8.8 Performance Characteristics Subcommittee – Stephen Antosz, Chairman; Ed teNyenhuis, Vice-Chair; Bruce Forsyth, Secretary

8.8.1 Introduction / Attendance

The Performance Characteristics Subcommittee (PCS) met on Wednesday, October 28, 2009 with 57 members and 37 guests in attendance. Two guests requested membership. Prior to this meeting the total membership of the PCS was 119; therefore, with 57 members present we did not have a quorum of at least 50%.

8.8.2 Approval of Meeting Minutes

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

8.8.3 Chairman's Remarks

8.8.3.1 Administrative Subcommittee Notes

a) Upcoming IEEE – PES Meetings
   - Next Transformer Committee meeting date and locations is as follows:
     - Spring 2010, March 7-11, – Houston, TX
   - PES General Meeting: July 26 – 30, 2010, Minneapolis, MN.
   - IEEE T&D Conference & Expo: April 19-22, New Orleans, LA
   - IEEE PES Conference on Innovative Smart Grid Technologies: January 19-21, 2010, Washington, DC

b) Committee Membership Recognition Program:
   - Transformer Committee members will receive a plaque at Main Meeting on Thursday.

c) Quorums and Rosters:
   - WG & TF Chairs (or Secretary) must maintain accurate and up-to-date list of active members and attendance. AM system has tools to make this easy.

d) Update on status of revisions of C57.12.00-2006 and C57.12.90-2006:
   - 12.00 is almost ready for recirculation.
   - 12.90 is ready and waiting for 12.00 to catch up so they can both publish at the same time.

e) New WG under PCS approved by Admin SC:
   - Revision to Loss Evaluation Guide for Transformers C57.120 been transferred from Power Transformers SC to Performance Characteristics SC.
   - Was previously C57.12.33 for Distribution Transformers. The WG met yesterday. See 8.8.4.7 for meeting minutes.

8.8.4 Working Group (WG) and Task Force (TF) Reports

8.8.4.1 PCS WG on "Test Code", C57.12.90 – Mark Perkins, Chairman; Kirk Robbins, Secretary

The PCS Working Group for Revisions to test code C57.12.90 met in Lombard, IL on October 26, 2009 at 09:30 A.M. There were 111 persons in attendance, 51 (of 136 total) members and 60 guests of which 6 requested membership. We did not have a quorum.

Announcements

The chair asked if anyone had any patent issues relating to this standard. Being none, this discussion was closed.

The minutes from the last meeting were then reviewed and approved as written by oral vote.

Old Business

The previously revised sections of Sections 6 and 7 were sent to the working group and dielectric test subcommittee for survey. There were 21 surveys returned, with 15 affirmative, 5 affirmative with comments and one abstention. The group discussed the comments.

- Dennis Marlow had a comment on method b) from section 7.1.4 that requires that the winding of a transformer with an ungrounded neutral be reconfigured to a delta connection if the voltage readings are not balanced. Dennis felt that a clarifying note should be added. After discussion of the group, it was consensus that method b) should just be removed. The chair agreed to speak with Dennis and if he would be satisfied with this change, then the draft would be modified and resurveyed. A resurvey is needed to allow a majority of the members of the working group to consider this issue.

- Steve Jordan commented that he preferred to keep the old Figures 2 and 3 for academic purposes. When the chair explained that these figures were misleading in that they did not correctly describe the definition of additive and subtractive polarity, Steve agreed to withdraw his comment.

- Barry Beaster suggested moving the section 6.3.3 on the polarity using the ratio bridge to the position of 6.3.1 and renumbering sections 6.3.1 and 6.3.2 since it is the most common method used. The group agreed.

- The other two comments had to do with numbering of figures, which will be handled when the revisions are incorporated within the new document.

The group then had a report from Marcel Fortin on the survey of section 12 of C57.12.90. Marcel reported that there were 17 responses received including 1 negative, 2 without comment, and 6 comments. One comment was received to remove the re-clamping step after a short circuit test prior to dry out. Marcel Fortin recommended no change and he stated this option needs to be left in the standard. After some discussion, it was agreed to not accept this comment and leave the document as is. Marcel recommended accepting the comment that the pre-set method be used on distribution class units. Marcel will discuss the resolution of these comments with the members who submitted the comments, and then the section 12 as revised will be sent to the standards subcommittee for insertion in the next revision of C57.12.90.

The proposal to include testing of buried tertiary windings for resistance, polarity and ratio was discussed, and it was agreed to include this in the test code. A proposal for specific wording changes will be prepared for the next meeting for discussion.

New Business

Subhash Tuli requested clarification on the wording of Section 6.3.2.1 to indicate that the figures are not all inclusive, but only demonstrate the method. This was agreed to and a minor change in the wording was needed. The third bullet point is changed as follows:

- Either plot these values or compare them for their relative order of magnitude. Figures 5 and 6 show examples of this method for some common types of connections.

Having no other business, the meeting was adjourned at 10:30 AM.

8.8.4.2 PCS WG on "General Requirements", C57.12.00 – Steve Snyder, Chairman; Enrique Betancourt, Secretary

The Working Group met at 3:15 PM on Monday, October 26, 2009 with **30** members and **42** guests present. There are 82 total members, therefore the criteria of a 50% quorum was not met. The following five (5) guests requested membership, bringing the Working Group membership to **87** members :

William Bartley	Hartford Steam Boiler
Vinay Mehrotra	Waukesha Electric Systems
Joseph Melanson	J. Melanson, Inc.
Abderrahmane Zouaghi	ABB Inc.
Robert Ganser	Transformer Consulting Services

Following introductions, the minutes of the April 20, 2009 Miami meeting were approved as submitted. Working Group members were then asked if anyone was aware of any applicable patent activity that might impact our work. No patent issues were disclosed by anyone.

The chairman provided an update on the latest C57.12.00 ballot. The standard was balloted in October 2008 and has been in the ballot resolution process since the ballot closed. The first ballot recirculation is now expected to come out within the next week.

The meeting began with **Old Business**, WG item 82 :

WG Item 82, Clause 7.1.4.4 Stabilizing Windings

Addresses an issue raised in an earlier ballot of standard C57.12.00 which requested:

(a) Recommendations for guidelines to determine MVA rating of buried tertiary windings,
(b) To define the conditions under which this MVA is applicable, and
(c) Determine the tests or calculations necessary to prove the tertiary MVA rating.

Received a report from the Stabilizing Windings Task Force chairman Enrique Betancourt. Enrique presented a summary of the task force work since the prior meeting, and encouraged all interested individuals to attend a special meeting

scheduled for Tuesday to continue this discussion in more depth. At the time of this meeting there was not a consensus from the task force on the appropriate changes necessary to resolve the issue.

Under **New Business**, the discussion began with WG item 85 :
WG Item 85, Section 8, Testing and Calculations

Request for consideration of long term over-excitation test. This item was raised as a potential new test for addition into standard C57.12.00 at the spring 2008 PCS meeting. The discussion began about the merits of conducting such a test, what does it prove, how often is it specified, and to what class of products would this apply. Some users specify 110% over voltage for a duration of 10 – 12 hours, but usually only for EHV transformers or where there is some history / suspicion about the core performance. The intent apparently is to detect core over-heating and gassing, and to "stabilize" the core after impulse tests. It was also noted that the Canadian standards do specify such a test, 110% for 1 hour, after all dielectric tests are complete. In opposition to requiring the test it was stated that such an over voltage would have to exist for a much longer time period than 12 hours to generate enough gasses as to be detectable. After considerable debate, it was unanimously determined that this test should NOT be listed in the standards, and the topic will be discontinued.

WG Item 87, Table 18 Short-circuit apparent power of the system

Request to revise Table 18 on short-circuit apparent power of the system to be used unless otherwise specified. This was a comment (negative ballot) generated in an earlier revision of C57.12.00 to reconsider the levels of fault current shown in the table, with a recommended level of 63 kA rms as the standardized maximum value. The discussion began with statements that many times users specify an infinite bus supply and through negotiations with the manufacturer arrive at agreed upon withstand levels. Most users do not know their system characteristics, and those conditions might be subject to change, leading to a preference for infinite bus specifications. But the table is useful in the example of low impedance autos and in other special cases. There is an impression that short-circuit proof design is not a problem these days with advanced computer software available. With limited discussion, there was not much interest in changing the table values, but the chair will contact the commenter (Pierre Riffon) to solicit more input from him. This item will be carried forward for continued discussions at the next meeting.

WG Item 88, Table 10, footnote 9

Request to review Footnote 9, Table 10 as it pertains to CT identification and designation. The request was withdrawn immediately prior to the meeting, and will be removed from WG consideration.

WG Item 89, Sections 5.9, 7.4, 8.4, 8.7

Request to adopt a standard definition for the term "reference temperature". This is presently being defined for inclusion into C57.12.80, and then will be presented for adoption into C57.12.00. (Future activity).

Meeting adjourned 4:30 PM.

8.8.4.2.1 <The following report was not presented at the subcommittee meeting but is referred to in the minutes of the PCS WG on "General Requirements", C57.12.00>

PCS TF on "Stabilizing Windings", C57.12.00 – Enrique Betancourt, Chairman; Steve Snyder, Acting Secretary

The Task Force met at 11:00 AM on Tuesday, October 27, 2009 with **7** members and **61** guests present; this was the first open meeting of the group since its formation. 7 of 11 members were present therefore a quorum was established. There were eighteen guests (18) that stated interest on further participating as members of the Task Force, that would raise the Task Force membership from **11** to **29** members:

Peter Zhao	Hydro One
Hanxia Zhu	BC Hydro
Bill Boettger	Boettger Transformer Consulting LLC
Dinesh Sankarakurup	Niagara Transformer Corp.
Dihru Patel	Hammond Power Solutions Inc.
Verena Pellon	Florida Power and Light
Devki Sharma	Consultant
Roger Hayes	Siemens Canada
Abderrahmane Zouaghi	ABB Inc.
Subhas Sarkar	Virginia Transformer Corp.
K-Vijayan	CG Power System Canada
Randy Rensi	Dynamic Ratings
Vinay Mehrotra	Waukesha Electric Systems
Vijay B. Tendulkar	Onyx Power Inc.
Vivek Bath	Waukesha Electric Systems
Dong Kim	Southern California Edison
Jinho Kahn	Hyundai Heavy Industries
Tamyres L. Machado	Siemens Brazil

Following introductions, the chairman stated the purpose of the Meeting: "To present to a broader audience the status of discussions of the TF on Stabilizing Windings, and to ask for inputs regarding the present scope of the TF and to sense general interest on development of an Application Guide for Tertiary and Stabilizing Windings". Task Force members and guests were then asked if anyone was aware of any applicable patent activity that might impact our work. No patent issues were disclosed by anyone.

The chairman provided a report with the background of the TF and a summary of present discussions, as described next.

Background of the TF Stabilizing Windings: To address an issue raised in an earlier ballot of standard C57.12.00 which requested:

(a) Recommendations for guidelines to determine MVA rating of buried tertiary windings,
(b) To define the conditions under which this MVA is applicable, and
(c) Determine the tests or calculations necessary to prove the tertiary MVA rating.

Summary of findings and conclusions from TF activity up to meeting's date:

- It is necessary to clearly differentiate the concepts of “tertiary windings” (TWs) vs. “stabilizing windings” (SWs): SWs behave more like neutral grounding devices and can carry only single phase (“zero sequence”) currents.
- SWs are Delta connected and apply only to three phase transformers.
- Short circuit performance of SWs is properly covered by present Clause 7.1.4.4.
- It is necessary to describe in explicit form the current and temperature limits required for thermal rating of stabilizing windings.
- The compliance of SWs with a new Clause would be demonstrated by calculation
- An efficient dimensioning of, and even decision on actual need for, SW´s requires appropriate knowledge of expected unbalanced loading conditions of the main windings: an Application Guide would be required
- An Application Guide for SWs could address as well application of TWs
- It is still desirable to solve present ambiguity around thermal rating of SWs by having a simple, extended version of Clause 7.1.4.4 in C57.12.00

Following, the questions to address during the meeting were stated as:

1. Is the scope of this TF achievable?
2. What recommendations might come from the audience?
3. What would be the Next Steps

In order top start the discussion, the chairman presented a proposed new wording for the short circuit requirements and thermal requirements for stabilizing windings, that could be included in C57.12.00.

The part of thermal requirements (“Loading Part”) was the main matter of discussion, departing from the next paragraph:

> “---------- Loading Part (Paragraph on Section 5?)
>
> Stabilizing windings shall be designed to withstand continuous thermal duty of the circulating current resulting from temporary load and or voltage imbalance on the main windings, as specified by the user. Main windings' load currents and supply voltages should be specified in magnitude, angle and duration, to allow verification of compliance with maximum allowable temperatures according to C57.12.00. In the event no continuous thermal duty for the stabilizing winding can be established from the user’s spec, the manufacturer will use as stabilizing winding's continuous circulating current, that current resultant from a full single phase load in the main secondary winding (approximately a 33.3% of the transformer’s or autotransformer's three phase rating) and infinite bus supply from the primary winding. The manufacturer shall prepare transient and permanent loading calculations for stabilizing windings temperatures, in order to demonstrate adequacy to requirements established in foregoing clauses. Starting point for those transient and permanent loading calculations will be the three phase transformer or autotransformer operating at its maximum continuous three phase rating and temperatures, in compliance with the present standard, before switching to the single phase loading conditions specified.”

Highlights of the discussion:

- Thermal rating of SWs should be better correlated with actual service conditions, to avoid unnecessary over dimensioning of SWs: full single phase load is still considered pessimistic, with a 10% load unbalance seen as more realistic.
- For thermal rating of SWs, it should be considered that they might be addressed to perform at its maximum rating (circulating current) right after having the transformer operating at its maximum three phase rating and temperatures.
- Some participants would like to have a more detailed description of short circuit duty for SWs, as, for instance, it is addressed in IEC Stds.
- Eighteen (18) attendees to the meeting raised hands in response to the question if they would be willing to further pursue the development of an Application Guide for SWs and TWs.

Conclusion and Next Steps:

The Task Force has not yet reached a consensus on the best manner to address the original comment, which remains the primary focus until this question is satisfactorily answered. Then the discussions can be expanded to take on the much broader task of addressing all things involving tertiary windings, which may evolve into the development of a "Guide".

Meeting adjourned 12:15 PM.

8.8.4.2.2 Subcommittee Discussion

Subhash Tuli recommended that the WG on “General Requirements”, C57.12.00 consider specifying when the no-load losses should be measured for the purpose of performance guarantees. He noted that many manufacturers measure no-load losses before and after impulse tests, but it is unclear in that situation which value should be stated on the test report. After several comments the Chair called the discussion to an end in order to consider the best approach. In subsequent discussion with Subhash, the PCS Chair suggested that the proper place for such a change would be C57.12.90 rather than C57.12.00. The Chair requested Subhash to submit in writing his comments so they could be properly considered at the next meeting. At a minimum, this should cover a summary of the problem, standard and clauses affected, justification for a change, and most importantly with a proposed solution to this issue.

8.8.4.3 WG on “Frequency Response Analysis (FRA) Guide”, PC57.149 – Charles Sweetser, Chairman

WG PC57.149 met for the development of the Frequency Response Analysis (FRA) Guide in Lombard, IL on October 26, 2009 at 1:45 PM. There were 78 people in attendance.

The FRA Working Group meeting was called to order at 1:45 PM.

The first order of business was to show the four slides regarding patents, assurances and inappropriate behavior.

The minutes from the Miami, FL 2009 meeting were approved by unanimous vote.

Working Chair Update

Draft 7 was presented to the Working Group, which is the final "draft" that will be submitted for the balloting process.

The Working Group Chair presented a brief report on what had been prepared for this final "draft." The latest contributions and edits were identified and discussed. It included the following sections.

Edits to Section 4: Test Records – It was determined to consolidate the list of "required" nameplate fields. These entries are the minimum information needed to save a unique data file that can be identified for future use. The fields are: date/time, serial number, location, manufacturer, transformer ID, company (owner), measurement type (OC, SC), and terminal connections.

The working group discussed the possibility of creating a standard data format. The file format XML was recommended and was considered to be the best choice for avoiding obsolescence. The opposing argument felt that the guide did enough to define the content of the data file, and that this requirement should be left to the end user.

Edits to Section 5: Analysis and Interpretation - The discussions focused on failure modes and related case studies.

The working group discussed whether or not the loose clamping structure case study (Section 5.5.8) should remain in the guide, several members expressed interest in keeping this example. The main concern focused on the use of the high frequency to perform the analysis. Alexander Kraetge gave an example of a loose clamping structure example that showed only a slight variation; he felt the results did not warrant enough information to determine the failure mode.

Alexander Kraetge provided a short presentation and update on other FRA industry documents. The following documents were discussed:

- DL 911/2004 (Chinese National Standard)
- Cigré Brochure 342
- IEC Standard 60076-18

In comparison the IEEE PC57.149 appeared more complicated than the others, however the Working Group was satisfied with the content.

Other Comments

It was recommended that Major Deviation and Minor Deviation be removed from the definition section, because they are not used in the document.

A figure illustrating Bulk Movement in Section 5.3 appears to be missing. It will be corrected.

The ballot process will be initiated once the changes are made.

The meeting was adjourned at 3:00 PM.

8.8.4.4 WG on "Switching Transients Induced by Transformer / Breaker Interaction", PC57.142 – Robert Degeneff, Chairman; Bill Griesacker, Secretary

1. There were 57 attendees, 16 members and 41 guests. We did not have a quorum.

2. The minutes from the March 2009 meeting in Miami, FL were approved.

3. There was a request for any patent issues to be made known, none were voiced.

4. The latest ballot resulted in 25 comments; 12 editorial, 7 general, 6 technical in nature. Six of the comments were negative requiring them to be addressed. The negative comments were reviewed in the meeting. Several of the more demanding comments are given below:

   Comment 7 – "This document is related and written for low to medium voltage. You will never see a snubber at high voltage. Either change all the language to be relative to all voltages and list where only low to medium voltage is appropriate such as a snubber circuit." Proposed to add voltage range up to 38 kV to title. This comment was made on the original ballot and the decision was to leave the document as it is.

   Comment 8 – This phenomenon is independent of interrupting medium. Propose to remove all references to vacuum and replace with switching device. This comment was made on the original ballot and the decision was to leave the document as it is.

   Comment 9 / 25 – Request to remove Annex A because complete data for case study is not provided. Will leave Annex A in the document.

   Comment 13 – Request wording change in regard to fuse. Will work with the reviewer to resolve the wording.

   Comment 24 – The phrase "but usually highly inductive" was questioned in regard to loading. This will be worked out with the reviewer.

   Other minor editorial comments were reviewed to inform the working group of the proposed changes to the document.

5. The changes will be incorporated in the document and Draft 7 issued. The recirculation ballot is expected to be ready in November of this year.

6. There was no old or new business.

7. The meeting adjourned at 8:30 a.m.

8.8.4.5 WG on "IEEE Standard Requirements, Terminology, and Test Procedures for Neutral Grounding Devices", PC57.32 – Steve Schappell, Chairman; Peter Balma, Vice-Chair

The Neutral Grounding Devices working group was called to order at 9:30 AM on October 27, 2009. There were 20 attendees: 9 members and 11 guests, with 1

requesting membership. Copies of the previous minutes and Draft 7 of the standard were distributed.

1. IEEE patent policy was reviewed and the group was asked if there were any disclosures. There were none.

2. The minutes from the Miami, Florida meeting on April 21, 2009 were approved.

3. A PAR modification has been requested in order to remove Capacitors from the scope. A one year PAR extension was also requested. The goal is to have a straw ballot ready early 2010, and to have the ballot ready by April/May 2010.

4. The committee membership has been reviewed and adjusted based on attendance and contributions. Any member removed incorrectly may contact the Chair or Vice Chair for re-inclusion.

5. The working group had an extensive discussion concerning Draft 7 of the document.
   - The clauses for scope and purpose, normative references, definitions, altitude, and construction are complete.
   - Minimum temperatures will be added to service conditions. Dave Harris volunteered to do this.
   - Clause 6 concerning the K factor will be revised and will note that applications close to generators or motors may require higher factors.
   - Extensive discussion of Table 6 Insulation Classes for Neutral Grounding devices took place in regards to Columns 3 and 4 Fault Voltage Criteria.
   - The source for 4 second ratings will be investigated. Historically this rating was not in the document. There was a motion to eliminate this rating; however the group decided more investigation is needed.
   - Table 7 Limits of Top Oil Temperature Rise needs to be revised to reflect modern transformer classes.
   - Table 8 Dielectric Test Voltages will be revised based on all working group discussions. Peter Balma volunteered to do this. The group suggested adding 600 volts class.
   - The working group would like to use IEC material for ground fault neutralizers. Jodi Haasz will be contacted.
   - It was noted that the temperature discussion on page 13 also needs to be revised to reflect 65 degrees C insulation systems.

6. New Business: A note will be added to Table 6 Insulation Classes indicating that for system voltages not found in the table, the next higher voltage should be used.

7. The meeting adjourned at 10:45 am.

8.8.4.6 WG on "Semi–Conductor Rectifier Transformers", C57.18.10 – Sheldon Kennedy, Chairman

The Working Group met on Tuesday, October 27, 2009 at 3:15 PM with 8 members (of 42 total) and 6 guests present. We did not have a quorum. Sheldon Kennedy chaired the meeting.

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

The minutes of the April 20, 2009 meeting in Miami, Florida were approved.

The Chair announced that the Amendment, C57.18.10a had been approved and published in March 2008. The Errata was produced by IEEE in 2006. Along with C57.18.10 we now have these three documents as a group. C57.18.10 expired in 2008 and was sent out as a Reaffirmation Ballot. The Reaffirmation ballot of C57.18.10 along with the Errata and the Amendment, C57.18.10a were included as a group. This ballot passed with no negative votes and only one affirmative comment. The standard, amendment and errata were sent to REVCOM and approved.

The Working Group has completed its task. There is interest in keeping a Task Force to work on a few special items while we still have the group together. The Semi-Conductor Rectifier Transformers Working Group, the Performance Characteristics Subcommittee and the Dry Type Subcommittee were surveyed to get approval for this Task Force. There was only one negative vote from any of the groups.

There was a discussion about the standards being written in the Vehicular Transportation Society of IEEE. A traction rectifier transformer standard, rectifier standard and many C37 switchgear standards are being revised by this organization with emphasis on the needs of the transit and rail industry. Concerns about duplication of standards and conflicts in the standards were raised. This standard has been in pre ballot for a year and nobody knew when it may actually come to ballot.

The chair announced that the IEC Converter Transformers for Industrial Applications IEC 61378-1 standard is under revision again. The chair discussed some of the highlights of their latest draft. We will ask IEEE to request a copy of their work for harmonization with our document.

Phase shifted secondary windings with multi-pulse secondary windings such as 18 pulse, 24 pulse, 36 pulse, 48 pulse and 54 pulse are becoming a great part of the motor drive transformer applications, as well as higher current rectifier transformers. There is no discussion about these in the present C57.18.10 and this will need some work. We began to discuss how we would incorporate these circuits into C57.18.10 since this is all relatively new work since the document was originally published in 1998. Numerating additional rectifier and transformer circuits was discussed. As we began to discuss this, Dhiru Patel informed us that there were patents on a lot of the methods of phase shifting windings by the drive and rectifier companies. Not wishing to have a problem with patents, the Task Force decided to just propose general discussions of phase shifting windings and not give any of the exact phase shifts that are being used in industry. This seemed the best way to accomplish this. Since there were now patent issues that were raised, the chair will discuss this with Tom Prevost.

Electrostatic ground shields are not discussed in the present standard. We discussed some general comments that can be made about them regarding their purpose and issues to be considered about them in design. The Chair will circulate some comments and the members will consider additional comments.

There were no further comments. The meeting was adjourned at 4:30 PM.

8.8.4.7 PCS WG on "Loss Evaluation Guide for ~~Distribution and~~ Power Transformers and Reactors", PC57.120 –– Don Duckett and Al Traut, Co-Chairmen

The meeting was called to order at 3:15 pm on Monday October 26, 2009. A roll call of the membership was taken. 13 of 21 members were present therefore a quorum was established. The minutes of the Miami meeting 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.

Chair reported that the April 2009 recommendations of the WG were implemented. On Sunday October 25, 2009, the Administrative Subcommittee approved our request to disband C57.12.33 and in its place establish a WG to revise C57.120. This new WG is under Performance Characteristics Subcommittee. The current co-chairs will continue to serve as chairs for this new WG.

The meeting next focused on discussion related to the title, scope and purpose of the revision of C57.120. The WG members unanimously approved the following.

Guide for Loss Evaluation of Distribution and Power Transformers and Reactors

1.1 Purpose

This guide offers a methodology to determine and thereby specify the economic value of no-load, load, and auxiliary losses. The use of this guide allows manufacturers to tailor the design to the unique economic situation of each user, and allows the user to evaluate multiple designs.

1.2 Scope

This guide covers the economic loss evaluation of liquid filled and dry type distribution and power transformers and reactors.

The chairs will prepare a PAR prior to the next meeting and merge the C57.12.33 and C57.120 documents prior to the next meeting.

There was no other new business.

The WG adjourned at 4:30pm and will need a meeting slot at the Spring meeting.

8.8.5 Old Business

None.

8.8.6 New Business

8.8.6.1.1 There was additional discussion regarding the no-load loss issue previously raised by Subhash Tuli in 8.8.4.2.2. Participants commented that some manufacturers perform no-load loss tests before and after impulse tests to detect imperfections in the core, particularly those resulting from a poorly cut core.

8.8.6.1.2 After the PCS meeting and at the Main meeting on Thursday, Sanjib Som raised an issue stating that there was some conflict in C57.12.00 and/or C57.12.90 regarding the 85°C reference temperature for load losses on 55/65°C or 65°C rise transformers. Rather than debate this issue with no background information, the PCS Chair requested Sanjib to submit this issue in writing describing the problem, the standards and clauses affected, and most importantly with a proposed solution, so that it could be properly considered at the next meeting.

8.8.7 Adjournment

The meeting adjourned at 4:10 PM.