

IEEE SWITCHGEAR COMMITTEE CORRESPONDENCE

Minutes: IEEE High-Voltage Fuses Subcommittee
Place: Hilton Head, SC
Date: Wednesday, April 27, 2016
Presiding officer: John Leach - Chair
Recorder: Alan Yerges – Secretary/Vice-Chair

MEMBERS PRESENT

Glenn Borchardt	S & C Electric Company
Sterlin Cochran	Hubbell Power
Gary Haynes	ABB Inc.
Frank Lambert	NEETRAC
John Leach	Consultant - Hi-Tech Fuses/T&B/ABB
Chris Lettow	S&C Electric Company
Sean Moody	Mersen
T. E. Royster	Dominion Virginia Power
Jon Spencer	ABB-Thomas Betts/Hi-Tech
Mark Stavnes	S & C Electric
Charles Worthington	Hubbell Power
Alan Yerges	Eaton's Cooper Power Systems

MEMBERS ABSENT

Jonathan Deverick	Dominion Virginia Power
Dan Gardner^	Thomas & Betts/ABB
J. R. Marek^	Consultant
R. Neville Parry^	Consultant
Jim Wenzel	Eaton

^ correspondence only

GUESTS

Sam Chang	PG&E
Rodolfo Elizondo	ABB
Paul Found	BC Hydro
David Frisch	Macleam
Blake Henard	Hubbell Power
Travis Johnson	Xcel Energy
Brad Lewis	AEP
Bobby Moorhead	Dominion Power
Randy Ward	Aluma-Form

HONORARY MEMBERS

John Angelis, L. Ron Beard, Ray Capra, Steve Hassler, Frank Ladonne, Herb Pflanz, R (Kris) Ranjan, John Schaffer, Frank Muench, Don Parker, Jan Zawadzki.

1. **Call meeting to order** - at 1:35 PM
2. **Approval of Agenda** – No changes requested, agenda accepted.
3. **Member/guest introduction** – 12 members, 9 guests. No request for new membership to subcommittee.
4. **Roster check**– roster circulated for correction.
5. **Approval of September, 2015 minutes** – Approved.
6. **Report from the Chair:** Nothing new to report, outside of later agenda items.
7. **Standards Document Status Report: (see Annex B)**
 - a. PAR for C37.41 and C37.42: documents have been balloted and are on track to be revised by the end of 2016.
 - b. PAR for C37.45: final draft has been submitted to RevCom.
 - c. We will discuss later C37.48 (good until 2020) and C37.48.1 revision (good until 2021).
 - d. Regulations require a revision every 10 years, or it will expire.

8. Working Group Reports

a) Revision of Fuse Standards – J. Leach John reported that:

The Working Group met on April 27th, 2016 from 8 am-12 noon, with 21 members and three guests present. Blake Henard and Rodolfo Elizondo were accepted as new members.

The Working Group recognized Glenn Borchardt for his years of service as Working Group Secretary/Vice-Chair. Glenn has retired from this position, and Alan Yerges was named the new Secretary/Vice-Chair. The focus of the meeting was on ballot comment resolutions for C37.41. John reported that C37.41 had a successful ballot with 171 comments (91 must be satisfied), 58 balloting, 94% returned, 8 disapprovals. The most significant discussion involved whether the proposed changes for polymer cutout test requirements should also include CL fuses by removing the reference to 'expulsion' fuses. Significant discussion resulted in no appreciable change to the existing wording. The intention of the working group throughout the development of the polymer cutout mounting was for expulsion fuse cutouts. (All testing was done to qualify the mountings using fuse link style expulsion fuses). No work, discussion, or data was generated as part of the Working Group activities on other devices (prior to this meeting). A definition was added for 'cutout fuse support', to make it clear as to what type of support was covered by the new testing.

The Working Group wished to recognize the large amount of work performed by the Task Forces for polymer cutouts and cutout test series 4, under the leadership of Chris Lettow.

John reported that the final ballot resolution information would be sent to the WG for their approval, negative balloters would be contacted individually with resolution details, and he will liaise with Mark Stavnes in order to have PC37.41 and PC37.42 recirculate together.

b) Revision of Fuse Specification Standards – M. Stavnes

Mark reported that the Working Group for the Revision of Fuse Specifications Standards (C37.42 & C37.45) Meeting was held on Tuesday, April 26, 2016. There were 16 members and

3 guests in attendance. Mark reported that PC37.45 Draft 6 had a successful recirculation ballot with 100% approval and is scheduled to be considered for publication at the 4/29/2016 Revcom meeting.

PC37.42 Draft 11, had a successful ballot with a 98% approval rate and 81 comments. These comments were considered and resolved by the working group and Draft 12 will be prepared for recirculation in coordination with PC37.41 Draft 9. It is expected the recirculation of both documents will occur in time for any comments to be considered at the fall meeting to be held on October 11 in Pittsburgh.

The Subcommittee recognizes Mark and the Working Group for the effort and success in getting C37.42 to ballot and C37.45 to RevCom.

9. Report of liaison to other committees

- a) ER&P Committee – John Leach** reported that the ER&P committee met at 12:00 pm on April 27th. Various proposals for award recipients were discussed (but this information remains secret until awards are made). For the Young professional award we are trying to identify those who have graduated in the last 10 years. Fortunately, several members of our subcommittee and working groups fall into this category!

The “honorary member” list was discussed. It was decided to remove the “deceased” designation from certain members as it is not known whether other members are also deceased. It was felt that leaving old names on the list made a fitting historical reference to those who had gone before us, and made a significant contribution to our committee.

10. IEC Report – J.G. Leach: (for full report see Annex A)

- a. Maintenance Team 3 (CL Fuse Documents for IEC)
 1. Meeting regularly to update active current limiting fuse document IEC 60282-1.
 2. Met in Mannheim, Germany March 16th, 2016. Meeting in Frankfurt, Germany in October 14th, 2016.
 3. Getting ready for revision of IEC 60282-1.
 4. INF document will go out in May to inform of the plans for the October meeting
 5. Notable proposed change: Series 2 (North American) voltages will be done at 100% of rated voltage, instead of present 87% of rated voltage (European voltages will still use 87%).
- b. Maintenance Team 6 (Application Guide) will start working informally to match up with changes to IEC 60282-1 (CL fuses)
- c. TAG Meeting
 1. Other than J. Leach, there is no one presently attending HV fuse meetings from the USA.
 2. J. Leach requested other TAG members to consider attending meetings as back-up and/or succession (note only CL fuse activity at this time, but MT6 includes expulsion fuses, and additional expulsion work may be necessary after C37.41 has been published and if other countries then want IEC 60282-2 to align with the IEEE document).

11. Unfinished business – None

12. New business

- a. Topic: C37.48 (CL Fuse Application Guide) and C37.48.1 (CL Fuse Tutorial Application Guide)
 1. Desire was to align better with IEC's application guide.
 2. IEC has consolidated information for all types of fuses, and has incorporated most of the application guide information in C37.48.1, together with similar information for expulsion fuses.
 3. IEEE ultimately agreed to give copyright permission to use material from C37.48.1 in IEC 62655 TR (technical report – tutorial and application guide).
 4. One option would be to simply use the present IEC guide, but add an annex for unique items related to IEEE. However nomenclature differences and reference to the present CL fuse standard would make it difficult for North American readers and somewhat obsolete as the new 60282-1 should be complete by 2020. An alternative is to seek permission from IEC to incorporate most of the material but keep it an IEEE standard.
 5. Tim Royster motioned to proceed with the plan to incorporate the content of the IEC document into the IEEE document to target alliance where appropriate. Chris Lettow seconded. Unanimously approved.

13. Next meetings:

- Fall 2016 (9 – 14 Oct) Sheraton Station Square, Pittsburgh, PA, USA
- Spring 2017 (23 - 27 April), Hilton Charlotte University, Charlotte, NC, USA
- Fall 2017 (October 8-13) Marriott Portland Sable Oaks, Portland, ME
- Spring 2018 (April 22-27) Disney's Contemporary Resort, Lake Buena Vista, FL
- Fall 2018 – TBD
- Spring 2019 (April 28-May 1) Hilton, Burlington, VT
- Fall 2019 (Oct 6-10) Catamaran Resort, San Diego, CA

14. Adjournment – 2:35PM

Annex A - IEC Report

SC32A - U.S.A. Technical Advisory Group

Dr. John G. Leach, Technical Advisor ♦ j.g.leach@ieee.org ♦ 828-256-3744 ♦ Fax 828-322-2376

IEC Report 2016-1 September 2015 to April 2016

From: Dr. John G. Leach, Technical Advisor SC32A, April 24th 2016

Summary

Since the September 2015 report there has been another meeting of MT3 in Mannheim, Germany, on Wednesday March 16th 2016.



Our next MT3 meeting will be in Frankfurt Germany on Friday October 14th, 2016, during the 80th General meeting of the IEC. The place is yet to be determined. TC32, SC32A, SC 32B and SC32C will meet, as well as TC32/CAG (chairman's advisory group [note - J. Leach is a member of this group]).

Report of activities - MT3

The current-limiting fuse maintenance Team met in Mannheim, Germany, on Wednesday March 16th 2016. Participants were:

Didier Fulchiron (Secretary SC32A)
Harold Handcock
Ulrich Haas
John Leach (Convenor IEC 32A MT7)
Stephane Melquiond
Juan-Carlos Perez-Quesada (Convenor IEC 32A MT4)
Viktor Martinčič

At the end of April 2015, Convenor Norbert Stein suffered a stroke and spent several weeks in hospital. While Norbert is doing well, and met with a number of MT3 members for a meal the on the evening before the meeting, he is not in a position to continue active involvement in the maintenance Team. Consequently, Secretary John Leach conducted the meeting in Norbert's absence, as acting convenor.

The meeting took place at FGH e.V. (a research organization). Since the next plenary meeting will take place at the 80th General meeting of the IEC, in Frankfurt, October 10 to 15, 2016, plans were made for gaining approval to move the revision of the HV Fuse test document IEC 60282-1 forward. The proposals made in Dresden were reviewed, with additional input from Didier:

- a. Extension of stability period of IEC 60282-1 to 2020 by SC32A, on October 13th 2016 during the General Meeting in Frankfurt (plenary).
- b. Decision for revision of IEC 60282-1 during the plenary, based on an INF document distributed before or on June 10th (four months before the meeting). Circulate a CD after the meeting, with the anticipation of a second CD a year later, before CDV a year after that.
- c. Didier reported that an "RR" would not be needed as the minutes of the SC plenary meeting would contain the decision and the necessary timing for the project. He also suggested simplifying the INF with a brief list of proposed changes, and then following this with a clause showing further detail for those needing it. The text of a proposal for the INF, incorporating the suggested changes, is attached as Annex A.

Didier raised another area of concern that by incorporating the test information from IEC 60644 (only about four pages of technical information in each language is left after the application information has been moved to IEC/TR 62655) we eliminate one of our five fuse standards. The SMB could consider that, with our limited participation from National Committees, the stability of our documents, relatively few meetings, and proposed reduction in number of documents, our subcommittee was becoming less viable. Members noted that the stability of our documents came partially from the relatively stable technology of fuses, but also from Central Office urging us that customers were looking for document stability! In addition, given the size of the fuse industry and the relatively small number of world-wide fuse manufacturers, many of our documents were quite substantial – in English we have IEC 60282-1 (71 pages), IEC 60282-2 (53 pages), IEC/TR 62655 (131 pages), and IEC 60549 (16 pages). Didier said that we should highlight the possible reduction from 5 to 4 standards in the INF so that NCs would

come to the October meeting prepared to specifically acknowledge that they had their country's approval for the reduction

We again agreed that MT7 could start work on a revision of IEC 62655 during the 60282-1 project to reflect its changes, with the anticipation of project approval after the revision. This would avoid having to circulate any drafts that referenced clause numbering in an unapproved standard, which could cause confusion. The SC could explicitly approve this at the plenary meeting, although the job of an MT is to continually look at necessary updates to a standard.

Items discussed at the meeting:

- a. **Add a definition for an FEP.** Proposals from John and Ulrich for "fuse enclosure package" and "canister" were accepted with minor changes.
- b. **Review regular and parallel fuse homogeneous test requirements....** There was not time to discuss this topic in any depth.
- c. **Review striker requirements in 4.3.1.4.** Under the general subclause "Characteristics of particular fuse-link types and applications", a subclause containing information on "thermally operated strikers" supplied by Ulrich was discussed and a modified version added here.
- d. **Review striker requirements: 7.3.2.3 Striker operation tests.** Additional information was placed here to cover thermally operated strikers.
- e. **Other topics.** Ulrich Haas had provided a list of comments to the standard. As time allowed these were reviewed, leading to a number of changes.

A significant amount of time was spent in discussing 5.1.2 "Standard conditions of use". Didier objected to the use of the term "single-phase system" in connection with the coordination of the fuse-link rated voltage and the recovery voltage that the fuse experiences. Didier maintained that there was no such thing as a single phase system, only "single-phase applications" on three-phase systems. The wording was therefore changed to reflect this.

Another item discussed (put on the agenda at Norbert's request), was the future position of Convenor of MT3/MT6. Didier explained that periodically all convenors have to be re-approved, and their national committees have to agree to them continuing to serve. Thus Juan-Carlos and John have to receive a recommendation for their NCs in order to continue as convenors of MT4 and MT7. Didier is seeking nominations for MT3 and MT6 from national committees in the light of Norbert's situation.

The meeting concluded with a vote of thanks to Norbert Stein; he has been involved in IEC standards for over 40 years, with 26 as convenor of MT3.

Date and place of next meeting: Our next MT3 meeting will be in Frankfurt Germany on Friday October 14th, 2016, during the 80th General meeting of the IEC. The place is yet to be determined. Note the IEC meetings will clash with our IEEE fuse meetings.

John Leach, 4/24/16

Annex "B" Project status

Document	Title	Sub-Committee	WG Chair	PAR	IEEE Status	Activity/Plans
C37.40	Standard Service Conditions and Definitions for High-Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories.	HVF	John Leach 828 256 3744 j.g.leach@ieee.org		Approved 2003 R2009	None - To be combined with C37.41
C37.41	Standard Design Tests for High-Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories	HVF	John Leach 828 256 3744 j.g.leach@ieee.org	Approved 2012-16 Revision	Approved 2008	Revision to incorporate C37.40 in ballot comment resolution stage
C37.42	Standard Specification for High-Voltage (>1000 V) Expulsion Type Distribution Class Fuses, Fuse and Disconnecting Cutouts, Fuse Disconnecting Switches, and Fuse Links, and Accessories Used with These Devices.	HVF	Mark Stavnes 773-338-1000, Ext. 2071 MStavnes@sandc.com	Approved 2012-16 Revision	Approved 2009	Revision to incorporate C37.43, C37.46 and C37.47 in ballot comment resolution stage
C37.43	Standard Specifications for High-Voltage Expulsion, Current-Limiting and Combination Type Distribution and Power Class External Fuses, with Rated Voltages from 1kV through 38kV, Used for the Protection of Shunt Capacitors	HVF	John Leach 828 256 3744 j.g.leach@ieee.org		Approved 2008	None – to be combined with C37.42
C37.45	Standard Specifications for High-Voltage Distribution Class Enclosed Single-Pole Air Switches with Rated Voltages from 1kV through 8.3kV	HVF	Mark Stavnes 773-338-1000, Ext. 2071 MStavnes@sandc.com	Approved 2015-19 Revision	Approved 2007	Revision to incorporate material from C37.41 and C37.40. Balloted, and Submitted to REVCOM
C37.46	Standard for High-Voltage (>1000 V) Expulsion and Current-Limiting Type Power Class Fuses and Fuse Disconnecting Switches.	HVF	Mark Stavnes 773-338-1000, Ext. 2071 MStavnes@sandc.com		Approved 2010	None - To be combined with C37.42
C37.47	Standard Specifications for High-Voltage (>1000 V) Current-Limiting Type Power Class Fuses and Fuse Disconnecting Switches	HVF	Mark Stavnes 773-338-1000, Ext. 2071 MStavnes@sandc.com		Approved 2011	None - To be combined with C37.42
C37.48	Guide for Application, operation, and Maintenance of High-Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories	HVF	John Leach 828 256 3744 j.g.leach@ieee.org		Approved 2005 R2010	None - Good to 2020 PAR to combine C37.48 and C37.48.1 with IEC/TR 62655 to be sought in 2016
C37.48.1	Guide for the Application, Operation, and Coordination of High Voltage (>1000 V) Current-Limiting Fuses.	HVF	John Leach 828 256 3744 j.g.leach@ieee.org		Approved 2011	None – Good to 2021 See C37.48