10.2 Distribution Transformers Subcommittee – Ed Smith, Chair

edsmith@h-jenterprises.com

Meeting Time: 9:30AM, Monday, March 17, 2003
Attendance: 47 Total
25 Members
22 Guests

10.2.1 Chair's Remarks & Announcements:

Review of Administrative Committee meeting highlights by Ron Stahara

- Transformer Standards Activity

10.2.2 Working Group Reports

10.2.2.1 C57.12.20 Overhead Distribution Transformers

(Copyright: IEEE/**NEMA – Joint Copyright MOU**)
Alan Wilks & Glenn Andersen Co Chairs
(awilks@ermco-eci.com & gwanders@duke-energy.com)
PAR Status: Current
PAR Expiration Date: End of 2005
Current Standard Date: 1997
Current Draft Being Worked On: 8.1 Dated: March, 2003
Meeting Time: 09:30am, Monday, March 17, 2003
Attendance: 32 Total
17 Members
15 Guests

Issues, Remarks & Announcements:

- Introductions were made and the loss by death of our friend George Henry was noted. The minutes of the last meeting in Oklahoma City were approved. Ron Stahara reported that in the Ad Com meeting yesterday, it was noted that the IEEE Board of Governors is sympathetic to our position regarding metrification. Therefore, we have been directed by our Ad Com to proceed with dual dimensioning of our product standards.
- Our latest draft, 8.1, was reviewed. All of the proposed changes from the last meeting were approved as most were related to US Customary units being shown in footnotes(which will be modified to dual dimensioning in our next draft, 9).
- Proposed paragraph 6.5.4.6, “Cover Grounding”, was reviewed. It was agreed that the cover ground was for static discharge purposed only and the current carrying ability of the grounding mechanism was not important. After considerable discussion, we agreed to reword 6.5.4.6 “Static Cover Bond”. The transformer cover shall be electrically bonded externally to the tank. The location of the bond shall not interfere with the lifting lugs.
- Note 1, Table 6 for 16.34KV only was discussed. As written, Table 6 was unclear and wrong as related to Note 1. It was decided to add a second 95 KVBIL line with Note 1 for 16.34 KV only identifying the 380 mm(15 inch) creep dimensions and 42 and 36 KV withstand levels appropriately.

New Business

- The angle of the tilt was discussed (paragraph 7.2). An unknown user has asked for a maximum angle of tilt. Since the allowable angle of tilt is dependent upon some of the components that may be inside the transformer, a value could not be set. Since all current product standards have the same angle if tilt wording, we will make a recommendation to our sub-committee to see if there is a better way to describe the angle of tilt and still keep uniform wording.

- The meeting adjourned at 10:45AM

10.2.2.2 C57.12.23Single Phase Submersible Distribution Transformers

(Copyright: **IEEE**)
Al Traut & Roger Lee Co Chairs
(alant@keco.com & leerj@sce.com)
PAR Status: Approved 3/18/1999 (For Standard Revision)
PAR Expiration Date: N/A
Current Standard Date: 1992, Reaffirmed 1999
Current Draft Being Worked On: #IV
Meeting Time: ***DID NOT MEET THIS SESSION***

10.2.2.3 C57.12.25Single-Phase Padmounted Distribution Transformers

(Copyright: IEEE/**NEMA – Joint Copyright MOU**)
Ali Ghafourian & Ernie Nols Co Chairs
(aghafourian@ermco-eci.com & ernest.nols@pseg.com)
PAR Status: Approved 12/08/1998 (For combining Standards C57.12.25 & C57.12.21)
PAR expiration Date: End of 2002
Current Standard Date: 1990
Current Draft Being Balloted: #VIII
Current Draft Being Worked on: #3, Dated: March 2003
Meeting Time: 11:00AM, Monday, March 17, 2003
Attendance: 40 Total
11 Members
29 Guest
3 Guest Requesting Membership

Issues, Remarks & Announcements:

- The minutes of the October 2002 meeting, in Oklahoma City were approved.
- The C57.12.25 standard will be re-circulated for ballot.
- Draft #3 of the combined Standard C57.12.25 (Dead Front) and C57.12.21 (Live Front) dated March 2003 was submitted. Changes made from the previous meeting were discussed and the document was reviewed. Additional changes and corrections were recommended and they will be included in the next draft.

• A task force was set up to look at tank temperatures of Single Phase & Three Phase padmounted transformers, caused by transformer loading and outside ambient temperatures.
• A motion to include delta connected, line to line, transformers was proposed. The group voted in favor of looking to include this detail in the standard.
• The meeting was adjourned at 12:10PM.

C57.12.28, C57.12.29, C57.12.31 & C57.12.32 Standards previously under the NEMA Secretariat are reviewed and revised NOW under the IEEE Transformer Committee Secretariat)

10.2.2.4 C57.12.28 Pad-Mounted Equipment Enclosure Integrity

(Copyright: IEEE/**NEMA – Joint Copyright MOU**)
Bob Olen & Dan Mulkey Co Chairs
(bolen@cooperpower.com & dhm3@pge.com)
PAR Status: Approved
PAR expiration Date: May 09, 2007
Current Standard Date: ANSI/NEMA 1999
Current Draft Being Worked on: #1.5 Dated: February 23, 2003
Meeting Time: March 18, 2003 Time: 8:00 AM
Attendance: 41 Total
17 Members
23 Guests
1 Guest Requesting Membership

Issues, Remarks & Announcements:
• The first meeting section was entirely devoted to enclosure integrity issues. The new pry test procedure and tool was presented, reviewed and accepted by the Work Group.
• The minimum padlock shackle size included in section 4.1.8 Enclosure Access was extensively discussed. A Work Group committee was formed to review the three paragraphs in this section.
• The 1.12 inch penta bolt washer maximum is being deleted. There are also additional issues with the english to metric conversion.
• At the October 2002 meeting, it was suggested that a steel probe wire might be more severe. After several Work Group members reviewed steel versus copper, the copper was recommended and will remain in the standard.
• A color range of Hunter DeltaE=4 was recommended and will be reviewed by the Work Group
• The SCAB test and procedure was modified to include internal cabinet coating systems. This proposal received Work Group approval.

10.2.2.5 C57.12.29 Pad-Mounted Equipment Enclosure Integrity for Coastal Environments

(Copyright: IEEE/**NEMA – Joint Copyright MOU**)

Bob Olen & Dan Mulkey Co Chairs
(bolen@cooperpower.com & dhm3@pge.com)

PAR Status: Approved by NES Com May 23, 2002
PAR expiration Date: May 09, 2007
Current Standard Date: ANSI/NEMA 1999
Current Draft Being Worked on: #1.0 Dated: September 29 2002
Meeting Time: March 18, 2003 Time: 8:00 AM
Attendance: 41 Total
17 Members
23 Guests
1 Guest Requesting Membership

Issues, Remarks & Announcements:

- Removed "Stainless Steel" from section 5.1
- The substrate weld bead test panel was reviewed. A question related to how a weld bead would be applied to composite materials was discussed.
- The coastal outdoor exposure test was modified to include both external and internal cabinet coating systems.
- A public safety concern related to the hot temperatures which pad-mounted equipment develops in southern states was discussed. This issue may impact the Work Group in the future.
- The meeting was adjourned at 10:43 AM

10.2.2.6 C57.12.31 Pole Mounted Equipment Enclosure Integrity
(Copyright: IEEE/**NEMA – Joint Copyright MOU**)

Bob Olen & Dan Mulkey Co Chairs
(bolen@cooperpower.com & dhm3@pge.com)
PAR Status: Approved by NESCOM December 06, 2001
PAR expiration Date: December 2006
Current Standard Date: ANSI/NEMA 1996
Current Draft Being Worked on: Dated:
Meeting Times: March 18, 2003 Time: 8:00 AM
Attendance: 41 Total
17 Members
23 Guests
1 Guest Requesting Membership

Issues, Remarks & Announcements:

- Minutes of the October 22, 2002 meeting approved.
- Standard published by IEEE during the first quarter of 2003

10.2.2.7 C57.12.32 Submersible Equipment Enclosure Integrity
(Copyright: IEEE/**NEMA – Joint Copyright MOU**)

Bob Olen & Dan Mulkey Co Chairs
(bolen@cooperpower.com & dhm3@pge.com)

PAR Status: Approved by NESCOM December 2001
PAR expiration Date: December 2006
Current Standard Date: ANSI/NEMA 1994
Current Draft Being Worked on: Dated:
Meeting Times: March 18, 2003 Time: 8:00 AM
Attendance: 41 Total
17 Members
23 Guests
1 Guest Requesting Membership

Issues, Remarks & Announcements:
- Standard published by IEEE during the first quarter of 2003

10.2.2.8 C57.12.33 Guide For Distribution Transformer Loss Evaluation
(Copyright: **IEEE**)

Don Duckett & Tom Pekarek Co Chairs
(don.duckett@fpc.com & tjpekarek@firstenergycorp.com)
PAR Status: PAR extension renewed for two years
PAR expiration Date: December 2004
Current Standard Date: October 2001
Current Draft Being Worked On: #9 Dated April 2003
Meeting Date: March 18, 2003 Time: 13:45
Attendance: 35 Total
25 Members
10 Guests
0 Guest Requesting Membership

Issues, Remarks & Announcements:
- The Working Group meeting convened on Tuesday, March 18, 2003, with co-chairman Don Duckett of Progress Energy presiding. There were 25 members and 10 guests present.
- A correction to previous meeting date in Oklahoma City was made on the Minutes of the last meeting in October 2002, was made on the meeting date. Revised minutes were approved.
- Draft 9.0 of the document was passed out to all attendees. Will try to get this version into a form acceptable to the editorial staff and then send it out for balloting before the next meeting.
- Dave Wiegand of Transformer Services commented on the DOE's Project Team concerning transformer losses and efficiencies. The DOE Team has visited several transformer plants both liquid and dry-type manufacturers. Weekly teleconferences on the progress and intent of the DOE activities are being held with the Team. The DOE team is looking at the A and B factors and their effects on the evaluation. A A minimum efficiency line such as NEMA TP1 is a possible consideration. The largest savings are expected in the 600v and below DRY types.
- An ANOPER (Advanced Notice of Proposed Rulemaking) meeting is scheduled in May or June 2003, maybe. This will be followed by an NOPER later approximately one year later (2004). DOE rulemaking is expected t be in effect by 2007.

• Tony Bouza is the DOE Program Manager on this issue. Contact phone numbers, as well as a number of DOE documents and worksheets are available on the DOE website addressed to this issue. (www.eere.energy.gov/buildings/appliance_ standards).

10.2.2.9 C57.12.34 Three-Phase Padmounted Distribution Transformers
(Copyright: **IEEE**)

Ron Stahara & Steve Shull Co Chairs
(rjstahara@msn.com & sshull@empiredistrict.com)
PAR Status: Approved 9/21/1995 (For Standard Development)
PAR expiration Date: December 2004
Current Standard Date: New Standard
This NEW Standard is a combination of the following two Standards
C57.12.22 1989 (Three-Phase Padmounted Distribution Transformers with H.V. Bushings) (Copyright ANSI)
C57.12.26 1992 (Three-Phase Padmounted Distribution Transformers with Separable Connectors) (Copyright ANSI)
Current Draft Being Worked On: 10 Dated:
Meeting Date: 03-17-2003 Time: 01:45 – 03:00 PM
Attendance: 38 Total
20 Members
17 Guests
1 Guest Requesting Membership

Issues, Remarks & Announcements:
• Ron Stahara called the meeting to order, introductions were made, and an attendance roster was circulated.
• Ron stated the document, Draft #9, had passed the ballot with a vote of 62 affirmative(79%) and 16 negative(21%). However, he did point out that of the affirmative votes, there were 8 that had comments concerning their objection to the metric/U.S. customary units presentation in the document. However, in the spirit of compromise, they approved it. Ron covered in detail the comments that were received from SCC10, SCC14 and IEEE Editorial. He emphasized the response from SCC14 that stated the document didn't meet the Metrification Policy. Ron pointed out that he had been directed to write this document in dual dimensions as per the results of an earlier Administrative Subcommittee meeting. Ron pointed out that the standard's dual dimensions will be sustained. His thought was that the dual dimensioned draft (Draft 10) could be balloted and approved by the October meeting.
• Ron then asked the working group to look to the next revision of C57.12.34 and thus a new PAR. He asked the group to consider the following suggestions and determine their position by their next meeting. Some of these came from the negatives during the balloting of PC57.12.34 D9.

1) Change the minimum impedance on 300 & 500 kVA 208/120 ratings
2) Change the maximum Secondary Voltage from 277/480 to 1000 volts
3) Change the Table 2 values based on new calculation philosophy
4) Add a new pad-mount front plate for a three-phase miniature design

5) Make provisions for a grounding attachment point external to the cabinet
6) Remove the barrier between the high and low voltage compartments for dead front units
7) Move the drain valve and sampler to the primary compartment

Meeting adjourned at 3:00 PM.

10.2.2.10 C57.12.35 Bar Coding For Distribution Transformers
(Copyright: **IEEE**)

George Henry Chair
(gehenry@centralmoloneyinc.com)
PAR Status: Active for Reaffirmation
PAR expiration Date: The PAR expires December 2002(*see below)
Current Standard Date: 1996
Current Draft Being Worked On: NONE
Meeting Time: ***DID NOT MEET THIS SESSION***

10.2.2.11 C57.12.36 Distribution Substation Transformers
(Copyright: **IEEE**)

John Rossetti, Leon Plaster & David Aho- Co Chairs
(jrossetti@mlgw.org & leon.plaster@us.abb.com)
PAR Status: PAR Approved June 2002
PAR expiration Date: October 2005
Current Standard Date: NEW Standard Under Development
Current Draft Being Worked On: #1 Dated October 14, 2002
Meeting Date: March 18, 2003 Time: 11:00AM
Attendance: 30 Total
13 Members
13 Guests
4 Guest Requesting Membership

Issues, Remarks & Announcements:
- Minutes from the Oklahoma City meeting were reviewed and approved as written
- For now the document will proceed with dual dimensioning as appropriate
- The focus of this meeting was to assign responsibility to review specific sections of the document. Since the focus of the Oklahoma City meeting was on the "ratings" section, we tried to work on the "construction" section. The following assignments were made,

Accessories – Leon Plaster
Bushings, Enclosures, Switches & other neutral terminations – Jerry Murphy & Fortin Marcel
Lifting/Moving/Jacking, Nameplate & ground pads - /Stan Kostyal
Polarity & Termination Markings – David Aho
Liquid Preservation, Tanks, & Auxiliary Cooling – Rich Von Gemmingen

CT's – Steve Shull
Arresters – Dave Aho

All others in attendance were requested to review the document and submit comments to either Dave Aho or the person identified as having responsibility for the sections stated above. Comments should be submitted by the end of May.

Specific Document Comments:

1) Rating tables will provide standard limits for voltage ratios and voltage limits based on KVA ratings. A request was made to provide some guidance on how to deal with exceptions to these limits.
2) This document, as currently written, doesn't address the requirements of sidewall-mounted bushings very well. Items like Bushing Terminations, Bushing Supports, Enclosure Sizes and Mechanical Clearances need to be addressed.
3) Although this standard is for Distribution Transformers, the bushing section will need to address "Power" Bushing, since these are very common.
4) A comment to remove the word "Revenue" from the CT section defining the type of accuracy class was discussed. Steve Shull will review.

• A revised draft of the document will be distributed to all Working Group members by the end of March. Mr. Marcel offered to act as a liaison with the Switchgear Committee to obtain comments.

• With no further business, the meeting adjourned at 12:00PM.

10.2.2.12 C57.15-200XStep-Voltage Regulators
(Copyright: **IEEE**)

Craig Colopy & Gael Kennedy Co Chairs
(ccolopy@cooperpower.com & grkenne@nppd.com)
PAR Status: Approved July 27, 2000
PAR Expiration Date: April 2004
Current Standard Date: C57.15 – 1999 – Published April 2000
Current Draft Being Worked On: Draft 2.0 Dated: March 2003
Meeting Date: Tuesday, March 18, 2003 Time: 3:15PM
Attendance: 28 Total
11 Members
17 Guests
3 Guest Requesting Membership

Issues, Remarks & Announcements:

• Introduction by all present
• Draft 2.0 document was e-mailed to the committee on Friday, March 07, 2003
• Minutes from last meeting were approved (moved by Ron Stahare, 2nd by Glenn Anderson)
• Dual dimensioning to be maintained in Draft 2.

• Showed draft organization sheet to document the comments of the Working Group for revisions to be included in rev 3.
• Walked through Draft 2.0; requested comments back by the end of June so the update can be discussed at the Pittsburgh meeting.
• Updated this draft to match C57.12.00 and C57.12.90._5.2 need to be sure to buy what matches the substation requirements 55 vs 65, but match the kVA ratings for the installation.
• 5.4 The limiting factor in past has been the load tap changing requirements.
• Table 3-6 have the international flavor and include both the 50/60 hz design.
• Table 11 is for both 50/60 hertz units – need to update title.
• Table 12 limits to 200kV BIL
• 5.8 Short Circuit requirements (distribution switchgear defines maximum preferred rating
• 5.9.2.1 added statement from C57.12.00
•6.7.1.2.f added new paragraph regarding the weight criteria versus the kVA criteria
• Table 14 – four-hole spade or threaded stud, so the user can apply their own. Maybe add another column for diameter and threading of studs. Add note that other terminations are available for user to specify. Threaded stud with four-hole spade. Change title to "Recommended Bushing Terminal Connectors"?
• 7.2 Section added. 25 times base rated or 25 times normal full load current. User needs to install limiting reactors not the regulator manufacturer. User responsible to install other means to limit fault currents.
• 7.2.a recommend that this be lowered to 500 kVA versus 750 kVA 500n matches the 5MVA transformer capacities
• 8.5.4.2 Impedance voltage added new explanations.
• 8.7 Revised and replaced with what was in C57.12.90
• 8.9.4 Winding temperature revised to allow for metric or US Customary units
• 9.4.1.4 Added to include EMI testing C37.90.2
• 9.4.2.1 Updated test voltage to 1500 volts instead of the 1000 volts; AC test is pass/fail.
• Comments requested on the total document. These should be turned into Craig by the end of June 2003. A copy of the Draft and the form will be e-mailed to attendees.

Questions, areas for more discussion:

Ratios in 8.3.2 tolerances for ratio came from C57.12.00 need to interpret for regulators.

Note for voltage regulators should not be on nameplate voltages. The ratios between control and shunt windings must be somehow noted and defined. 0.5% is over the entire range?

Lots of comments and discussion; a very good meeting.

Adjourned at 16:30.

10.2.2.13 C57.12.37 Electronic Reporting of Test Data (formerly P1388)
(Copyright: **IEEE**)

Richard Hollingsworth & Thomas Callsen Co Chairs
(rhollin@howard-ind.com & Thomas.Callsen@ExelonCorp.com)

PAR Status: PAR Expiration Date
Current Standard Date: Published under IEEE Std. 1388-2000
Current Draft Being Worked On: D10
Meeting Date: March 17, 2003
Attendance: 21 Total
16 Members
5 Guests
0 Guest Requesting Membership

Issues, Remarks & Announcements:

- The draft is being edited and advancing to the balloting stage.
- Discussion was opened regarding the next phase of the standard. We will request a new PAR to change the scope. We are going to drop the liquid immersed restriction so we can pick up the dry type transformer reporting. We will also be expanding the scope to include regulators.

- Until the next phase is active, we can report dry type transformers by defining the insulating fluid as "none".
- Data compression is an option that can be agreed upon between user and manufacturer.
- This document will **not** cover any form of encryption.
- If a manufacturer has multiple plants in the same city, it must identify the city and an identifier must be used to indicate where the transformers were manufactured.
- Under the postal service delivery, we addressed 2 topics.
  A) The user must provide the address for the delivery and
  B) Changed the restriction from 3.5 inch diskette to removable storage media
- We will be providing an Appendix with some useful formulas. A task force to identify useful formulas has been set.

They are:

Ron Kirker
Tom Callsen (Excelon West)
John Borst (ABB)

- Add reference documents for Regulators (C57.15) and Dry Type (?)

10.2.2.13 C57.144 Guide to Metric Conversion of Transformer Standards
(Copyright: **IEEE**)

Dudley Galloway/Tim Olson
(gallowaytt@aol.com)
PAR Status: Active
PAR Expiration Date: April 2006
Current Standard Date: New Document
Current Draft Being Worked On: D3 Dated: March 2003
Meeting Date: March 17, 2003 Time: 3:15PM
Attendance: 18 Total
11 Members
6 Guests

1 Guest Requesting Membership

Issues, Remarks & Announcements:

- Steve Shull chaired the meeting for Dudley Galloway who was unable to attend.
- Draft 3 had been distributed prior to the meeting; changes included:
    1) Rewritten per IEEE Standards Style Manual
    2) Uses the style sheet Version 6.2 from IEEE-SA
    3) Use of the CSA guide as a reference was deleted
    4) CSA Guide updated to 2000 and listed in the Bibliography
    5) Examples from PC57.12.34/D9 were included as a normative annex
    6) Sub-clause 3.17 on "force and mass" was rewritten
    7) The word "probably" was added to the last sentence of Sub-clause 3.6
- A question was raised concerning the preference between: "0.5-13UNC" vs. "1/2-13 UNC". This was thought to be more of a DT SC decision than a guide issue.
- It was noted that if dual dimensioning is ultimately allowed, then convenience rounding should be avoided or at least used with caution.
- Mike Culhane agreed to provide an updated version of his conversion spreadsheet.
- It was noted that the Working Group needs a co-chair to help Dudley.

10.2.3 Subcommittee Old Business:

None reported

10.2.4 Subcommittee New Business:

None reported

Liaison Report – Transformer Committee Website Development

The website development task force met at breakfast this morning. This meeting was chaired by Susan McNelly and attended by approximately 30 people.

Moving forward, we are going to give more access to the committee chairs in an effort to prevent Susan from being overloaded. With this in mind, we have setup a secure area on the committee website where documents and other files can be placed by committee groups. This will include drafts, meeting minutes, drawings, etc. It should be possible for working group chairs to place documents at this site and inform the members through an email that the document is available. We can also have Susan place a link on the website.

Access to the website will be by password:

Name: xfmrcom
Password: Trs34acc

The password is to change twice/year – on the Friday after the committee meeting. The Account Name will not be changed.

There was a discussion on how a working group (etc) could make use of this new website. Currently this will be up to the individual group to decide. We should be mindful of keeping the clutter to a minimum.

There were also discussions on how long the minutes of the meeting should be kept online. It was decided the minutes will be kept in DOC and PDF format (in the grid) for 3 meetings. Then the DOC files will be moved off line (archived) and the PDFs will be moved to a separate page.