Dry Type Transformers Subcommittee – Unapproved Meeting Minutes
March 10, 2010 – Houston, Texas

9.7 Dry Type Transformers SC **Chair Charles Johnson**
Secretary Lewis Powell

9.7.1 Introductions and Approval of Minutes

The Dry Type Transformer Committee meeting began at 1:30pm Wednesday, March 10 in Regency C of the Omni Houston Hotel with introductions of members and guests. There were 13 members and 5 guests present. Tim Holdway made a motion to approve the minutes of the Lombard meeting; Mark Haas seconded and the WG approved. The Chair then asked if anyone knew of any patent related issues; none were identified.

9.7.2 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:

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

1. The working group met in the Regency C Room of the Omni Houston Hotel
2. The meeting was called to order at 11:01 AM by Chairman Tim Holdway
3. The meeting was convened with seventeen (17) members and seven (7) guests present.
4. The minutes of the Lombard October 26, 2009 meeting were approved.

   Motion: Chuck Johnson
   Second: Mark Gromlovits
5. Attendees were asked if they knew of any patents that may be related to the work of this working group. No patents or patent claims pertinent to C57.12.01 were identified by working group members.
6. Old business
   a. PAR

      The Chairman stated this Working Group had an approved PAR that expires in 2013. The proposed changes from the Fall 09 meeting were incorporated into the Title, Scope, and Purpose portions of the PAR.

   b. Altitude Correction

      i. Rick Marek stated that Section 4.2.5 is vague on what dielectric tests are affected for altitudes above 3300ft (1000m). Marcel Fortin stated that the dielectric test equipment could be adjusted at each facility and corrected for the air density. General discussion revolved around both correcting from a lower altitude to a higher altitude and from higher altitude to lower altitude.

      ii. The decision was made to keep Table 1 in some format. A suggestion was made to include the inverse of the current correction factors to better explain their usage. Additionally the members are to submit their suggestions for replacing the existing text in 4.2.5 to Tim Holdway before the next meeting.

   c. Partial Discharge

      i. Rick Marek formally suggested that the standard be changed to adopt the PD levels and measurement durations from IEC 60076-11 section 22 for Cast Coil Technology only. Charles Johnson and Mark Gromlovits suggested that different

PD levels in pC be developed for Cast Coil and Open Ventilated windings. Table 6 —Partial discharge limits and pre-stress limits will be updated with (1) column for Cast Coil and (1) column for Open Ventilated.

ii. A motion was made by Rick Marek that Cast Coil use 10pC. The motion was seconded by Chuck Johnson and the group voted affirmative.

iii. The Open Ventilated test levels were not set, but Mark Gromlovits volunteered to submit a suggested level.

7. New business

   a. Purpose

      i. Chuck Johnson made a motion to add the work 'underground' before the words 'mine transformer' in 1.2 f) that lists the exceptions. The motion was not seconded and Tim Holdway tabled the discussion.

      ii. Marcel Fortin proposed that 'e) general purpose' transformers be removed from the exception list. The group discussed the definition of 'general purpose transformer' without a formal resolution. No formal motion was made, but Tim will investigate if an additional change to the PAR can be made at this time. He will inform the members of the group via email once he has determined the feasibility of modifying the PAR.

   b. Nameplate

      i. Chuck Johnson informed the group that the C57.12.00 WG had proposed to add the words 'DOE Compliant' to their nameplates. Aleksandr Levin agreed to serve as the liaison to this group and to determine the details. He will inform Tim Holdway via email and Tim will distribute to the WG.

8. Next meeting: Fall 2010: October 24-28 in Toronto, Ontario Canada

9. With no further business, the meeting was adjourned at 12:17 PM.

   Motion: Chuck Johnson
   Second: Mike Haas

9.7.2.2 IEEE PC57.12.91 - Dry Type Test Code **Chair Derek Foster**

1. The working group met in Regency C of the Omni Houston Hotel. The meeting was called to order at 3:15 PM on March 8.

2. The working group met with 11 members and 9 guests present.

3. There were no patent issues regarding this standard.

4. The minutes of the last meeting, held in Lombard, were approved as written.

5. Old Business

   a. The final draft of the revised sections of this standard was circulated to members of the working group for review in December. Four members replied with comments. Most of these comments have now been incorporated into the standard, which is currently with IEEE for the Mandatory Editorial Coordination review. After completion of the editorial review, the standard will be sent out for ballot.

   b. Marcel Fortin had provided several comments for consideration during the next revision of the standard, and these comments were presented and discussed briefly during the

meeting. A copy of Marcel's comments will be sent to all working group members after this meeting. Marcel also suggested the formation of a task force to review section 11 of the standard, on temperature rise test procedures, in view of similar work being carried out on section 11 of C57.12.90, the liquid filled transformer test standard.

c. Marcel Fortin agreed to give his presentation at the next meeting on the loading back method of temperature rise testing.

d. Rick Marek had made proposals for two revisions to C57.12.01 regarding corrections for dielectric strength at altitudes above 3300 feet, and also for partial discharge levels and test procedures, and it was agreed that this working group would work closely with the C57.12.01 working group to coordinate any revisions regarding these proposals, in both standards,

6. There being no new business, the meeting was adjourned at 4:00 pm.

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

1. The Working Group met on Monday, March 8, 2010 at 9:30 AM with 10 members and 6 guests present. Sheldon Kennedy chaired the meeting. There were four new members added during this Working Group meeting bringing the total WG membership to 12. We had a quorum for the meeting.
2. The IEEE disclosure statement was read. There were no patents pertaining to this standards work for which any members had awareness.
3. Minutes of the October 26, 2009 meeting in Lombard, Illinois were reviewed and approved.
4. Draft 3 of the document was placed on the IEEE Transformers Committee website. A survey was circulated to the Working Group of Draft 3 before the meeting. Returns are minimal so far, but it still has 20 days to run.
5. The Working Group reviewed the changes made in Draft 3.
6. 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.
7. Tables 2 and 3 which give voltages and BIL tables will be eliminated and we will refer back to C57.12.01.
8. 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.
9. Clause 9.4.3.1 will eliminate the reference to Table 2 and instead refer to IEEE C57.12.01.
10. This completed the review of Draft 3. There was a review of construction features with questions from some of the new Working Group members.
11. If the results of the Working Group Survey are successful, the document will be sent out for a survey of the Dry Type Subcommittee. This should all be accomplished before the next meeting. If there are comments in the surveys, we will resolve those at the next meeting. If there are no comments, we hope to proceed to an official ballot.
12. There were no other comments.
13. There was no other old business or new business.
14. The meeting was adjourned at 10:10 AM.

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

1. The W.G. for the Revision of IEEE C57.16 (Dry Type Reactor T.F.) met on March 8, 2010, at 8:00 a.m. in the Regency C Meeting Room of the Omni Hotel in Houston, Texas. There were 11 members and 4 guests present. The following are the highlights of the meeting:
2. Introductions were made and the attendance list circulated.
3. IEEE patent policy was reviewed and no issues were raised.
4. The minutes of the W.G. meeting in Lombard, Illinois were approved.

   Note: The minutes of the WG meeting in Houston, Texas will not be approved until the WG meeting in Toronto.
5. The revision process for IEEE C57.16 was reviewed, specifically Draft #6. The following are the highlights:
   a. The test code for the T-T test has been revised to reflect the impact of the changing circuit design. The total test period will be such as to ensure the application of 7200 crest voltages of required magnitude. Typically only the first crest voltage of each decaying sinusoidal train is critical. However the second peak can also be counted providing it is of required magnitude; this implies that the first overvoltage peak is above specified magnitude.
   b. Annex F and final input from the IEEE Switchgear Committee was discussed. Devki Sharma suggested sending the latest draft to the Chairman of the HV Circuit Breaker SC, Richard York. Input could also be solicited from Bill Bergman (who provided input during the initial stages of development of Annex F, and Dennis Dufournet (also provided early input). The Chairman stated that he would contact these people and would copy the WG on all e-mails. Devki Sharma stated that the next IEEE Switchgear Committee meeting would be April 26, -29, 2010. Devki Sharma also stated that his perception when attending the last meeting of the IEEE Switchgear Committee was that many of the engineers involved in CB TRV issues were not aware that mitigation capacitors could be mounted inside distribution class CRs. IEEE C37.011, which includes CB TRV application issues, is being revised and will include information on reactors and possible CB TRV issues.
   c. To save time, the Chairman agreed to send Draft #6 of the revision of IEEE C57.16 to IEEE for Mandatory Editorial Co-coordination.
   d. Work is being done in IEC on their sound measurement guide. A clause will be included on dry-type air-core reactors.
   e. Clause B.1.3 “References” should be retitled “Supporting Documentation”.
   f. Since the “notes” in Table #4 are “boxed in”, they are considered normative and the use of “shall” is okay. The Chairman will “double check” with IEEE.
   g. In general all notes are informative and the use of “shall” is not allowed. On this basis the “note” in A.4.2 should be made part of the main text.
   h. The Chairman will ensure that the “purpose” and “scope” are as exactly on the PAR.
   i. The WG felt this information now included on 3 phase stacked reactors is okay. It was also noted that in most cases 3 phase stacked FRs are not grounded and hence there is no zero sequence current.

j. Shall is used in the "note" on Page 59. The "note" will be made part of the normative test.

k. "Shall" is used in a "note" on Page 44.

l. The "note" in Figure 5 will be converted to normative text; "in the above figure the following guidelines shall be considered".

m. In ANNEX G [B10] to [B12] are incorrectly formatted.

n. The Chairman stated his intention to complete Draft #7 in Early May, the latest, and will distribute to the WG for approval. If okayed by the WG, then a formal IEEE ballot will commence.

o. Copyright permission will have to be obtained from IEEE for the "excerpted" information in F11; excerpted from ANSI C37.0721-1971.

6. The meeting adjourned at 9:15 a.m.

9.7.2.5 WG Dry Type Loading Guide C57.96 Chair Rick Marek

1. The first meeting of the working group was held in the Regency G Room of the Omni Houston Hotel at 11:00 with 13 in attendance. Introductions were made, and the attendance sheet was passed around. 11 requested membership. There were no patent issues.
2. The Chair announced that the PAR had been approved and 2013 is the completion date. In summarizing the PAR, no changes were made to the title of the document. However, there were some apparent discrepancies between the approved PAR version of the old scope and purpose. This was compared to the current document scope. The current document does not have a purpose. Chuck Johnson volunteered to check on the history of the document to see what happened.
3. The Chair reviewed the current loading guide highlighting key sections and the general perspective of the document. Several issues were noted with some of the curves and the computer program. The document also includes cast transformers, but only in the annex, rather than in the main body. All of these issues must be addressed during the revision.
4. He then reviewed the current IEC loading guide, IEC 60076-12. He stated that as a member of the IEC working group, he had provided official copies of C57.96 to the working group. The resulting document has many similarities.
5. Both documents were discussed and compared at length. The question posed, was could we adopt the IEC loading guide as it is without change? It would be different, but would it be sufficient for the needs of our users who are really the ones who need this document. Permission to use the IEC document has been requested for standards development purposes and members will have access to a copy.
6. The task then could be one of three choices: Revise, correct and re-write the IEEE document, adopt the IEC document intact without changes or some combination of the two, using portions of the IEC document in a new IEEE document. This document appears to be a very good candidate for adoption since the two key differences which are issues for other documents are not an issue in this one. Those differences are the ambient and the dielectric testing. All were requested to review the IEC document very closely and compare it to the IEEE document. The group was strongly encouraged to consider adoption.
7. During the discussion at the Subcommittee meeting, Paulette Powell was thought to have conducted the last reaffirmation. She will check to see if she has balloter comments from that reaffirmation.

8. The meeting was adjourned at 3:00

9.7.3 Old Business

There was no old business.

9.7.4 Chairman's Remarks

1. The Chair provided the following status of standards:
    a. Expiring in 2009: C57.12.60 approved and to be published this month. C57.96 PAR is approved and expires Dec 2013. C57.124 the reaffirmation has been approved by REVCOM. There are comments on the state of the technology. The Chair proposes a TF to review and if necessary to revise, a PAR will be taken out. C57.259 reaffirmation is with REVCOM for approval.
    b. Expiring in 2010: C57.12.01 – the PAR has been extended to Dec 2013. C57.12.91 has a Chairman established and development is proceeding. C57.16 – development is proceeding. C57.94 - Paulette Powell to lead the reaffirmation.
    c. Expiring 2011 C57.12.52 – WG Chairman established and development is proceeding. C57.12.59 – a reaffirmation leader is needed. C57.134 – a reaffirmation leader is needed.
    d. Expiring In 2013 C57.12.51 and C57.12.58 were recently approved; no activity is anticipated at this time unless issues rise warranting review.
2. Working Group Practices and Procedures Manual is being developed as an operating and procedures manual for WG officers as guidelines for conducting meetings.
3. The Chair reminded that a quorum is needed in order to conduct meeting business; no decisions can be made unless a quorum is established. He urged the WG Chairs to clean up their rosters purging non-participating individuals.
4. The Chair suggested that WG/SC officers have a back-up in event they are unable to attend so that standard development work can continue.

9.7.5 New Business

1. Discussion ensued on coordination of partial discharge between C57.12.01, C57.12.90 and C57.124. C57.12.01 addresses BIL levels, C57.12.90 specifies how to test, and C57.124 which no longer represents state of art, addresses how to measure. A TF may be needed to address partial discharge coordination among the three documents. Comments on the state of C57.124 included adoption of IEC 60270 and patterning the revision based on C57.113 liquid-immersed document. Marcel Fortin suggested retaining C57.124 as he stated no standard includes recent digital systems.

Being no other business, the meeting was adjourned at 2:30pm.