Dry Type Transformers Subcommittee – Unapproved Meeting Minutes
October 28, 2009 – Lombard Illinois

8.10 Dry Type Transformers SC **Chair Charles Johnson**

Secretary Lewis Powell

8.10.1 Introductions and Approval of Minutes

The Dry Type Transformer Committee meeting began at 1:30pm Wednesday, October 28 in the Jr. Ballroom C of The Westin Lombard Yorktown Center with introductions of members and guests. There were 18 members and 6 guests present. Mike Haas made a motion to approve the minutes of the Miami meeting; Paulette Powell seconded and the WG approved. The Chair then asked if anyone knew of any patent related issues; none were identified.

8.10.2 Working Group/Task Force Reports

The next order of business was the presentation of the reports of the various working groups and task forces. See the following sections for the individual reports:

8.10.2.1 IEEE PC57.12.01 - Dry Type General Requirements Chair Tim Holdway

The working group met in the Magnolia B/C room of The Westin Lombard Yorktown Center. The meeting was called to order at 11:00am.

The meeting was convened with twelve (12) members and seven (7) guests present.

The minutes of the Miami April 20, 2009 meeting were approved.
Motion: Mark Gromlovits
Second: Mark Haas

No patent issues were identified.

Old Business

Partial Discharge

Rick Marek formally suggested that the standard be changed to adopt IEC 60076-11partial discharge levels and durations. Mark Gromlovits and Charles Johnson suggested separate partial discharge and pre-stress limits for cast coil and open ventilation transformers. Table 6 partial discharge and pre stress limits will be updated to include a separate column for cast coil and separate column for open ventilation transformers.

Altitude correction in 4.2.5 is vague on dielectric tests that are affected at altitude greater than 3300 feet. Ensuing discussion resulted in recommended corrections for higher to lower altitude and lower to higher altitude. Rick Marek is to prepare the draft.

Table 5
Note “a” was only applicable to the two tables published in the previous edition of C57.12.01. Table 5 replaced these two tables in C57.12.01-2005. Note “a” will be removed from the draft.

Proposal for a change to paragraph 4.2.5
Rick Marek presented his proposal to revise clause 4.2.5 at the Charlotte meeting. Rick was not present at this meeting and his proposal was not discussed. Rick will be asked to attend the next meeting by Charles Johnson to describe his proposal in detail.

New business
The PAR is being prepared; the scope and purpose will be updated as well as the standard title changed. As it has been suggested to remove cast coil and resin encapsulated windings from the title and these products are still within the standard scope.

With no further business, the meeting was adjourned at 12:10 PM.
As follow-up to the WG report, the Chair commented that removal of the wording cast coil and resin encapsulated windings from the title is suggested as the winding types were originally added to the title when the technology became available on the market.

8.10.2.2 IEEE PC57.12.91 - Dry Type Test Code — Chair Derek Foster

The working group met in the Cypress A/B room of The Westin Lombard Yorktown Center. The meeting was called to order at 3:15 PM on Monday October 26, 2009.

1 There were 11 members and 5 guests present.

2 The minutes of the last meeting, held in Miami, were approved as written.

3 There were no patent issues regarding this standard.

4 Old Business

Draft will be ready for WG review by November and expect to ballot it by the end of the year. The hot resistance reading will be kept at six minutes rather than the 4 minutes recommended by C57.12.90 Section 11.0 WG for oil-filled transformers.

5. There being no new business, the meeting was adjourned.

Following presentation of the WG report, there was a question on how to deal with the impulse wave shape being long enough for low impedance circuits. Chuck Johnson stated that the verbiage in the draft is almost verbatim to the Impulse Test Guide. What is presently in the standard correlates well with what is in the Impulse Test Guide.

8.10.2.3 IEEE PC57.12.52 - Sealed Dry Type Power Transformers — Chair Sheldon Kennedy

The Working Group met on Monday, October 26, 2009 at 9:30 AM with 12 members and 6 guests present. Sheldon Kennedy chaired the meeting.

The IEEE disclosure statement was read. There were no patents pertaining to this standards work for which any members had awareness.

Minutes of the April 20, 2009 meeting in Miami, Florida were reviewed and approved.

Draft 2 of the document was placed on the IEEE Transformers Committee website. The working group reviewed Draft 2.

It was decided to add the words “at the time of filling” where we first mention that the transformers shall be filled with dry air or nitrogen. The concern was that the air may not stay dry over the life of the transformer.

Tables 2 and 3 which give voltages and BIL tables will be eliminated and we will refer back to C57.12.01.

In clause 6.4.3 we will remark that the neutral will be insulated to the values given in IEEE C57.12.01, since Table 3 will be removed.

Clause 9.4.3.1 will eliminate the reference to Table 2 and instead refer to IEEE C57.12.01.

This completed the review of Draft 2. There were no other comments. The chair will make the revisions noted and produce Draft 3. This will be surveyed with the Working Group members. We should be able to shortly send the document out for an official ballot, if all goes well in the survey.

There was no other old business or new business.

The meeting was adjourned at 10:45 AM.

8.10.2.4 WG for Revision of IEEE C57.16: Dry Type Reactors Chair Richard Dudley

The W.G. for the Revision of IEEE C57.16 (Dry Type Reactor T.F.) met on Monday, October 26, 2009 from 8:00 a.m. to 9:15 a.m. in the Magnolia A/B Meeting Room, of the Westin Lombard Yorktown Center in Lombard, Illinois. There were 13 members and 5 guests present. The following are the highlights:

1. Introductions were made.

2. No patent issues were identified.

3. The minutes of the W.G. meeting in Miami were approved.

   Note: The minutes of the WG meeting in Lombard will not be approved until the WG meeting in Houston, Texas.

4. Draft #4 and other inputs to the revision of IEEE C57.16 were discussed. The key points are as follows:

   (i) The issue of possible CB TRV issues associated with switching filters especially during capacitor bank faults or bus faults were deemed to be more systems related and will not be included in a note in A.3.1.

   (ii) Annex F "TRV Considerations in the Application of Current Limiting Reactors" will be reviewed once again to ensure there are no references to CB type and performance. The focus of the annex must be on use of capacitors supplied with reactors to mitigate the TRV seen by the CB. It was also agreed the inclusion of the annex is essential to IEEE C57.16 as the capacitors used for mitigation are usually within the scope of supply of the reactor manufacturer. IEEE C37.011, the circuit breaker application guide, has been referenced.

   (iii) The "notes" below Table 3 will be converted to "footnotes" or "blocked in" to ensure they become a normative part of the standard as "notes" are considered to be informative.

   (iv) "2. References" will be relabeled "2.Normative references". References that are cited in a very specific way will remain "normative references". Those that are cited in a

general way will be moved to the bibliography. The Chairman will review this issue and also asked for input from WG members.

(v) The terminology "shunt capacitor reactors" will remain. However, a note will be added in B.1.1 that in IEC 60076-10 the terminology used is "damping" reactors although their function is in-rush or out-rush current limiting and do not provide damping.

(vi) The reference to capacitor standards in B.4.1 of Annex B is not correct. The basis for the continuous current rating of shunt capacitor reactors needs to be determined and documented. During the WG meeting clause 20 of IEC 60871-1 "Shunt capacitors for power systems" was briefly reviewed re the tolerance factor for capacitors of 1.43. Clause 5.3 of IEEE Standard 18-2002, "IEEE Standard for Shunt Power Capacitors" (standard under the jurisdiction of Substations Committee) was reviewed; capacitor tolerance of 135%.

B.3.3 should state that capacitors are manufactured to IEEE (ANSI) and IEC standards. The impact on the current rating of the shunt capacitor reactor should be stated as a range; 1.35 to 1.49. K. Papp, M. Sharp and Peter Balma will review and suggest appropriate changes.

(vii) Three phase stacked filter reactors were discussed. It was determined that 20% to 25% of filter reactors are provided in a three phase stack arrangement. The inherently higher coupling (vs. a "side by side" arrangement) and associated larger mutual reactances has a greater impact on effective reactances. In the case of low Q filters coupling in a three phase stack arrangement should be minimized. In the case of high Q filters, stacking should be avoided. One paper authored by Xiangfu Guo and another authored by Klaus Papp et al will be referenced. Klaus Papp and Mike Sharp will review the material in Draft #4, including input from Xiangfu Guo and others, and produce a revised draft of Annex A. Notes will also be added re stacked 1/3 and 1/6 harmonic filter reactors and the impact of zero sequence currents.

The Chairman agreed to produce Draft #5 before the end of 2009. The revision to Annex A discussed above should be sent to the Chairman as soon as possible. The Chairman stated that his objective is to circulate Draft #5 to WG members, obtain their approval and ballot Draft #5 in advance of the WG meeting in Houston so that ballot results can be discussed at the WG meeting. The WG adjourned at 9:15 a.m.

8.10.2.5 WG Dry Type Thermal Evaluation C57.12.56/60 Chair Roger Wicks

The WG had a successful ballot, resolved comments and completed the recirculation ballot with no additional issues. The balloted draft has been sent to the Standards Board for approval.

8.10.3 Old Business

There was no old business.

8.10.4 New Business

The chair provided the following status of standards:

Expiring in 2009: C57.12.60 , C57.96, C57.124, and C57.259.
C57.12.60 has been sent to the Standards Board for approval. C57.96 has Rick Marek assigned as Chairman, and Henry Cooke as Secretary. The PAR has been submitted for approval. C57.124 reaffirmation has been submitted to REVCOM for approval. A WG will be formed for revision of the standard. IEEE 259 has Dave Stankes leading the reaffirmation; the ballot pool is being formed.

Expiring in 2010: C57.12.01 and C57.94. C57.12.01 PAR has been initiated and the standard has 3 more years before expiring. C57.94 looking for volunteers to review the document for revision or reaffirmation. Paulette Powell mentioned she may have the comments from the last approval and will lead the effort.

Expiring 2011 C57.12.52, C57.12.59, and C57.134. A Chairman is designated for C57.12.52, and reaffirmation leaders are needed for C57.12.59 and C57.12.134.

Expiring In 2013 C57.12.51, C57.12.58
The Chair mentioned the opportunity to piggy back on work of other groups, such as oil-filled WG efforts, but prefers to have final documents in place first. Then the Dry Type WGs can review and determine relevancy for dry technology. We will continue to work on keeping Dry Type standards updated.

Being no other business, the meeting was adjourned at 2:08pm.