

Low Voltage Switchgear Devices (LVSD) Subcommittee Meeting
Mills House – Charleston, SC
May 23, 2001
Minutes

The Low Voltage Switchgear Devices Subcommittee met on May 23, 2001, with 7 members and 6 guests present. There were 8 excused absences.

Members:	J. M. Jerabek N. P. McQuin	P. J. Notarian R. J. Puckett	M. D. Sigmon N. Simon	A. D. Storms
Guests:	F. Chapman P. W. Dwyer	D. J. Edwards D. Gohil	T. W. Olsen J. Ross	
Excused:	H. L. Hess W. E. Laubach	A. Livshitz S. P. Slattery	D. L. Swindler F. C. Teufel	S. H. Telander G. R. Nourse
Absent:	M. T. Brown	D. Mazumdar		

- Chairman J. M. Jerabek welcomed the members and guests and introductions were made.
- The minutes of the meeting in Tucson, AZ on October 11, 2000 were approved as distributed.
- The next chairman of the committee will be N. Simon, and S. Slattery will become vice chair. We need a person to serve as the LVSD Secretary. It would be desirable that the Secretary not be a manufacturer.
- Reports:
 - ADSCOM Committee Report: Mr. Sigmon reported that
 - Mr. Tobin presented a proposal for formation of a strategy for harmonization of IEC and IEEE standards. No action was taken, but overall reaction was favorable. Some discussion ensued on the IEC process and how we can effectively participate in the process.
 - ASC C37 has submitted revised operating procedures for ballot. This will be discussed in the Main Committee meeting, so that the entire Switchgear Committee can participate in determination of the IEEE vote.
 - Members are requested to apply for Senior Membership Grade if they are eligible. The application can be completed on-line. A meeting will be held following the Main Committee meeting to assist those who would like to apply.
 - The electronic balloting process was discussed. The intention is that most, if not all, future ballots be electronic.
 - IEC Report (IEC 17B/WG5) Mr. Notarian reported that the WG met in January in Bonn, Germany. The addition of molded-case switches has been deferred. An appendix on EMC requirements is in process. There is also a proposal to disconnect electronics prior to application of dielectric tests. For further information refer to IEC Activities Report (Attachment 1). The next meeting is in Toulouse, France this summer.
 - C37.108 Guide for Protection of Network Transformers: The WG is meeting this week in New Orleans. We continue to monitor clauses 8 and 9 of this document. We have appropriate text to discuss the need to use devices as isolators between generators and systems which are capable of handling the potential double voltage across the open contacts.

- IEEE SCC21: IEEE 1547 met in New Orleans last month to resolve ballot comments. Of 167 members in the ballot pool, there were 50 negatives with over 200 pages of comments. There is no coordination with the Switchgear Committee, but N. McQuin and T. Olsen maintain surveillance. Interested LVSD members can download the latest draft from the IEEE website (<http://grouper.ieee.org/groups/scc21/1547/index.html>).
- C37.100.1 Common Clauses: Draft D1 is out to task force leaders for review. The IEC template is being used. For additional details, refer to Common Clauses WG minutes which will be posted on the Switchgear Committee website (<http://www.ewh.ieee.org/soc/pes/switchgear/index.htm>).
- Working Groups:
 - The working group chairs were requested to confirm the membership of the working groups so that a listing of the working group members can be forwarded to IEEE-SA to fulfill the requirements related to indemnification.
 - C37.14: This document is currently out for ballot. It is expected that comments will be able to be addressed electronically, with the possibility that a review meeting will be needed at the Fall 2001 meeting in Quebec City.
 - C37.29: Mr. McQuin reported on the discussions concerning the need for a longer time duration of overload (1200%) current during testing. For a transformer with the source applied to the primary winding, the inrush currents and durations are as historically documented. However, if the transformer is applied with the source applied to the normal secondary winding, the magnitude of the inrush currents increases significantly, and the duration increases greatly due to core saturation. This is because the secondary winding is adjacent to the core steel. A result is that the time constant is much longer. Currents can be up to 4-5 times normal out at 0.3 seconds. Therefore, it appears clear that attention is needed to C37.29 to recognize these facts of physics. W. Laubach supports continuation of the present 50ms duration, whereas N. McQuin and D. Swindler support a longer duration (e.g., 300ms or perhaps more). If we choose to retain the 50ms duration in the C37.29 document, we should add text to the document to emphasize the issue.
 - C37.13: Mr. Edwards reported that draft D3 was reviewed. An open discussion was held to brainstorm new subjects that should be covered in C37.13 but are not. Topics considered included isolation (i.e., surge withstand), trip system misoperation, failure mode analysis of trip system, protection of wires connected to the power circuit, and whether a BIL requirement should be imposed. Also, comments from W. Laubach and F. Teufel were reviewed. In the Fall 2000 meeting, a motion 1A was approved to reaffirm the present C37.13. It is reported that an electronic invitation to ballot should be posted in the very near future. For further information refer to C37.13 and C37.27 Report (Attachment 3).
 - C37.27: This document will be handled in series with C37.13. Work on C37.27 has not started, but will begin after more progress is made on C37.13.
 - C37.13.1: Mr. Notarian reported that draft D6 was reviewed. D7 should be available in the summer, and will be distributed to LVSD. Comments from LVSD should be reviewed at the Fall, 2001 meeting. For further information refer to C37.13.1 Working Group Report (Attachment 4).
 - C37.26: Mr. Hess has prepared a draft as a base for update of this standard. A motion 1A should be requested to reaffirm C37.26-1972. A working group should be formed to revise the document. N. McQuin, H. Hess, T. Olsen, and P. Notarian volunteered to serve on the

working group. We will also ask if S. Telander and G. Nourse will participate. We also need a chairman.

- Old Business: Document Status was circulated for updated. The document status will be updated and made a part of the minutes to be posted on the Switchgear Committee website.
- New Business: Shortly after the meeting adjourned, it was noted that C37.18 needs to be reaffirmed. Motion 1A to this effect will be requested. Separately, Mr. Nourse and Mr. Laubach will be requested to begin an effort to form a WG to revise C37.18.
- Upcoming Meetings
 - Quebec City, CAN (Loews LeConcorde) Sept 30-Oct 4, 2001
 - Newport, RI Spring, 2002

Minutes submitted by:

T. W. Olsen
Acting Secretary

Attachment 1 – LVSD Minutes

IEC Activities

This is a report of IEC 17B/WG5 activities since the Fall, 2000 meeting.

The WG met at Bonn, Germany on Jan 10-12 and will meet in Toulouse, France on July 10-12.

The primary topics covered at the Bonn meeting were:

- The 2nd amendment is still under discussion. There are 5 negative votes associated with Annex L, Circuit Breakers not Fulfilling the Requirements for Overcurrent Protection. The USTAG proposed this Annex. It covers the product called a Molded Case Switch in the US.
- Work was begun on the 3rd amendment. This will include “minor clarifications”
- EMC requirements – there is an Annex covering this testing but work is ongoing.
- Simplified testing for circuit breakers of the same design – there was a discussion of the stresses on 4-pole versus 3-pole circuit breakers under short-circuit conditions.
- Dielectric testing – there was a discussion about disconnecting electronic circuits during dielectric testing based on a proposal from WG1.

The meeting in Stockholm, Sweden was part of the SC17 Technical Committee meetings. The same items were discussed and a couple of new items were added.

- Metal Foil – a comment was made that there appears to be no uniformity between testing stations of applying the metal foil. I am assuming that they are talking about metal foil that is used to detect arcing to ground since a metal test enclosure is not used.
- There was discussion of allowing the temperature rise test to follow the dielectric withstand test in Test sequence IV, Rated Short-time Withstand Current.
- A member thinks that the lack of a definition of resetting time could result in a problem. This will be discussed at the next meeting. No references were given in the minutes to identify the test in question.

There is a proposal to have WG5 of 17B get involved in the discussions about operating voltages for RCDs. The USTAG is opposed to the proposal.

The time and place of next meeting of WG5 after Toulouse has not been designated.

Submitted by:
P. J. Notarian
May 18, 2001

IEC Activietie4/winword6/c.

Attachment 2 – LVSD Minutes
(reformatted from original to attachment to LVSD minutes)

GE Industrial Systems

Philip M. Piqueira
Chief Engineer-Standards Integration

General Electric Company
41 Woodford Avenue, Plainville, CT 06062
860-747-7234 Dial Comm 8*756-7234
Fx: 860-747-7660 Dial Comm 8*756-7660
e-mail: Philip.Piqueira@indsys.ge.com

July 13, 2000

Mr. Ken Gettman
National Electrical Manufacturers Association
1300 North 17th Street
Suite 1847
Rosslyn, VA 22209

Re: IEC 17B/WG5 Meeting Trip Report (June 28-30)-Bergamo, IT

Please find attached a copy of our trip report for the IEC 17B/WG5 meeting which took place in Bergamo, Italy on June 28-30, 2000.

I have attached those documents which are relevant to the issues discussed (BERGAMO (01)-(03)). However, if there are any other documents which are referenced but not included, please don't hesitate to contact me.

Philip M. Piqueira

cc: Cutler-Hammer

C. Kimblin

NEMA

V. Baclawski

Siemens-Atlanta

B. DiMarco
J. Young

Square D-Cedar Rapids

G. Gregory

Square D-Lexington

R. Reed

Underwriters Laboratories

P. Notarian

REPORT OF INTERNATIONAL MEETING

DATE: July 5, 2000

DELEGATES: B. DiMarco
P. Piqueira

REPORT OF MEETING: IEC 17B Working Group 5

DATE AND PLACE: Bergamo, Italy
June 28-30, 2000

COUNTRIES/DELEGATES ATTENDING:

FRANCE: H. Wolff, Chairman WG5
J. Nereau, Schneider
M. Delaplace, Secretary 17B

GERMANY: B. Adam, Siemens

ITALY: H. Tebbe, Klockner Moeller
M. Bossi, Btcino (6/29, 30)
A. Sciani, Nuova Magrini Galileo
R. Dosmos, ABB Sace

SOUTH AFRICA: V. Cohen, CBI

SWITZERLAND : W. Breer, Specher-Shue

UNITED KINGDOM: P. Galbreath, Merlin-Gerin
R. Upton, MEM

U.S.A.: B. DiMarco, Siemens
P. Piqueira, GE

Absences : T. Baiatu, AB/CMC

Guests : A. Elli, CESI (6/28 only)
F. Martinelli, Btcino (6/30 only)

IMPACT STATEMENT

WG5 consists of experts from various countries which have the assigned responsibility from sub-committee 17B for the development of low voltage standards covering industrial molded case and power circuit breakers defined by separate UL, NEMA, and ANSI domestic standards.

RATIONALIZATION FOR PARTICIPATION

The development of any new standard or related appendix involving the above mentioned product lines could greatly affect future domestic designs and marketing decisions. Active participation is required to insure that present USA application and safety requirements are not jeopardized.

OVERVIEW OF MEETING

The meeting was essentially conducted in line with the chairman's agenda, 17B/WG5(Chairman)12/00, which is attached as BERGAMO (01).

1) 2nd amendment of IEC 60947-2 (17B/1038/CDV)

- The CDV was accepted although there were still five negative votes (Australia, Finland, France, Italy, and Japan). All of the negative votes were associated with Annex L
- The comments for the CDV document were reviewed and Annex L again was discussed in detail. Among the modifications made to the document, as a result of the comments reviewed, were the following :

TITLE : Circuit Breakers Not Fulfilling the Requirements for Overcurrent Protection

SCOPE : This annex covers circuit breakers which do not fulfill the requirements for overcurrent protection specified in the body of the standard here-in-after referred to as CBI's. They are capable of being tripped by an auxiliary device, e.g. shunt or undervoltage release. They do not provide circuit protection but may trip under short circuit conditions for self-protection. They have a conditional short circuit rating and may be used for isolation. They may incorporate accessories such as auxiliary and alarm switches for control purposes, and/or remote operators.*

**Note : This applies in particular to overload protection*

- The WG5 review of comments are attached as BERGAMO (02). The document will be circulated as an FDIS document by the middle of July (the vote on the document will probably be completed in November. Note ; These revisions should bring Annex L closer to the UL requirements for molded case switches.
- 2) 3rd amendment of IEC 60947-2 (17B/.../CD)**
- The CD has not yet been officially distributed although a draft of the document was recently distributed to the working group.
 - Minor clarifications to the document were agreed upon and the modified CD will be circulated by the middle of July.
 - However, the issue of the “three-phase limit of 70% of supply voltage “ is continuing to be raised by ACOS and they have requested a further clarification. WG5 will provide that clarification, as follows, but will not modify B.8.9.2 : (1) *The case of a loss of one phase in a 3-phase system is covered in B.8.9.1. (2) In the case of volt drop due to an overcurrent resulting from a low impedance fault-to-earth is covered by B 8.9.2 . Whatever the voltage on the phase on which the fault occurs, the resultant voltages are always sufficient to ensure operation of the residual current function of the CBR the value of 70% proposed in B.8.9.2.a (see 17B/WG5(Chairman)38a/99) being in fact conservative as proven in the various technical papers produced for this purpose.*
- 3) EMC requirements in IEC 60947-2**
- It was agreed that the terminology in 17B/1038/CDV (F.5.4.3) regarding environment should line up with the body of the standard in that Environments 1 and 2 should read Environments B and A, respectively. It was also agreed that the text of F.5.4.3 will be moved to 7.3.1 of the main body of the standard.
 - The warning note proposed by Mr. DeVries and accepted for IEC 60947-3, does not appear necessary for IEC 60947-2 because the issue is covered in the body of the standard (5c), and by the two notes in 17B/1038/CDV (F.5.4.3).
 - The following note will be added to IEC 947-2 after the title of clause 7.3.1: Clause 7.3.1 of Part I is actually under revision. In particular, Environments 1 & 2 are to be referred to as Environments B & A, respectively, to be in line with CISPR This has been taken into consideration in this amendment.
 - Mr. DeVries is correct in that tests for RF conducted disturbances (F.5.3), in the frequency range 0,15 to 30MHz, are required. Consequently, this will be under consideration (Paul Galbreath will co-ordinate the preparation of proposals by the electronic experts in time for the Stockholm meeting, if possible).
 - 17B/WG5(Upton)02/00, attached as BERGAMO (03), was reviewed. This proposal develops Annex J which provides a complete summary of the tests for immunity and emission which are presently located in Annex' B and F of IEC 947-2. Ray Upton will modify the document and it will be reviewed at the next meeting in Stockholm. When complete, it is intended for this document to be part of the 3rd amendment of IEC 947-2.

4) Simplified testing for circuit-breakers of the same fundamental design

- Mr. Dosmo presented the argument that 4-pole current limiting breakers, when operating under short circuit conditions, may actually be subjected to less severe operating parameters than than 3-pole breakers would experience. He will present a computerized model to support his contention at the next meeting.
- As part of 17B/WG5(Dosmo/Nereau)01/00, Mr. Dosmo proposed modifying clause 7.1.5 of IEC 947-2 to indicate that *"type designations and purely aesthetic measures (e.g labels) do not constitute construction breaks"*. This was agreed to by WG5 and will be part of the next CD which includes Annex J

5) Dielectric testing (Amendment to IEC 60947-1 - 17B/...../CDV)

- During the last meeting of IEC 17B/WG5, the proposed amendment to IEC 947-1 dealing with clause 8.3.3.4.1 of IEC 60947-1, was found to be unacceptable. The proposal dealt with the concept of "protective function" and the mandatory interdiction of the electronic circuits during impulse testing.
- WG5 found that to be unacceptable because disconnection during dielectric tests of electronic circuits connected to the main circuit has always been permitted for circuit-breakers to IEC 60947-2. Further, the failure resulting from electronic circuits remaining connected would not permit the completion of the tests and would therefore serve no useful purpose because the electronic circuits will certainly be destroyed during the dielectric tests thus rendering the test of solid insulation invalid.
- As a result of the input from WG5 and other working groups, the proposal was withdrawn by IEC 17B/WG1.
- An alternative proposal was submitted by Ray Upton (17B/WG5(Upton)03/00) which states : *"Conductors ensuring the continuity of the protective earth (PE) circuit shall not be disconnected for the test. Failure of a component in such a circuit is permitted if the overall equipment can be considered not to introduce an electric shock hazard under service conditions"* This will be submitted to the advisory group for their meeting in Stockholm.

6) Stockholm meetings

- The chairman reviewed his May report to SC 17B.
- The IEC 17B subcommittee will be meeting in Stockholm on September 14-15, 2000.
- The joint meeting of the IEC 17B and 17D subcommittees will take place in Stockholm on September 15, 2000.

7) Other matters

- No additional matters were discussed

8) Next meetings

Future scheduled meetings of IEC 17B/WG5 are now as follows :

- September 11, 12, 2000: Stockholm, Sweden (in conjunction with IEC General Meeting and TC 17 meeting-September 11-20 ; September 14-15, 2000 will be the 17B subcommittee meeting)
- January 10-12, 2001 : Bonn, Germany
- May 2-4, 2001 : France
- October, 2001 : United Kingdom

P.M. Piqueira

B. DiMarco

Attachment 3 – LVSD Minutes

IEEE Power Engineering Society
Switchgear Committee
C37.13.1 Working Group Report
May 21, 2001

The working group met on May 21, 2001 with 5 WG members and 4 guests, some part time.

Draft 6 was reviewed. This draft had been reformatted by Mr. Puckett, and included previous significant comments from Messrs. Olsen, Puckett, and Storms.

The discussion from the meeting will be used to create Draft 7 which will be sent to LVSD Subcommittee members for comments. After resolution of LVSD comments, the document should be ready for balloting IEEE-SA and ASC C37.

Report submitted by:

P. Notarian
WG Chair

Attachment 4 – LVSD Minutes

C37.13 and C37.27 Doug Edwards **May 2001 – Charleston** May 22, 2001

C37.13 Working Group met on Tuesday, May 22, 2001.
Only C37.13 was discussed – C37.27 has not been discussed.

Attendance: Four members and Five Guest

Document Status: C37.13 Draft 3 was distributed and discussed.

Reaffirmation Ballot: The electronic ballot was approved on May 14, 2001 and invitation to ballot should be received in near future – exact schedule under IEEE control obviously.

Discussions:

The meeting was split into two sessions, brainstorming new subjects and then review of comments.

Brainstorming Session: We had open discussion in an attempt to get new ideas and targeted areas/tasks/items identified for further discussion.

- 1. Isolation requirements:** Damage due to signals originating externally of the breaker may cause problems with Trip Units (TU). Synopsis of discussion is that WG should assure that C37.13 is coordinated with C37.17, C37.90.1 and C37.90.2.
- 2. Mis-operation of Trip Units – Software Reliability:** Mis-operation issues with the electronics in a breaker can be due to items targeted in item 1 above and due to software bugs. Adding software reliability references were targeted.
- 3. New Devices:** New devices on LV CB's which are not specifically discussed presently include breaker mounted metering, communication's modules, and linear couplers. Details associated with such components are to be considered.
- 4. Failure Mode Analysis:** Wording such as the concepts that failure of meters should not affect the protective operations of TU's.
- 5. Control Wire Connections:** Wording about the wiring of communications modules and trip unit power supplies to main bus and possible failure caused by such wires is targeted as a discussion item.
- 6. BIL Requirements:** Presently no BIL requirements exist in C37.13 while IEC standards do include BIL requirements and new breaker construction may (or may not) lead to such a requirement.

Attachment 4 – LVSD Minutes

C37.13 and C37.27 Doug Edwards **May 2001 – Charleston** May 22, 2001

Discussion of Draft comments: Comments had been provided by Fred Teufel and Ward Laubach. Discussion of these comments included:

7. **Application of CB based on Power Factor and X/R ratio:** Wording associated with application of CB's based on power factor and X/R ratio factors were discussed.

8. **Short-Circuit and Short-Time Nomenclature:** Nomenclature associated with SC and ST current ratings associated with CB's without instantaneous trip elements were discussed.

9. **Electro-Mechanical Trip Devices:** We discussed the need (or lack of need) to continue addressing electro-mechanical trip devices. Although a focus of revisions is to update the standard considering "new" technologies, revisions concerning electro-mechanical trip devices will continue.

Action Items

10. **Revised Draft and Comments:** Draft 3 to be revised and collection of Teufel and Laubach comments to be distributed.