IEEE SWITCHGEAR COMMITTEE CORRESPONDENCE

Minutes:	IEEE High-Voltage Fuses Subcommittee
Place:	Galveston, TX
Date:	Wednesday, October 1st 2013
Presiding officer:	John Leach - Chair
Recorder:	Frank Muench - Secretary

MEMBERS PRESENT

Glenn Borchardt	S & C Electric Company
Garry Haynes	ABB Inc.
John Leach	Consultant - T&B/Hi-Tech Fuses/ABB
Chris Lettow	S&C Electric Company
Sean Moody	Mersen
Frank Muench	Eaton's Cooper Power Systems
R. Neville Parry	Eaton
Charles Worthington	Hubble Power Systems
Alan Yerges	Eaton's Cooper Power Systems

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MEMBERS ABSENT

D. Gardner^	Thomas & Betts – Hi-Tech
J. R. Marek^	Consultant
D. Parker^	Alabama Power
T. E. Royster^	Dominion Virginia Power
M. Stavnes^	S & C Electric
J. Zawadzki^	

^ Excused

GUESTS

Chris Borck	Eaton's Cooper Power Systems
Sam Chang	PGE
Sterlin Cochran	Hubble Power Systems
Jonathan Deverick	Dominion VA Power
Edward Jankowich	Thomas and Betts
Frank Lambert	GT/NEETRAC
Scott Lanning	Eaton
Paul Leufkens	KEMA-Powertest
Jon Spencer	T&B
Erin Spiewak	IEEE SA
Jim Wenzel	Eaton's Cooper Power Systems

HONORARY MEMBERS

J. G. Angelis, L. R. Beard, R. L. Capra, S. P. Hassler, F. Ladonne, H. Pflanz, R. Ranjan, J. S. Schaffer

1. **Call meeting to order -** at 1:30 PM
2. **Approval of Agenda** – No changes requested, agenda accepted.
3. **Member/guest introduction** – 9 members 11 guests
4. **Roster check–** roster circulated for correction.
5. **Approval of October 3rd 2012 minutes –** Reviewed and approved without change.
6. **Report from the Chair:** – will be covered in later agenda items.
7. **Standards status report:** Attached as Annex "B". PAR granted for revision of C37.41 with completion date of December 2016.
8. **Working Group Reports**

   a. **Revision of Fuse Specification Standards –** Since Mark Stavnes was unable to be present at these Switchgear Committee meetings, it was decided to hold two meetings of the RFS WG to advance the C37.41 document on which the structure of C37.42 will be dependant. Members were asked to review Jim Marek's draft Annex (previously circulated) and the drafts of C37.42 and C37.45 to be circulated in the next few weeks.

   b. Revision of Fuse Standards - J. G. Leach. John reported that:

   - The revision of fuse standards Working Group met on Tuesday April 30th with 17 members and Wednesday May 1st with 18 members and one guest (a total of 6 attendees requested membership).
   - The PAR for the revision of C37.41, was granted last December.
   - Tuesday was spent in discussing proposed changes to C37.41. The dielectric testing section has been simplified and condensed. As with IEC expulsion fuses, it is proposed that for both expulsion and currentlimiting fuses the testing tables will show that all testing is performed at 100% of the fuses' rated maximum voltage. For fuses intended to be used only on three-phase effectively grounded circuits, two alternative tests for maximum interrupting current (I_1) will be permitted, one at 87% voltage and full current and the other at 87% current and full voltage. No existing designs will therefore require re-testing.
   - Most of Wednesday was spend discussing the proposals of the task force on polymeric insulators, lead by Chris Lettow. Good progress has been made on identifying appropriate testing for outdoor fuses (primarily aimed at cutouts). Before this testing is incorporated in C37.41, it is proposed that existing designs undergo the suggested testing to verify that it is appropriate. A project is to be proposed, with testing performed by NEETRAC (who have conducted similar studies in the past). This testing will also be opened to participation by cutout manufacturers who are **not** presently members of the Task Force. Interested parties should contact the Chair of the Task Force or the Subcommittee Chair.

9. **Report of liaison to other committees**

   a) ER&P Committee – J. G. Leach:

   There has been a hold-up at IEEE in the awards process, so none proposed in the fall will be presented at the Spring meeting. John Brunke has been advanced to "honorary member" of the Committee. Those who are not yet senior IEEE member are encouraged to apply (now it is

an on-line process and relatively easy). We also need more Fellows, although this is a harder process. Ken Edwards is our new web-master.

10. Report of IEC activities - J. G. Leach:

John reported that in the area of fuses, IEC moving somewhat towards IEEE practice and we are reciprocating. IEC has begun to follow some IEEE practices, such as fuses within a liquid filled transformer so they have been adding material to reflect this. We are restructuring our documents, moving material concerning fuses and switches that are not covered by IEC to annexes, and generally following the same outline and organization as is used by IEC.

IEC is ready to release formal technical report, a "Tutorial and application guide". This includes (for the first time in IEC) application information related to "North American" style applications (e.g. combinations of backup and expulsion fuses in transformers).

IEC is ready to issue a new capacitor fuse standard that has passed balloting.

MT 3 has almost completed an amendment to the CL fuse standard (that includes liquid tightness testing for transformer applications) and is proposing a more comprehensive revision of 60282-1. The HV Fuses subcommittee (SC32A) of IEC is meeting in Poland this June, to discuss this.

John then discussed the difficulties IEC had experienced working with IEEE, and expressed concern over the apparent ethical shortcomings of IEEE during the process to get approval for the IEC Technical Report TR 62655. The technical report consolidates application guides for CL and expulsion fuses into a technical report, and in addition to material from existing IEC standards and significant new material, C37.48.1 was used as a basis for some parts related to North American practice (approximately less than 10% of the total). Copyright approval for the IEEE material was requested before the project began, and it was stated by IEEE that when the project was completed it would be granted. After almost 5 years of work this was done, but IEEE initially refused copyright approval!

After further review, and significant "behind the scenes" lobbying, IEEE approved the use of copyright material, but demanded a very cumbersome copyright acknowledgement - requiring separate acknowledgement for each individual reference (this could be many separate sentences per page, for numerous pages). More negotiations followed. It was pointed out to IEEE that we would need to use a significant amount of IEC material in the revision of C37.41 if it were to stay up-to-date (e.g. new IEC capacitor fuse testing). If IEEE and IEC could not work together to share common material (as has been done for the last 30-40 years) it may become impossible to maintain the relevance of IEEE fuse documents. An alternative would be for the USA to use IEC fuse standards with "in-country" clauses to address our needs (as is done by most other countries). The standards could possibly be published by ANSI (who represent the US National committee of IEC). Eventually, agreement was reached for IEC to use copyright language similar to that currently used by the IEEE for IEC material used in C37.100.1 (common clauses). John was clearly less than happy with his experience of working with IEEE over the last six months, and was somewhat critical of their behaviour and performance…

The full TAG report is attached as Annex "A".

11. Unfinished business – None

12. New business – The Chair reported that Frank Muench, who has been a member of our fuse working groups and subcommittee for over 25 years, would be retiring at the end of August. This was likely, therefore, his final meeting (although he will stay as a corresponding member for a little longer). John expressed gratitude to Frank for the many years of faithful service he had given to the Switchgear committee and its sub-groups, and in particular for the work done on many fuse

working groups, the HV Fuses Subcommittee, and the IEC Technical Advisory Group. He pointed out that few members had been as consistent in both attending meetings and providing leadership and input to the important work achieved while Frank has supported our activities, and that Frank was wished a very happy and productive retirement. John stated that Frank will always be welcome at any of our meetings that he is in a position to attend in the future. *[Frank was presented with a certificate of appreciation by the Switchgear Committee, during the ADSCOM meeting on May 2nd.]*

13. Next meetings:

Fall 2013 (16th September – 18th September) Hilton Palacido del Rio, San Antonio TX

Spring 2014 (5 May – 8 May) Disney Contemporary Hotel, Orlando, FL.

Fall 2014 (September 21-25), Renaissance Hotel, Asheville, NC

Spring 2015, (April 26 – 30), Tradewinds Island Resorts, St. Pete Beach, FL

Fall 2015, (September 20 – 24), Catamaran Resort Hotel, San Diego, CA

14. Adjournment – 2:30PM

Annex "A" IEC report

IEC Report 2013-1 October 2012 to April 2013

From: Dr. John G. Leach, Technical Advisor SC32A, April 27th 2013

Summary
Since the October 2012 report there has been a meeting of MT3 and WG6 in London, England on Tuesday November 27th and Wednesday November 28th 2012. The second CD for an amendment to IEC 60282-1 closed on November 9th 2012 and at the meeting a Circulate Comments and CDV were prepared. The CDV has been issued on April 26th as 32A/302/CDV. The DTR (Draft Technical Report – equivalent for a technical report to a Final Draft International Standard) received affirmative votes and the WG made editorial changes to enable the Technical Report (IEC/TR 62655:2013) to be issued in 2013. The Committee Draft Vote document for the revision of the Capacitor Fuse standard closed on November 30th 2012 with no significant comments. It was therefore decided to skip the FDIS stage and go directly to publication. The final versions (including the French translation) should be available for publication in May 2013. A meeting of SC32A will be held in Warsaw on June 24th, followed by a meeting of MT3 to begin discussions concerning a general revision of IEC 60282-1 (CL fuses).

MT3

MT3 met in London, England, on Tuesday November 27th and Wednesday November 28th 2012 with eight members and Subcommittee Secretary Didier Fulchiron present. The second CD for an amendment to IEC 60282-1 (32A/295/CD) had closed for comments on 2012-11-09. There were 21 comments received from the circulation of 32A/295/CD with 19 requiring a response. After discussion, the Maintenance Team recommended that ten comments be "accepted", four be "accepted in principle" (changes to the proposal were made) and to not accept four. Three of the "not accepted" related to the frequently discussed "General Purpose fuse" definition and testing requirements. The Technical Report 62655, which contains all of the relevant information from application Clause 9 of IEC 60282-1, including the changes proposed in the amendment, has received approval from the National

Committees, and will be published May-June 2013. It was therefore decided that the CDV for the amendment would be changed in three ways:

a) State that Clause 9 is being deleted in favour of application information contained in TR62655
b) Remove the proposed changes to Clause 9 as these are already incorporated into TR62655.
c) Add items that change each instance of a reference to Clause 9 in 60282-1 to a reference to TR62655

Members then reviewed proposals for future revision of IEC 60282-1 (CL fuses). some of which had come out of discussions during the preparation of the Amendment, but that were thought to be beyond the scope of the Amendment. It was felt that it be important that if the Subcommittee gave permission to address such a revision, the scope be large enough to ensure that any discovered issues, that the MT felt were significant, not be "beyond the scope" of that revision. Consequently, various broad topics were listed (see Annex A) that incorporated specific issues identified as well as more general topics raised.

WG6

WG6 met in London, England, on Tuesday November 27th with eight members and Subcommittee Secretary Didier Fulchiron present. Circulation of the Draft Technical Report for the new Fuse Tutorial and Application Guide TR 62655 closed on 2012-11-16. Sixteen countries voted in favor of the draft becoming a Technical Report with no negatives and six abstentions. However, thirty comments were received from five national committees. Some of these comments went beyond what would be acceptable "editorial" corrections that could be accepted at the FDIS stage of a standard; however the rules for a TR are somewhat more relaxed and comments that did not change the technical content, but provided clarification, were considered. Fourteen comments were rejected, many due to them being inappropriate to consider at this stage of publication (i.e. they introduced controversial topics). Nine items were accepted in principle with some change of wording proposed, while five comments were accepted (two comments were "noted" and did not need a response). The DTR had been examined for editorial content by the Central Office and numerous minor changes proposed. The WG went through these changes and accepted most but some required that Didier pursue further discussion with the editors. The final versions (English and French) were provided to CO in March, after a prolonged discussion between IEEE and IEC (with me spearheading the liaison) regarding copyright acknowledgement. Suitable wording was finally agreed (based on the IEEE acknowledgement in C37.100.1).

MT7

The Committee Draft Vote document for the revision of the Capacitor Fuse standard closed on November 30th 2012 with no significant comments. It was therefore decided to skip the FDIS stage and go directly to publication. The final versions (including the French translation) should be available for publication in May 2013.

John Leach, 4/27/13

IEC report Annex A

List of proposed topics to be considered in a revision of IEC 60282-1.

Version 1.1, generated at the MT3 meeting in London 28th November 2012 (with minor changes).

1. Revision of Table 6 (temperatures) and fuse current rating system to address applications at surrounding temperatures over 40 °C.

2. Review fuse current rating system for special applications.
3. Review temperature measurement methods for fuses and ambient temperature.
4. Review insulated/bare conductor requirements and fuse position for test circuits (including fuses in enclosures).
5. Review definitions to ensure compatibility with other standards (particularly switchgear standards).
6. Review test circuit parameters and test requirements for compatibility (e.g. comparison of power factor and peak current requirements).
7. Clarification of the equivalence of 50 Hz and 60 Hz testing.
8. Review series II voltages in all associated tables.
9. Review virtual time usage and specifications for TCC (with comparison to IEC 60282-2 and 60269)
10. Review striker requirements including thermal strikers (including switch-fuse requirements).
11. Review 87% testing requirements in relation to non-effectively earthed systems and comparison with testing methods for expulsion fuses in 60282-2.
12. Review parallel fuse homogeneous test requirements.

Annex "B" Project status

Document	Title	Sub-Committee	WG Chair	PAR	IEEE Status	Activity
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	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
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
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
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 2007	None
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
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
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
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