10.2 Distribution Transformer Subcommittee Report

Ken S. Hanus - Chairman
ken.hanus@ieee.org

The Distribution Transformer Subcommittee has a total of 8 active working groups, 8 of those met in Montreal.

Subcommittee Meeting Wednesday October 25, 2006 at 3:00 pm
34 Members
12 Guests
46 TOTAL
2 Requests for membership

10.2.1 Chair's Remarks & Announcements:

Review of Administrative Committee meeting highlights

- Future Meetings
- The Unapproved Costa Mesa minutes were approved with no corrections.

10.2.2 Working Group Reports

10.2.2.1 C57.12.20 Overhead Distribution Transformers

Alan Wilks & Tommy Cooper Co Chairs
awilks@ermco-eci.com & Tommy.cooper@faypwc.com
PAR Status: Approved 9/15/2006
PAR Expiration Date: 12/31/2010, Current Standard Date: 2005
Current Draft Being Worked On: D1
Meeting Time: 09:30am, Monday, October 23, 2006
Attendance: 43 Total
21 Members
22 Guests

Alan Wilks called the WG C57.12.20 meeting to order at 9:30, introductions were made and rosters were circulated. The minutes of the spring 06 meeting in Costa Mesa were reviewed and approved. Alan then reminded everyone of the IEEE policy on patents and asked if anyone had any patents to declare, none were declared. Alan then welcomed 2 new members to the Working Group. (Giuseppe Termini, Martin Rave)

Old Business: Tommy went over the comments from 1 NESCOM member on the wording of the scope of the PAR. He was instructed to respond to the comments explaining the characteristics. Alan then explained the meaning of the Low Frequency Test Working Group's definition of test frequency and recommended we leave as is. It was suggested that three-phase transformers be added to the paragraph. Tommy then covered the results of his survey of 5 PRD manufacturers on the diameter of their pulling rings. The results ranged from 0.86" to 0.876" with almost complete unity.
Marcel Fortin covered his task forces rewrite of Section 9. Everyone appeared to agree with Marcel's presentation. Alan is to survey the WG to get approval to replace Section 9. It was

recommended that Marcel's flow chart be added in an Informative Annex. This will also be covered in Alan's survey. Everyone was asked to forward comments to Marcel at fortin.marcel@ieee.org.

New Business: Alan went over the error in Figure 2 in the published copy of C57.12.20-2005. Alan then went over Rich Hollingsworth's suggestion that we add "a safety factor of 5" to paragraph 7.5.2 and it was accepted. Rich also proposed a change to Figure 3 on the look of support lugs yet keeping the same slot sizes. Alan asked Rich to get him a sketch on what the lugs should look like. Ali Ghafourian suggested that Figure 2 be modified to allow smaller hanger bracket spacing (11.25") when the thank height would not permit the 23.25" spacing. Giuseppe Termini volunteered to survey EEI with the proposal.
The meeting adjourned at 10:45 am.

10.2.2.2 C57.12.38 Single-Phase Padmounted Distribution Transformers
Combined C57.12.25 & C57.12.21
Ali Ghafourian & Ignacio Ares Co Chairs
aghafourian@ermco-eci.com & Ignacio_ares@fpl.com
PAR Status: Approved 12/08/1998 (For combining Standards C57.12.25 & C57.12.21) PAR changes were submitted and will be approved next week. The PAR change centered on the dropping of the delta loop transformers and to cover only 240/120 secondary volts.
PAR expiration Date: 12-31-2009
Current Standard Date: 1995
Current Draft Being Worked on: D6, Dated: March 2006
Meeting Time: 11:00am, Monday, October 23, 2006
Attendance: 35 Total
27 Members
8 Guests
1 Request for membership

Introductions were made and roster was circulated.

The IEEE Patent Disclosure information was discussed and there were no patents noted that pertain to these standards.

The unofficial minutes of the last meeting held in Costa Mesa, California in March of 2006 were approved with no corrections.

Draft 6.1 dated October, 2006 was sent to IEEE to start the balloting process. The ballot pool is currently being developed. Invitations to ballot should be received by identified parties before the end of the year. There was an issue brought up about the inclusion of the words "live" and "dead" front in the standards. The proposed wording will be included in the balloting comments. The WG then started to work on the next revision of the standard. Draft D1 was handed out and a discussion followed on figures 5 and 6 which show delta connected transformers.
Ali then led a discussion on the inclusion of delta connected transformers which culminated in the WG voting not to include delta and delta loop transformers in the next revision of the standard

The meeting adjourned.

10.2.2.3 C57.12.28, C57.12.29, C57.12.31 & C57.12.32 Cabinet integrity Standards

Bob Olen & Dan Mulkey Co Chairs
bolen@cooperpower.com & dhm3@pge.com
Meeting Time: October 24, 2006 Time: 8:00 AM
Attendance: 36 Total
21 Members
15 Guests

The minutes from the March 21, 2006, in Costa Mesa, California were approved as submitted. A request was made for disclosure of any patents that may be related to the work of the WG, and there were no responses to the request for disclosure.

C57.12.31 Standard for Pole-Mounted Equipment – Enclosure Integrity

Reviewed Title and left as is.
Revised scope to:
This standard covers conformance tests and requirements for the enclosure integrity of pole mounted equipment containing apparatus energized in excess of 600v, typically not accessible to the general public, such as but not limited to the following types of equipment: pole-mounted distribution transformers, pole-mounted switches, pole-mounted regulators, pole-mounted metering equipment, pole-mounted reclosers/sectionalizers, pole-mounted capacitor.
Reviewed the Purpose and left as is.
Bob Olen will submit a PAR application
Items that still need to be done:
Remove Salt Spray Test following the .28 standard
Move US Customary units back into text
Compare to published .28, .29, and .32 standards

C57.12.xx Standard for Pole-Mounted Equipment – Enclosure Integrity for Coastal Environments
Reviewed Title and left as is
Revised Scope to:
This standard covers conformance tests and requirements for the enclosure integrity of pole mounted equipment for installation in coastal environments, containing apparatus energized in excess of 600v, typically not accessible to the general public, such as but not limited to the following types of equipment: pole-mounted distribution transformers, pole-mounted switches, pole-mounted regulators, pole-mounted metering equip-ment, pole-mounted reclosers/sectionalizers, pole-mounted capacitors.

Reviewed the Purpose and left as is.
Bob Olen will submit a PAR application
Items that still need to be done:
Made the same changes as in C57.12.31 ("Normal" Pole-Mount)
Work on stainless steel galling considerations

C57.12.32 Standard for Submersible Equipment – Enclosure Integrity
Put in for reaffirmation in early 2007.
Future work to be done:
Move US customary units back into text
Change scope: "(with exception of network protectors)" to "and network protectors"

Standard Status

C57.12.28 Standard for Pad-Mounted Equipment – Enclosure Integrity
Status: 2005 Standard, published – September 30, 2005
C57.12.29 Standard for Pad-Mounted Equipment – Enclosure Integrity for Coastal Environments
Status: 2005 Standard, published – November 10, 2005
C57.12.31 Standard for Pole-Mounted Equipment – Enclosure Integrity
Status: 2002 Standard – reaffirm or issue PAR before 2008
C57.12.32 Standard for Submersible Equipment – Enclosure Integrity
Status: 2002 Standard – reaffirm or issue PAR before 2008

Next Meeting: The next meeting is scheduled for March 13, 2007 in Dallas, Texas
Adjournment: The meeting was adjourned at 8:48 AM.

10.2.2.4 C57.12.34 Three-Phase Padmounted Distribution Transformers
Ron Stahara & Steve Shull Co Chairs
rjstahara@msn.com & sshull@empiredistrict.com
PAR Status: New PAR required for next revision
PAR expiration Date: N/A
Current Standard Date: Published March 8, 2005 (2004 date on document)
Current Draft Being Worked On: D1
Meeting Time: October 23, 2006 Time: 1:45 PM
Attendance: 44 Total
20 Members
19 Guests
5 Guests Requesting Memberships

Ron Stahara called the meeting to order, introductions were made, and an attendance roster was circulated. Ron reviewed the IEEE Patent Policy and asked the group if there were any patents that needed to be disclosed. None were announced to the group. The minutes were reviewed and approved as written.

Steve Shull discussed the voltage levels of the standard. He pointed out that the values of 12,000 Δ and 16,340 Δ voltages were not included in ANSI C84.1. These were also not specified in the

C57.12.10-1997. After some discussion, a motion was made by Ken Hanus and seconded by Myron Gruber to keep these voltages in the applicable tables. The motion was approved. The working group then discussed the Table 1 kVA ranges. Ali Ghafourian asked that the kVA range be lowered on a number of voltage levels. It was the conscience of the group that at 125kV BIL and below, the kVA range would be lowered from 75 kVA to 45 kVA. A discussion ensued concerning the 34,500 Δ BIL level shown in the document as well as associated kVA ranges. It was decided by consensus that the 34,500 GrdY/19,920 kVA levels would be used for this voltage. Some discussion was followed by a motion made by Iqbal Hussain and seconded by Myron Gruber to change the BIL level to 150kV to match the BIL of the 34,500 GrdY/19,920 kVA. It was further clarified by changing the Table 1 footnote d to the following;"The highest BIL level for separable insulated connectors is 150 kV BIL. If 200 kV BIL level is required, bushings must be used." The amendment to the motion and the motion both passed.

There was a request from one of the working group chairmen, Steve Shull, that a task force be established to develop a recommendation on Table 2 which discusses no-load tap values. The chairman of this group was Jerry Murphy, with members of Iqbal Hussain and John Crotty. It was their charge to develop this table either using pure voltage taps or specific voltages or some combination thereof. They were given comments from David Gilmer who was making a case for pure percentage taps. They will report at the next meeting.

The first draft of this standard was submitted to the working group and it was pointed out that this was extremely rough. Another task force was assigned the task of reviewing all of the drawings in the draft. The chairman of this group was named as Iqbal Hussain. The following individuals volunteered to work with Iqbal to accomplish this task; John Rossetti, Ken Hanus, Tom Callsen, and Dwight Parkinson. Dwight volunteered at the end of the meeting. They will provide their result to Steve Shull who will make correction to the document for submission to the Working before the meeting in March.

10.2.2.5 C57.12.35 Bar Coding For Distribution Transformers

Lee Matthews & Giuseppe Termine Co Chairs
lmatthews@howard-ind.com & Giuesseppe.termine@peco-energy.com
PAR Status: APPROVED Dated: March 4, 2005
PAR expiration Date: December 31, 2009
Current Standard Date: 1996 (R2004)
Current Draft Being Worked On: Draft #2, Dated: October 6, 2005
Meeting Time: October 24, 3:15 PM
Attendance: 34 Total
17 Members
7 Guests

The meeting was called to order on October 24, 2006 at 3:15 p.m. in the Cartier B Room of the Delta Centre-Ville Hotel in Montreal, Quebec, Canada.

The meeting began with introductions of those in attendance.

The chairman asked if anyone was aware of any patents that might affect the development of this standard. No patent claims were made.

The minutes of the previous meeting in Costa Mesa, California, were reviewed and approved.

The remainder of the meeting consisted of a review and commentary on Draft D5 of the document. A comment on Table 1 the was made to correct the spelling of Niagara.

A motion to ballot this draft (D5) was made; the motion was seconded, voted on and approved.

The meeting was adjourned at 3:46 P.M.

10.2.2.6 C57.12.36 Distribution Substation Transformers
John Rossetti & David Aho - Co Chairs
jrossetti@mlgw.org & daho@cooperpower.com
PAR Status: PAR Approved June 2002
PAR expiration Date: December 2006
Current Standard Date: NEW Standard Under Development
Current Draft Being Worked On: D10
Meeting Date: October 24, 2006 Time: 11:00AM
Attendance: 38 Total
15 Members
23 Guests
5 Guest Requesting Membership

The unapproved minutes from the SP06 Costa Mesa meeting were approved. The patent policy was discussed and no issues were identified.

A brief review of the document history was provided and how it relates to both C57.12.10 (Power Transformers) and C57.12.34 (3PH Padmount Transformers).

Balloting closed 3/17/06, with 77% of ballots returned and 86% were affirmative. There were 11 negative ballots and a total of 90 comments.

Administrative Issues: The PAR is set to expire at the end of 2006, therefore a 1 year extension has been requested. A PAR revision request has also been submitted in order to match the PAR with the actual document.

Document Review for Ballot Comments:
The focal point of the meeting was to address a significant number of comments submitted by Dennis Marlow. The WG also was able to resolve a number of open issues submitted during the balloting process. **New issues are being tabled for future revisions.**

Specific Elements Addressed:

- **Section 5.1.1 Tap Changer:** Decide to allow the tap changer handle on the cover when bushings are cover mounted. Added a sentence to clarify that only DETC's are covered by this document.

- **Section 1.2 Mandatory Requirements:** Additional clarification was requested to define what elements of the standard are mandatory. The WG felt no additional changes are needed.
- **Tables 4.2 & 4.3 Voltage Applications:** Clarified that the voltages defined are the "Winding" voltages. Also modified a few of the min & max values that the WG felt was acceptable to include.
- **Section 4.2 KVA Ratings:** The 1PH KVA ratings won't be modified to eliminate the ratings beyond 3333 KVA.
- **Section 4.5 Taps:** Section was revised to clarify possible configurations.
- **Table 4.5 Percent Impedance Voltage:** Modified title, clarified that the KVA ratings will cover both 1PH and 3PH for the ratings shown, and added a line for 750-4999 kva to address 350kV BIL.
- **Section 5.2 Bushings:** Suggested rewording for neutral bushing ratings was reviewed. Decided to keep this paragraph as written.
- **Section 5.10.2 Tanks:** Removed the word "minimum".
- **Section 5.15 Insulating Liquid:** Decided to leave the sentence as written. Any expanded info for fluid limitations should be handled outside this document.
- **Section 5.1.5 Pressure-Vacuum Gauge:** Reference to "shall be readable to a person standing at the level of the base" was questioned. Similar language is used in section 5.6 referring to "eye level" and the WG felt that this is a generally accepted term. Suggestions were made to reference NEC, NESC, and C12 (Metering Standards) for additional guidance.
- **General Editorial** comments were reviewed throughout the document.
- **Reference to the standards dates** were covered with Dave Ringle from IEEE prior to the meeting. Dates are not required unless citing specific tables or clauses. Will need to review these references throughout the document.

Comment Resolution:
For the supplemental comments provided by Dennis Marlow, a response will be sent to him right after the Transformer Committee meetings that address all his issues.

All other comments from the ballot process will be responded to shortly after the meetings. A few of the negative ballots will need to be responded to direct to try and avoid ongoing negatives.

All but a few comments have been addressed and incorporated into the draft. These open comments refer to items related to testing, sealed tank, and flange dimensions. The most challenging of these open comments are related to test requirements with respect to definitions of Distribution Transformers in C57.12.00 & C57.12.90. A few general edit items also need to be addressed including definitions, references, identification of WG members, and document format. The graphics need to be revised and a missing figure added. Re-circulation of the ballot should be issued prior to the next meeting.

The meeting adjourned at 12:07 pm

10.2.2.7 C57.15 Step-Voltage Regulators
Craig Colopy & Gael Kennedy Co Chairs
ccolopy@cooperpower.com & grkennedy@nppd.com
PAR Status: APPROVED Date: June 9, 2005
PAR Expiration Date: December 31, 2009
Current Standard Date: C57.15 – 1999 – Published April 2000
Current Draft Being Worked On: Draft 5.1 Dated: October 2005
Meeting Date: October 24, 2006, 1:45 pm
Attendance: 30 Total
35 Members
4 Guests
1 Guest Requesting Membership

Added angles to voltage – level values Table 19 , revise to 119.4 at 0 degrees
Short circuit discussions: 5.8.1- a lot (many) of the Utility specification which have the 25 times numbers in the formula been there for years mainly in the electrical testing side, requires the mechanical forces to be made more robust. Need an understanding of the regulator capacity to withstand short circuit fault currents. Walley's spreadsheet and Steve Shull's comments were noted and discussions held. Numbers based on C57.12.10 impedances. Remove 'and thermal' from sentence 5.8.1 first sentence. Walley and Bill to work on wording.
Look at C57.12.00 and C57.12.90 for changes that may affect item in this standard.
Suggested current for testing based upon rating of the regulator section 5.8.1 reword clause – long discussion. Everyone needs to look this over, break into 3 parts? 2 parts?
Clarify section 5.8 with section 7.2 on the 'optional short circuit withstand capacity'.
Marcel's template will be shipped to all participants' for review need to be returned by January 32, 2007. Same for Draft ----- be studious.
Draft is out on the web site, goal is to have a global document.

10.2.2.8 C57.12.37 Electronic Reporting of Test Data (formerly P1388)
Richard Hollingsworth & Thomas Callsen Co Chairs
rhollin@howard-ind.com & Thomas.Callsen@ExelonCorp.com
PAR Status: Need to submit PAR for next revision
PAR Expiration Date: N/A
Current Standard Date: July 2005
Current Draft Being Worked On: N/A
Meeting Date: October 23, 2006 Time: 8:00am
Attendance: 22 Total
11 Members
7 Guests
4 Guest Requesting Membership

The patent policy was reviewed and no one responded that they had any patents that would affect this document.

The meeting focused on requirements for the next revision of the document and what devices to add to the document. Three new areas were discussed, dry type transformers, regulators and DOE energy efficiency information. The current scope appears to cover dry type transformers and energy efficiency information but not regulators.

It was decided for the next document and PAR to include these three new sections on the document

No further business – meeting adjourned

The committee is requesting on one time slot at the next meeting.

10.2.2.9 C57.144 Guide to Metric Conversion of Transformer Standards
Tim Olson Chair
tolson@hydro.mb.ca
PAR Status: Active
PAR Expiration Date: April 2006
Current Standard Date: New Document
Current Draft Being Worked On: D5 Dated: March 10, 2004
Meeting Date: Time:
Meeting Times: ***DID NOT MEET***

10.2.3 Subcommittee Old Business:
None reported

10.2.4 Subcommittee New Business:

Jim Arnold was recognized for his long standing service to the committee and the fact he will no longer be attending committee meetings unless they are held in New Hampshire.

Several subcommittee members gave the group a summary of the status of the pending DOE energy efficiency legislation. They each detailed the work they had done on the possible impact the legislation could have depending on the level of efficiency picked by the DOE.