan (Joanne)	Hu	RBJ Engineering Corporation	Member	X
Arben	Bufi	HITACHI HVB, INC.	Member	X
Jeffrey	Nelson	Tennessee Valley Authority	Member	
Helmut	Heiermeier	ABB	Member	X
Anthony	Ricciuti	Eaton Corporation	Member	X

Ronald	Esco	Eaton Corporation	Guest	X
John	Webb	ABB	Member	X
Eldridge	Byron	Schneider Electric	Member	X
Dave	Mitchell	Dominion	Guest	X
Victor	Hermosillo	Alstom Grid	Vice-Chair	X
Thomas	Pellerito	Detroit Edison	Member	X
Patrick	Di Lillo	Consolidated Edison Co. of NY, Inc.	Member	X
Roderick	Sauls	Southern Company Services	Member	X
Todd	Irwin	Alstom Grid Inc	Member	X
Donald	Cantrelle	Georgia Power	Guest	X
Wes	Wadsworth	Hitachi HVB, Inc.	Member	
Douglas	Giraud	Powell Electrical Systems	Member	X
Francis	Ricard	FirstPower Group LLC	Member	X
Jerry	Baskin	Federal Pacific	Guest	X
Sivakumar	Ganesh	ENMAX Corporation	Member	X
Li	Liu	Eaton	Member	X
Vincent	Marshall	Southern Company Services	Guest	X
Neil	McCord	Southern States	Guest	X
Michael	Skidmore	AEP	Secretary	X
Lucas	Collette	Mitsubishi Electric	Member	X
Bjorn	Lofgren	Siemens Energy	Member	X
Hongbiao	Song	Bechtel	Guest	X
Jon	Rogers	Siemens Energy, Inc	Member	X
Gilbert	Carmona	Southern California Edison	Member	X
Jiong	Zhang	MEPPI	Member	X
Jiong	Zhang	MEPPI	Member	X
Dave	Riffe	Westinghouse Electric Company	Guest	X
Lisa	Yacone	IEEE-SA	Guest	
Cody	Brehm	American Transmission Company	Guest	X
John	Shullaw	GE Energy - Industrial Solutions	Guest	X
Joachim	Oemisch	Siemens AG	Guest	X
Sushil	Shinde	ABB Inc.	Member	X
Dave	Collette	Mitsubishi Electric	Guest	
Vernon	Toups	Siemens	Guest	X
Robert	Foster	Megger	Guest	X
Charles	Hendrickson	Arizona Public Service Company	Guest	X
Erin	Spiewak	IEEE	Guest	X
Don	Steigerwalt	Duke Energy	Guest	X
Stephen	Cary	Eaton Corporation	Member	X
Tom	Mulcahy	Dominion	Guest	X
Donald	Swing	Southern States, LLC	Guest	X
Lise	Phan	Parcific Gas and Electric Company	Member	X
Carl	Schuetz	American Transmission Company (ATC)	Member	X

Wangpei	Li	Eaton	Guest	X
William	Bane	Nashville Electric Service	Guest	
Lee	Cox, Jr.	Efacec	Guest	X
Molson	Parvin	CB&I	Guest	X
Jacob	Joseph	Toshiba International Corporation	Guest	X
Jeffrey	Hanson	Schneider Electric	Guest	X
Andrew	Crane	Consumers Energy	Guest	
Anton	Janssen	Liander	Guest	
Ricardo	Martinez	CFE-LAPEM	Member	X
Roy	Ayers	Nashville Electric Service	Guest	X
Paul	Grein	Circuit Breaker Sales, Co, Inc, - GroupCBS	Member	X
Syed	Rahman	The United Illuminating Company	Member	X
Jerod	Day	Vacuum Interrupters, Inc.	Guest	X
Katrin	Baeuml	Schneider Electric	Guest	X
Peter	Marzec	S&C Electric Co.	Guest	X
Samala	Reddy	Powell Industries	Guest	X
Sandeep	Kulkarni	CG	Guest	X
Michael	Christian	ABB	Guest	X

“X” - individual was at the meeting in Galveston