Distribution Transformer Subcommittee Report

Chairman: Stephen Shull

Secretary: Jerry Murphy

Meeting Date: 3/14/2012 **Time:** 9:30 – 10:45

Attendance:

Members	**33**
Guests	**56**
Guests Requesting Membership	**12**
Total	**89**

Meeting Minutes / Significant Issues / Comments:

Steve opened the meeting; rosters were passed out, introductions were made & by a show of hands of members listed on screen showed we had quorum with 25 of the 47 members in attendance at the start of the meeting.

The minutes of the fall 2011 meeting of the subcommittee were presented and a motion was made by Kent Miller, seconded by Ron Stahara to approve the minutes; the motion carried by unanimous acclamation.

The following are the highlights of the reports that were submitted by the Working Groups and Task Forces. For further, detail please consult the individual reports.

- C57.12.36 –Distribution Substation Transformers

  The chair opened the meeting at 9:45 AM on Monday March 12, 2012, in the Fisk Room of the Renaissance Nashville Hotel, Nashville, Tennessee; introductions were made, and the attendance roster was circulated. Since this was the first meeting after the PAR was approved, no quorum had to be established, and the people in attendance were asked to indicate on the rosters whether they requested membership for this working group.

  Jerry informed about the status of the PAR, which was approved in December 2011, with an expiration date of December 31, 2015.

  The next item on the agenda was the discussion about the definitions of Class I and Class II Power transformers, and Jerry mentioned that the definition of the two classes was included only on one IEEE standard, and that this standard for Distribution Substation Transformers had essentially the entire scope of Class I Power Transformers.

  Marcel Fortin mentioned that 69 kV transformers, 15 MVA and above were being voted to meet requirements of Class II Power Transformers, but these transformers were out of the scope of this WG.

  Several members in attendance considered that even though not many users specified these distribution substation transformers referring to this IEEE Standard, the need existed to keep the document active, so that manufacturers could follow the requirements included on this standard for these specifications.

  As the next item on the agenda, the document with the comments from the previous balloting process was reviewed.

  The comment about section 5.1.4 Winding temperature indicator was discussed; it questioned if the hot spot temperature was a measurement or an indication. Gary Hoffman volunteered to review sections 5.1.3 and 5.1.4 for liquid and winding temperature indicators, and provide a recommendation to this WG, based on the current requirements of C57.12.10.

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Marcel Fortin mentioned that on section 5.9.2 other oil preservation systems, some text was missing after the first paragraph. Jerry mentioned that he would review this for the next meeting.

The next comment discussed was about section 5.9.1 Sealed tank system, related with the temperature range. The agreement was to change this section to reference the operating conditions as per C57.12.00, same as the C57.12.10 document.

The last comment discussed was about section 5.2.3 Electrical characteristics of bushings. The comment described some conflicts with the scopes of the standards referenced on this section. Jerry volunteered to review the bushing standards to address this comment.

Jerry said that he would make available the draft of the standard under revision as well as the file with the comments from the previous ballot, so that the working group can review them for the next meeting in Milwaukee.

The meeting was adjourned at 10:56 AM.

- C57.12.20 – Overhead Distribution Transformers

Introductions of members and guests.

A quorum of the Working Group's members was present (24 out of 32).

The minutes of the fall 2011 Boston meeting were approved as submitted.

Al Traut reported that the current revision expires in 2021. A PAR is needed by fall of 2012.

Discussion was held on a missing dimension on Figure A.3 of Annex A, but changed to whether hanger and kicker brackets should be included in the C57.12.20 standard at all. The WG suggested that a survey be done on how many, if any, Users still need crossarm hanger and/or kicker brackets. Chuck Simmons will put together a User survey to determine if hangers and/or kicker brackets are still being used with transformers or any other equipment.

Discussion was held on temperature requirements for gaskets. The WG is interested in pursuing some type of further guidance on temperature requirements for gaskets in the C57.12.20 standard. Chuck Simmons will forward results from the 2008 survey of transformer manufacturers and transformer component manufacturers. Additionally, Chuck will perform a survey of the WG to determine what changes are desired and report back at the next meeting.

Gael Kennedy reported to the WG on his research into low voltage ratings not presently in the C57.12.20 standard. He will investigate possible changes to the standard and offer a recommendation at the next meeting.

Discussion was held on the recent activity by the DOE with regard to distribution transformer efficiency - specifically that the DOE is asking for input on the creation of an Equipment Class specifically for overhead type transformers. The possibility of adding maximum weights and dimensions to the standard was also discussed, but didn't receive enough support to go forward.

Discussion was held on the possibility of adding impedance and/or regulation requirements to the C57.12.20 standard. Chuck Simmons will issue a survey to Users asking if they have any specific impedance and/or regulation requirements they may have for 1 and 3-phase overhead type transformers.

Discussion was held on including bushing requirements in the C57.12.20 standard. Marty Rave and Josh Verdell agreed to investigate and offer a proposal at the next WG meeting.

Under new business, Ron Stahara asked if 240/120 and/or 480/240 Volt secondary ratings should be included in the standard. Gael Kennedy agreed to include these ratings in his investigation of low voltage ratings.

Meeting was adjourned at 12:14PM.

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- C57.12.38 – Single Phase Padmount Transformers

  The meeting was called to order by Ali Ghafourian.

  A roll call was conducted to determine if a quorum was present. Twenty of thirty-one working group members were present at the time of the roll call. Therefore, a quorum was present.

  The minutes from the October, 2011, meeting in Boston were presented and were approved.

  Ali Ghafourian gave the status of the PAR. It is good through 2014.

  A review of Draft 1.3 was continued. Changes discussed in the Boston meeting included the following:

  A proposed new Figure was presented by Tom Holifield showing low voltage bushing arrangements and dimensions. These are needed as a result of the expanded low voltage ratings that will now be part of this standard. A change to have all the bushings in a line rather than staggered for the Type 2, E/2E drawing was suggested. Tom will revise the figure for further discussion at the next meeting.

  A revision to Figure 4 was introduced at the last meeting to specify the stud sizes required for the new low voltage ratings now in the standard. Mike Faulkenberry presented a revision to the figure that corrected concerns from last time. There were no concerns with this new proposed revision, and a motion was made and seconded to approve revised Figures 4 (now Figures 4A and 4B) for inclusion in the standard. The motion was approved.

  A discussion took place on the need for changes if, as previously approved, the standard covers units with natural ester fluids. It was suggested that if IEEE C57.12.147 is referenced, that would take care of any requirements we would need to address. This will be reviewed further for discussion at the next meeting.

  Carlos Gaytan gave a presentation which first reviewed what had been found by the task group formed to study low voltage bushing cantilever loading. He then went on to address how their findings related to the requirements in IEC standard 60137 that addresses this issue. His conclusion was that if the center of the spade/connector is no more than 12 inches from the tank wall, there should not be any concern with damage to the bushing. His presentation will be posted on the web page. The members were asked to review this presentation and to be prepared to discuss this further at the next meeting. There was some question as to whether a new standard addressing this is required, if it needs to be a part of C57.19.01, or if wording needs to be included in C57.12.38 to address the issue.

  Ron Stahara raised a question about the fact that the standard does not address requirements to keep the lid from sliding off when the door is open and the unit is tilted to one side. Proposed wording to address this will be prepared and discussed at the next meeting.

  Ali Ghafourian suggested that there needs to be wording in the standard that addresses the safety factor for lifting the unit. Proposed wording to address this will be prepared and discussed at the next meeting.

  The meeting was adjourned.

- C57.12.34 – Three Phase Padmount Transformers

  Ron Stahara called the meeting to order. To establish a quorum, the member list was displayed on the screen and those who saw their names were asked to hold up their hand. From this count of hands, a quorum was declared. Ron asked that everyone introduce themselves by giving their name, company and location. Also, an attendance roster was circulated. A motion was made by Jerry Murphy and seconded by Kent Miller to accept the minutes of the past meeting. It was approved by acclamation with no corrections.

  Ron Stahara made a presentation of the modified figures showing the cabinet depth as referenced to the inside of the door and the modification of the tables in the figures to reflect the 24 inch depth of the cabinet that was determined for the 600A terminations at the last meeting. He reminded

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everyone that the 24 inch depth was the result of the survey presented at the last meeting by Jerry Murphy. Some discussion ensued with input from the representatives of Progress Energy, PG&E, WEnergy, and MLG&W. The comments pointed to the need for the additional cabinet depth due to the conductor fill at the lower voltages. A motion was made by Dan Mulkey and seconded by Ali Ghafourian to make this dimension 30" rather than 24". The motion passed by acclamation.

The next order of business was the footnotes which specifically referenced IEEE 386 specific drawings. There was some discussion concerning how to deal with the issue of the 600 A connections. It was finally concluded that these should be changed to only a general reference in the footnotes and exclude the specific figure references. A motion was made to this effect by Jerry Murphy and seconded by Dan Mulkey. The motion passed by acclamation.

It was determined that Steve Shull would make these modifications to the document by the next meeting.

This concluded the meeting.

- C57.12.39 – Tank Pressure Coordination

Carlos opened the meeting at 4:45 PM on Monday March 12, 2010, in the Fisk Room of the Renaissance; introductions were made, and the attendance rosters were circulated. Since this was the first meeting as a Working Group after the PAR was approved, no quorum had to be established, and the people in attendance were asked to indicate on the rosters whether they requested membership for this working group.

Carlos presented the status of the PAR, which was approved on February 6, 2012, with an expiration date of December 31, 2016.

The next item discussed was the review of a summary table of pressure requirements from various standards.

A task force was created to provide definitions for the Pressure Relief Valve and Pressure Relief Devices. The members were:

Chris Sullivan – Heartland
Josh Herz – Qualitrol
Justin Pezzin – IFD Corp.
Adam Bromley – City of Fort Collins
Libin Mao – ConEdison

The group discussed dynamic pressure requirements for submersible transformers. The question was why these transformers should be included in the requirement of the current standards. It was mentioned that it may be related to some designs which used bolted covers.

Dan Mulkey commented that a round tank submersible with a welded lid will still be ejected with an internal fault, even though it is stronger than a bolted cover design. However, square tanks will not experience this because they have the ability to bulge.

Al Traut offered to review the historical development of the submersible standards to see if there is anything relevant for the group to consider.

Carlos reviewed the proposed draft document with the group.

Section 3 comments:

Definitions may not be necessary for this standard. The definition of Static pressure was too long for a definition. It should only include information about what it is, and not what it is not. Dynamic pressure definition proposed changes: Should the title be transient, or rapid rise? No consensus on this, but Steve Shull mentioned he thought we were heading towards dynamic from previous meetings and should stick with that for now. It should incorporate a reference to the time component associated with the dynamic type of pressure rise…(i.e. rate of rise, or, rapid rise…etc…)

Section 4 comments:

Include PRV / PRD flow rates in this standard to capture the full requirements for the device in one location. Include negative pressure requirements for transformers in this

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standard. (i.e. must remain sealed to -8 psig) Use an informative annex to address the difference between the 7 psig value for no distortion of the tank, and the 10±2 psig operating value of the PRV. Include Voltage Regulator pressure requirements in this standard as well; the WG may need to change the scope to include this. A comment was made that it is a common practice to ship some specific transformer designs with a 3 psig blanket from the factory. Libin Mao added that ConEd will pressurize their submersible transformers so they will be at +6psig in the summer to ensure they will never go to a negative pressure in the winter. A comment was made that it might be good to include the rapid rise relay as a reference

Carlos mentioned that the comments would be incorporated in the draft document of this standard, which will be posted on the committee website by April 2012, along with an updated document that would include all the research that had been made since the start of this group as a task force in 2010.

With these documents, the Task Force for PRV/PRD requirements can use them as a guide to work on the assignment and present the progress at the next meeting in Milwaukee.

The meeting was adjourned at 5:47 PM

- C57.12.28, 29, 30 & 31 – Enclosure Integrity
  - ♦ C57.12.28

    Introductions of members and guests

    A quorum of the Working Group's members was present (25 out of 34).

    The minutes of the November 1, 2011 working group meeting was approved.

    A review of the C57.12.28 standard was then started.

    Normative references in Section 2 were reviewed.

    Discussed an alternative wording proposal for 4.1.8 but voted to keep the wording as shown in Draft 4

    After much discussion, 4.3.6 was revised to:

    "Following all of the above tests, the unit shall be lifted at least one meter in accordance with manufacturer's standard lift instructions and then set again on the flat surface. The doors shall be easily opened, closed, latched and locked without requiring adjustments to the cabinet, latch mechanism and/or enclosure door(s). All of the door latch points must fully engage when the door is closed."

    Discussed adding a section with a sunset clause for the design tests - 4.5 currently in draft form as "These design tests shall be repeated whenever the design is changed so as to modify performance, or at least every five years whichever is shorter"

    5.5.2 accepted as shown in Draft 4

    5.5.5 accepted as shown in Draft 4

    5.5.8 changed to the alternative "The rating shall be 4B to 9B per SAE J400 and no rusted chip shall be greater than 3 mm in diameter"

    Deleted dates from the Bibliography.

    The meeting came to a conclusion at 9:18 AM

  - ♦ C57.12.29

    All of the enclosure integrity tests and requirements included in the C57.12.29 Standard were covered during the review of the C57.12.28 standard. These two standards are very closely related and share many of the same features.

    In 5.3.2 agreed to change the test rate cycle from 2 to 4 years for the Exposure Test

    There was insufficient time to review the remainder of this standard. Chairs will update 12.29 to match the agreed changes in 12.28

    The meeting came to a conclusion at 9:18 AM.

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- C57.12.35 – Distribution Transformer Bar Coding

  The WG met on Tuesday, March 13, 2013 at 9:30 am in the Fisk Room of the Renaissance Hotel in Nashville, TN.

  An agenda was presented and introductions were made. There was a quorum present at this meeting. The meeting minutes from the San Diego and Boston meetings were approved.

  The note under section 4.1.6 of the standard was reviewed and it was agreed to leave it as it is in Draft 2.

  The Chair reviewed the suggestion to increase the minimum height requirement of the bar code on the temporary bar code label from 0.24" to 0.50". The Chair stated that if the size is increased it may require the manufacturers to install two labels for customers that require more than the standard information.

  A suggestion was made for customer labels that require more than the standard information to have first part of the bar code that contains Mfg, I.D. Code and S/N to be 0.5" and the remainder of the bar code to be negotiated between the end user and the manufacturer.

  After some discussion, a motion was made to modify Section 4.2.4.5 to increase the height of the bar code on the temporary label to no less than 1.27 cm (0.5"). After a discussion, the motion was amended to state: "The height of the bar code symbols for the label as defined in 4.2.2.1 shall be no less than 1.27 cm (0.5")". The motion was approved.

  A draft with the proposed revisions will be created for review at the next meeting.

  Meeting was adjourned at 10:10 am.

- C57.12.37 – Electronic Test Data Reporting
  The meeting was called to order at 4:45pm and Introductions were done.
  Roster was taken, and a quorum was met.
  Minutes from the meeting on 11/2/2011 in Boston, MA reviewed and approved.

  Old business:
  1. PAR was approved
  2. Reviewed again the proposed changes for the DOE. It was decided that we will wait to finalize the DOE changes for the final rule making 10/1/2012 of the new DOE guidelines. So it will be discussed at the next meeting.

  New Business:

  1. New scope and purpose was reviewed from the PAR

  2. Issues from the current standard besides DOE were requested. None were mentioned. The chair asked that this is reviewed before the next meeting and will put it on the website.

  3. The users were surveyed about the use of this standard. 3 users said they are presenting using the electronic data formatted to this standard. The other users in the room expressed interest in having a tutorial on how to use the data. Dan Mulkey to conduct a brief tutorial on how to use the electronic data at the Fall 2012 meeting in Milwaukee.

  Adjourned at 5:10pm

- TF – Transformer Efficiency and Loss Evaluation (DOE)

  The Task Force on DOE Energy Efficiency of Transformers was called to order and a quorum was present. The agenda was presented and the agenda was approved. The chairman reviewed briefly the contents of the previous meeting minutes. A motion was made and seconded to approve the minutes. The motion was approved by acclamation.

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The chairman noted that an NOPR has been issued by Department of Energy. He noted that he has prepared a tutorial on the NOPR that will appear on his website that is available to TF members. He further highlighted key elements. He noted in the new NOPR the reference to TSL is not the same as efficiency level and that Table 3 is not the same as appears in the 2010 law, particularly separating single phase (reducing losses from 6.2% to 12%) and three phase (reducing losses from 5.2% to17%) transformers and reducing losses in liquid and low voltage dry type transformers. He also noted that the closing date for public comment on the NOPR is April 18, 2012.

In further discussion he noted the disparity in the calculations used in determining the payback period outlined in table 6 of the presentation. It was noted that Lawrence Berkley Laboratories assumed incorrect material costs in their analysis, costs that are lower than manufacturers experienced.

At the last public meeting of DOE prior to the issuance of the NOPR, there was general acceptance of the efficiencies and data in the report, but on second look, it was felt that additional consideration should be given to the data to more accurately reflect real material costs. Energy prices used in the NOPR is twice that used by utilities today. It was noted there was a miscalculation of the loading values of low voltage and medium and dry transformer at 15% and 35%, respectively. (This may be the result of a misunderstanding amorphous core data.) A comparison of OPS data with known data, suggested a number of errors, though corrected in many case, they still remain in the low voltage dry transformer product.

It was noted that not all interests participated in the NOPR, particularly the production experts so their view was not included.

There is a view that DOE's proposal goes further than necessary. It is necessary that if there is agreement within the industry that those interested and/or affected by the DOE action should present their views as a response to the NOPR.

Discussion of comparison of efficiencies between M3, M2 and HiB and amorphous core transformers and the broad impact of their efficiency levels on the costs of transformers and their effect on the industry.

The chairman briefly reviewed loss data and noted that the DOE proposal comes extremely close to the crossover between M3 Core Steel and Amorphous. He noted that in discussions at DOE, proponents for greater losses have been challenged for the adverse effects the promotion of amorphous core transformers would have on the US steel industry. DOE still has to justify the impact of the loss levels on small manufacturers. This is an area the small manufacturers can provide information. The chairman volunteered to be the conduit for such information being passed on the DOE.

The chairman noted that comments to DOE should arrive by 18 April (copy Hopkinson for info) and a final rule is expected by October 2012.

It was noted that DOE raised 30 questions concerning this product area and requested replies.. NEMA is preparing a response. The chairman recommended individual companies may want to reply to those and provide him with an info copy as well. The questions are also included in the PowerPoint presentation he prepared.

The chairman assured members that he will post any material provided him and notify members of any DOE decisions. It was noted that emphasis should be on the economic impact of those decisions on the industry and its member companies.

In a question about the impact of loss values that impact US steel companies and whether or not they would provide steel for distribution transformers, it was noted that the steel companies would likely focus on the steel cores for power transformers. The NOPR does not change the rulings of 2010.

It was noted that Canada has adopted the 2010 efficiency levels, up to 7500 kVA. Both Canada and Mexico are seeking to follow US initiatives, so eventually, what is proposed is likely to impact those countries at some point. It was noted that DOE has indicated it would not regulate step-up transformers but may include wind power transformers up to 400 MVA; these are still under

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development.transformers and transformers for solar applications. (It was pointed out that solar transformers are included in the current NOPR.) It was noted that the IEC is looking to efficiencies for

There was no new business and the meeting was adjourned at 3:07 PM.

Old Business:

Steve asked if there was any old business to review and none was presented.

New Business:

Of interest to the Distribution Transformers SC the EL&P (user only) meeting may move again as the Sunday's meeting facilitated by Jerry Murphy was not attended as well in the past. Jerry advised the users to be on the lookout.

Bill Bartley suggested to the WG chairs to improve participation by WG members to send a separate e-mail advising members once the ballot is open.

Steve brought a request to the group from Tom Prevost for any tutorial topics that could be done during our Thursday morning time slot. He asked that those with any ideas to contact Tom directly.

Steve adjourned the meeting with unanimous consent at 9:53am.

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