

## **Annex C Distribution Subcommittee – Chair: Stephen Shull**

**March 4, 2015**

**Atlanta, GA**

**Chair: Stephen Shull**

**Vice-Chair: Jerry Murphy**

### **C.1 General Opening**

Steve opened the meeting welcoming everyone to the meeting. Jerry circulated the rosters. To establish a quorum, a list of members were displayed and a count of was made. We did have a quorum with 35 of the 42 members in attendance by count of those identified on a slide presented in the meeting. Recorded attendance gave 135 in attendance, 36 members and 23 requesting membership.

The agenda was reviewed and motion made by Dan Sauer, seconded by Ron Stahara and approved by unanimous acclamation of the members in attendance.

The Spring 2015 meeting minutes were reviewed and motion made by Dan Sauer, seconded by Sanjib Som and approved by unanimous acclamation of the members in attendance.

### **C.2 Working Group and Task Force Reports**

#### **C.2.1 C57.15/IEC 60076-21 – Step-Voltage Regulators – Craig Colopy**

Craig presented the following minutes from the working group meeting on March 21, 2016 at 4:45 p.m. with 48 people in attendance.

1. Meeting was called to order at 4:45 pm, 21 March 2016.
2. Check for Quorum made first: 35 Members listed on the roster, meaning 18 needed for quorum. There were 27 Members were available for the meeting.
3. Agenda of this meeting was accepted and passed. Dan Sauer made the Motion and Second by Steve Shull. Motion carried.
4. Minutes of the last meetings the two day work session and the scheduled summary at the Fall IEEE Transformer Meeting in Memphis were accepted and approved. Dan Sauer made the motion and Martin Rave seconded. Motion carried.
5. The Chairman advised the group on the reasons behind having drafts 1.2 through 1.5 dating back to the work session in Memphis, relating to the interactions between creating duplicate drafts using different formats from the IEEE and IEC processes.
6. Draft 1.5 was submitted as a CD to the IEC community for a 3 – month review. Comments will be made available after April 8<sup>th</sup>.
7. A balanced IEEE ballot pool was established and a MEC review completed on Draft 1.5.
8. Due to the number of technical comments received in March from the Working Group it was decided to delay submitting draft 1.5 to the IEEE ballot pool.
9. Some of the technical comments were discussed with decisions. The following is a synopsis of those discussions:

Clause 10.3.2. discussion on the interface connector using the MIL 5015 shell and pin design included a proposed change reducing the size and number of pins from 20 to 19. Suggestion was noted and accepted by the WG.

Clause 10.3.2. Figure 24 – during the discussion it was noted the drawing can be made more clear on the location of the universal interface which is only provided when specified by Purchaser. Location of the interface is at the bottom of a junction box located on the cover or at the bottom of an auxiliary box located between the cover and the control enclosure. The Working group agreed with this response.

Clause 8.6.5 and 8.6.6 – The WG Agreed with that the recommendation for the induced voltage test to be performed at the 15 Raise position. For the High Pot, Megger, and Power Factor Tests, the Working Group agreed specifying a specific tap for the test to be performed was not required. A Note will be added to clarify this so users are made aware.

Clause 5.3 – the WG agreed to leave the maximum value of Add Amp at 668 Amps. Note to be added: in the add amp ( ) section will allow but has to be worked out between the manufacturer and the users.

Working group agreed to place at the end of Annex E a Figure indicating stages of life regarding the moveable and stationary contacts.

Clause 5.4, Page 19 Line 18 – the WG agreed to leave the paragraph as is stating the minimum amount of regulation in the extreme Raise position is 10%.

Clause 10.5.1.7.3 Page 117 Line 2 & 3 – WG agreed to resolve minimum value of bandwidth and time delay range discrepancy between 10.5.1.7.3 and 10.2.1. WG agreed to change Bandwidth range in 10.2.1 to 1 – 6 and changing Time Delay range in 10.2.1 to 5 – 120. The WG agreed to add a note indicating if a minimum value of 5 sec is not available, the minimum value of a specific control is acceptable.

Clause 3 Page 7 Line 4 – the comment was to delete definition “reactor”. And add a definition for “bridging reactor” Reject proposal: Reactor does not have to be in a bridging position to be preventive when equalizer windings are used. The term reactor and Preventive autotransformer are referred to together in the load tap changer standards, C57.131 and 60214-1 and preference is to be consistent with them. The WG agrees with the comment rejection.

Clause 5.2 Table 4 – The comment suggested that for 33kV rated to meet a maximum system voltage of 36kV, BIL should be 200kV see Table 3 for example. The discussion noted that From IEC 60076-3: Highest Voltage for equipment winding  $U_m$  36 kV, The Full Wave Lightning Impulse 170 kV 200<sup>a</sup>–<sup>a</sup> These values are not given in IEC 60071-1:2011 for the particular value of  $U_m$  but are included either because they represent common practice in some parts of the world or for some switching impulse levels, because they represent a coordinated value for a particular value of lightning impulse level. The WG Agreed to leave BIL as is t=for 33 kV 50 Hz ratings

Table 2 footnote a - the comment was to remove the “experience and general acceptance, or an accepted test”. The WG agreed that the sentence be changed to: “Apparatus with specified temperature rise shall have an insulation system proven to possess minimum aging characteristics, by an accepted test.”

Clause 6.2.2 – the comment was to change the term “Sudden Pressure Relay” to something else. The WG agrees with verbiage as currently written.

Clause 6.2.1 – The comment noted the sudden pressure relay pressure change was incorrectly stated and this will be corrected to 0.5 psi/s to 3.0psi/s. this was incorrectly stated in draft 1.5. WG Agrees to correction.

Clause 8.8.3.2 – Comment was made to limit the maximum value of symmetrical current as the value of symmetrical current is raised to reach the required asymmetrical peak to offset difficulty in obtaining the asymmetrical peak due to the X/R ratio of the tested voltage regulator. The WG disagreed: As long as the asymmetrical requirement is not exceeded, the value of the symmetrical current is moot. WG agrees leave it as is.

10. Draft 2.0 will be created to include resolved technical and editorial comments from the WG. Resolved IEC CD comments will be included in this draft.
11. Next IEEE Transformer Committee WG meeting— Oct 23-27, 2016 in Vancouver BC. Meeting schedule to include a full day pre-session and the normal Monday afternoon session.
12. Comments not fully discussed will be addressed with WG by way of emails and Web conferences.
13. IEEE Ballot process will be delayed until an acceptable draft is completed. This Draft 2.0 will be used to create a new CD to be reviewed by IEC community. A total of 6-months is allowed from completion of ballot pool creation and ballot submission.
12. Said Hachichi moved for adjournment - second by Fred Friend – motion was unanimous.

Submitted by: Gael R Kennedy/Craig A Colopy

Date: 03/21/2016

### **C.2.2 C57.12.20 – Overhead Distribution Transformers – Al Traut**

Al presented the following minutes from the working group meeting on March 21, 2016 at 11:00 a.m. with 68 in attendance.

Quorum established with 26 of 33 members present.

Motion to approve agenda as submitted (Ron Stahara made /Said Hachichi seconded) and it was unanimously approved.

Motion to approve F15 Memphis meeting minutes (Ron Stahara made /Marty Rave seconded) and it was unanimously approved.

Al reminded that the ballot of the standard closes on 4/8/2016 and currently has 50% response rate. Al reminded that a 75% response rated is needed to be considered for approval.

The Working Group proceeded to review ballot comments received to date.

The first was the footnote “a” on Table 12. Since this was just informative a suggestion by Steve Shull was to make “footnote a” to just “note” to be included in the table which would indeed be informative. As well, for consistency of the table, Rhett Chrysler suggested to the removal the “%” symbol from the column entries but leave it in the column heading.

The second was on Clause 7.5.3. It was suggested by Al Traut to reject this comment regarding C57.12.31 as it is ambiguous. D. Mulkey suggested re-wording clause 7.5.3 to make it clearer as to the meaning as it applied in this standard. Dan suggested the following change.

#### **7.5.3 Tank and finish**

*Tank and finish shall conform to C57.12.31. Unless otherwise specified, the tank finish shall conform to Light Gray Number 70, Munsell Notation 5BG 7.0/0.4.*

Motion was made by Steve Shull and seconded by Ron Stahara to accept the re-wording of this clause. This motion passed unanimously.

The third concerned the labeling of delta connected transformers shown in Table 4. The comment stated that the note on delta connected units was not clear as to which ratings are delta connected. Rhett Chrysler mentions that other standards use the delta symbol. Steve Shull recommended using the delta symbol where appropriate. A motion was made by Rhett Chrysler and Saidi Hachichi to drop the note in Table 4 and insert the delta symbol on the applicable ratings. Motion carried unanimously.

The third concerned Article 4.1. R. Marek submitted a negative ballot because he request the change of Article 4.1 and include as a normative reference C57.154. The current wording was as follows:

#### **4. Ratings**

##### **4.1 Kilovolt-ampere ratings**

*Kilovolt-ampere ratings are continuous and are based on not exceeding either a 65°C average winding temperature rise or an 80°C hottest-spot temperature rise. The temperature rise of the insulating liquid shall not exceed 65°C when measured near the top of the tank. Kilovolt-ampere ratings for single-phase and three-phase transformers shall be as shown in Table 1. These ratings are based on the usual temperature and altitude service conditions specified in IEEE Std C57.12.00.*

And the proposed wording change and addition to the normative references as follows:

#### **4. Ratings**

##### **4.1 Kilovolt-ampere ratings**

*Kilovolt-ampere ratings are continuous for an insulation system thermal class of 120 as defined in IEEE Std C57.154 and are based on not exceeding either a 65°C average winding temperature rise or an 80°C hottest-spot temperature rise. The temperature rise of the insulating liquid shall not exceed 65°C when measured near the top of the tank. Kilovolt-ampere ratings for single-phase and three-phase transformers shall be as shown in Table 1. These ratings are based on the usual temperature and altitude service conditions specified in IEEE Std C57.12.00.*

##### **With the addition the Normative references:**

IEEE Std C57.154, IEEE Standard for the Design, Testing, and Application of Liquid-Immersed Distribution, Power, and Regulating Transformers Using High-Temperature Insulation Systems and Operating at Elevated Temperature

Alan Wilkes mentions that the conductor materials (magnet wire) are rated at 105°C. The 120 class is for a 110°C hot spot. Carlos mentions that the 120 class is not mentioned in C57.12.80. Steve Shull motioned to reject the comment until all the references align on the insulation level as stated in C57.154. Ron Stahara seconded this motion and it passed with one rejection.

Rhett Chrysler comments that Article 7.2.6 would be more appropriate in 7.5.3. Dan Mulkey stated that those clauses are discussing two different types of integrity. No motion was made and based on the discussion Al Traut stated the article would be left as written.

Josh Verdin suggests a note referencing the main breaker size used in the calculation in the Table 12 so that it would be more clear in understanding the method that was used to determine the minimum percent impedance. His concern stemmed from end-user safety concerns. After some discussion by the group, no real conclusion was reached. Al Traut stated that this would

be left as it is currently shown because of the complexity of the issue and the time crunch we are currently under to publish this standard. He suggested that this might be considered in the next revision.

Next meeting will be held October 23-27 in Vancouver, British Columbia, Canada.

The meeting was adjourned at 12:00pm, Kendrick Hamilton recording.

### **C.2.3 C57.12.28, C57.12.29, C57.12.30, C57.12.31, C57.12.32 – Enclosure Integrity – Dan Mulkey**

Dan Mulkey presented the following minutes from the working group meeting on March 22, 2016 at 8:00 a.m. in with 47 in attendance.

Introductions were made and a call for quorum showed 25 of the 38 WG members were in attendance giving quorum. Note that the full attendance list is recorded and available in the Association Management System.

The Fall 2015 meeting minutes were reviewed by the WG and with no further discussion the minutes of the was unanimously approved.

C57.12.32 IEEE Standard for Submersible Equipment – Enclosure Integrity is active, last published in 2003, and reaffirmed in 2008, and due for revision by 2018.

Reports from the assignments given at the Fall 2015 meeting were presented.

1. Carlos Gaytan looked for IEC and other standards for testing of submersible transformers. Carlos reported the RODE documents referred to other standards and he found two covering the subject.
  - a. NEMA 205-2003
  - b. IEC 60529Carlos' presentation will be posted to the website.
2. Jeremy Van Horn gave a presentation on the proposed definition of “submersible” for this standard. Already defined in C57.12.80, but not defined by RODE and there are no normative definitions like IEC 60529. Jeremy provided a listing of the standards relating to submersible with definitions including standards relating to service conditions and design tests.

Discussion followed concerning design leak tests with a motion by Giuseppe Termini, seconded by Said Hachichi to set submersion of 3 meters (9'-10”) to the top of the tank with a footnote that connections are only tested at 6'. Motion carried by unanimous acclamation.

Further discussion followed to set criteria for design leak testing with a motion to include the following:

- a. Talc or chalk dust to be applied to provide ready identification of leaks
- b. Minimum of 24 hours submersed
- c. Tank pressurized to 10 psig
- d. Then reverse the components and test again.

Question was asked if the production test didn't already provide this evidence. There was a preference to test the fully assembled unit.

Giuseppe Termini seconded the motion and a call of the question passed the motion with 15 in favor, 3 opposed and 4 abstaining.

3. Rebecca Giang with Sherwin-Williams presented information regarding the FS-40 bulb used for ultraviolet testing per ASTM D4587-01.

- a. Rebecca's report will be posted on the website.

Next meeting will be held October 23-27 in Vancouver, British Columbia, Canada.

Time was expiring and Dan adjourned the meeting at 9:15am, Jerry Murphy recording.

### **C57.12.34 – Three Phase Padmount Transformers – Ron Stahara**

Ron Stahara presented the following minutes from the working group meeting on March 21, 2016 at 3:15 p.m. with 75 in attendance.

Ron Stahara called the meeting to order and introductions were made. The rosters were circulated. The complete detail of attendance is recorded in the AM system. To establish a quorum, a members list was displayed on the screen and those who saw their names were asked to hold up their hand. From this count of hands, it was determined that a quorum was established. A motion was made by Ali Ghafourian and seconded by Alan Wilks to accept the agenda as shown. The motion was passed unanimously. The minutes of the Fall 2015 meeting were accepted as written by acclamation.

A quick review was conducted of the questions that were raised after the ballot or had been suggested in the balloting process. These were discussed as follows:

- 1 All standard references will be updated in the new document.
- 2 There were some concerns on the drawings on whether the low voltage bushing dimensions were carried forward from the earlier documents. Steve Shull showed that these were actually contained in the document and in particular on the specific dimensions drawings. Gary King asked that we verify that these were carried forward on the minimum dimension drawings as well.
- 3 There was a concern about accessing items on the transformer such as sight gauges, sampling valves, etc. in a compartment where an arc fault hazard exists. It was also mentioned that there were some instances where non-qualified individuals were asked to check a function or obtain an oil sample. Because of this a different compartment or area was requested to house these items. To reaffirm this thought, Adam Bromley stated that his company had considered requiring that the primary compartment contain these items because the fault current in his company's system was lower in this area than on the secondary side. There was some thought on the placement of a guide on the Arc Fault issue in an annex but it was abandoned due the complexity as well it pointed out that this subject was covered in NFPA 70E. Mike Thibault commented that this was really an operational issue and didn't really belong in this standard. The conclusion was that we should address the concern about accessing items such as sight gauges, sampling valves, etc. in a compartment or protected access area.
- 4 Dwight Parkinson asked that we review Figure 9 since there was a grayed out area for bushing height. Since the revision of IEEE 386 he felt that these could be filled out. Carlos Gaytan agreed in that he felt we needed to address any additions in the recently published IEEE 386. He also would like us to careful review the figures in this standard which could include a 200kV BIL dead-front interface and any new figures that had been added to clarify 600A and 900A interfaces statements in our standard.
- 5 Ron Stahara asked that this group address balanced lifting using the lifting lugs on the transformer. Jerry Murphy agreed since he is required to provide a lifting plan

when moving these units and this would help in its preparation. Alex Macias agreed with Jerry on this point.

After this discussed, the working group agreed that we need to proceed forward with a new PAR to address these issues. A motion was made to do this by Jerry Murphy and seconded by Marty Rave. The motion was passed unanimously. Steve Shull committed to getting this accomplished by the next meeting.

Next meeting will be held October 23-27 in Vancouver, British Columbia, Canada.

With this, the meeting was adjourned, Stephen Shull recording.

#### **C.2.4 C57.12.36 – Distribution Substation Transformers – Jerry Murphy**

Jerry reported the working group met Tuesday, March 22, 2016 at 1:45pm with 38 people in attendance.

Jerry Murphy called the meeting to order at 1:45 PM. Introductions were made. The names of the members were projected on the screen. By a show of hands the quorum was reached by having 14 out of the 17 members present. Gael Kennedy made a motion approve the minutes of the last meeting in Memphis; Steve Shull seconded, and the motion was approved.

Jerry mentioned that there were 3 comments that were pending to be resolved from the ballot of draft 4, and proceeded to review them. The first comment resolved was related with section 5.10.4, Tank base. Comment was about use or terms pad or foundation. After some discussion Gary Hoffman moved to reject the comment, since the proposed change was not of substantive nature. Steve Shull seconded and the motion was approved. Next comment was related to section 3.2, Liquid definition. Several definitions were reviewed such as liquid-immersed, insulating liquid and others. The group considered that the proposed change did not add significant additional information to the current definition. Gary Hoffman moved to reject the comment, Steve Shull seconded and the motion was approved.

The last comment was related with section 5.1.7, Pressure relief. After a long discussion, a motion was made by Wally Binder, seconded by Steve Shull, to eliminate the text below the line of venting and sealing characteristics, and substitute with making reference to PC57.12.39. Gary Hoffman made a friendly amendment to modify the text to include a proper reference. Wally and Steve accepted the amendment. Gael Kennedy made a 2nd friendly amendment to eliminate the first part of the text below the first line of 5.1.7. Wally and Steve accepted the 2nd amendment. Steve Shull called for the question, and the motion was approved.

Next meeting will be held October 23-27 in Vancouver, British Columbia, Canada.

Jerry informed that with all the comments resolved, he would next go for a recirculation ballot.

The meeting adjourned at 2:50 pm., Carlos Gaytan recording.

#### **C.2.5 C57.12.37 – Test Data Reporting – Tom Callsen**

This working group did not meet as planned.

#### **C.2.6 C57.12.38 – Single Phase Padmount Transformers – Alan Wilks**

Mike Faulkenberry presented the following minutes from the working group meeting on March 21, 2016 at 1:45 p.m. with 52 in attendance.

The meeting was called to order by Ali Ghafourian at 1:45 p.m.

Twenty-four of thirty-one working group members were present which met the requirements for having a quorum.

The working group members were asked if there were any changes or corrections to the minutes from the Fall of 2015 meeting, and none were offered. Ron Stahara motioned for the minutes to be approved, and it was seconded by Justin Pezzin. The vote was unanimous in favor of the motion.

The status of the PAR was discussed. A ballot pool is currently being formed for vote on Corrigenda 1 which corrects an error in Figure 1. Until that corrigenda has been approved for publication, a request for a new PAR will not be submitted. But we still can and will be working on the document until then.

Comments from the ballot that were not included in the currently published document were presented for consideration in the next revision. The first topic was for a definition of “small interface.” Mike Faulkenberry is on the working group for the next revision of IEEE 386 and stated that the “small interface” and “large interface” terminology is not in the upcoming revision. Instead, the interfaces are given numbers. Once 386 is published, we will reference the appropriate interface numbers.

The other ballot comment that will be included is the change from “oil” to “liquid” throughout the document. There was no further discussion on that addition.

Ali then presented items from the previous meeting mentioned as possible items to be addressed in the next revision:

- Definition of “Permanent Deformation” – A good bit of discussion about this took place. Ali mentioned that you cannot get zero deformation and asked, so what is acceptable? Do we not want to say something more than “no permanent deformation?” Ron Stahara suggested that if it passes, even with permanent deformation, but has no safety issues or leaking, is that a problem? After some discussion, Ali stated that we do not have to change it but instructed the working group members to think about it for further discussions.
- Dual Voltage Ratings – These were in the standard previously, and Ali asked if the working group wanted to add them back to the standard. After some discussion, no one knows for sure why it was removed from the standard. It was suggested that it may have been because of the difficulty in knowing for which voltage to fuse it for shipping. Ali suggested that we write something for inclusion in the next draft that we will discuss. It was also suggested that this might best be put in an informative annex.
- Add Minimum Impedances – Ali stated that we would wait for Al Traut to finish this addition in C57.12.20, and then we could use those minimum impedances in our document. No further discussion took place.
- Clarifying Note 2 on the figures to define the distance between the front plate and the closest sill projection – Ali asked for members to provide comments for further discussion as to why that is there.
- Add Commonly Used Components – This includes bayonet fuses, oil gauges, arresters, etc. It was mentioned that we have previously said we do not want to include such items in the document. There was a lot of discussion on the oil gauge for determining there was enough oil to operate bayonet fuses or switches and where exactly that should be located. Do we need to specify that? Steve Shull suggested that if we wanted to address the components, it may best be done in an informative annex. Further discussion will be held on this topic.



- Increasing Tilt Angle for HV Bushings in Type 2 Configurations for Ease of Operation – After discussion, it was determined that there were too many variables to correctly select the proper angle. No changes are suggested at this time.
- LV Bushing Cantilever Strength – Steve Shull says this will be covered by new C57.19.02 and invited participation in the upcoming meeting for this working group.

Next meeting will be held October 23-27 in Vancouver, British Columbia, Canada.

A motion to adjourn was made by Ron Stahara and seconded by Kent Miller.

Submitted by Mike Faulkenberry.

### **C.2.7 C57.12.39 – Tank Pressure Coordination – Carlos Gaytan**

Carlos reported the working group met Tuesday afternoon at 4:45 p.m. with 43 in attendance.

The meeting was called to order at 4:45 PM. Introductions were made; the names of the members were projected on the screen. By a show of hands the quorum was reached by having 19 of the 32 members present. By the end of the meeting the member count was 22. The agenda was presented. A motion for approval was made by Alan Wilks, seconded by Ron Stahara. The motion was approved. A motion to approve the minutes of the fall 2015 meeting was made by Stahara, seconded by Steve Shull. The motion was approved.

On the chair report, Carlos informed that the PAR would expire in Dec. 2016, and the plan to request a 1 year extension at the June 2016 Standards Board Meeting.

On old business, a review of comments from MEC was presented. A few changes resulted, based on style manual, adding of abstract and keywords; changes in use of words such as “Minimize” to “Reduce”, “should, shall, may, must”, use of absolute language: damage, safe, shock; all per MEC recommendations. Flow chart on Annex A was updated correcting references to document. There were no comments from the working group. Steve Shull indicated that a vote is not required for these edits.

Then the ballot status was reviewed. The Invitation started 07-Mar-2016; will close on 06-Apr-2016. Carlos mentioned that the Ballot Comment Resolution Committee that was formed in the fall 2015 meeting would be engaged as soon as the comments from the ballot were completed by June. This was with the intent of completing the comment resolution process prior to the Vancouver meeting, where the results would be presented.

The next WG meeting will be in Vancouver, BC, Canada, in October 23-27.

Ron Stahara made a motion to adjourn; Said Hachichi seconded. The meeting adjourned at 5:10 pm, Justin Pezzin recording.

Carlos concluded his report saying he would be requesting a one year PAR extension.

### **C.3 Old Business**

- None

#### C.4 New Business

- Steve Shull informed the subcommittee an update on DOE activity.
  1. DOE Transformer "minimum efficiency standards" (MES) are up for the "5-year" visit.
  2. Hearings to review the residential and smaller transformer data are planned.
  3. It is be supportive or at variance with data from some that indicated 39% was the "average loading" over 1 year which is lower than the current standard.
  4. DOE indicates that hearings are planned to be completed by "2019, to be effective January 1, 2022".
  5. Also, there are efforts to expand Distribution Transformer MES from current 2,500 kVA to 10,000 kVA sizes.
  6. It would be extremely helpful to have loading data on some higher kVA's, as several sources indicate they tend to be more highly loaded.

Currently we have an inactive task force that is focused on DOE Rule Making which is targeted toward Distribution Transformers. We are reactivating this task force. Phillip Hopkinson is the Chair of this group and Ned Brush is now named as Vice Chair. Since this has been inactive for a while, we will open up the task force membership.

##### Objective:

Determine RMS-Equivalent loading and patterns of loading for Distribution Transformers

##### Purposes:

- a. Optimization of Energy efficiency considerations
- b. Improved thermal life considerations and realistic life extrapolation

##### Variables for consideration:

- a. Power ratings from 10 kVA single phase to 10 MVA 3 phase
- b. Voltage classes
- c. Customer applications including general purpose, residential, industrial, commercial, & renewable power
- d. Geographical locations

##### Interested Parties:

Manufacturers, users, DOE, and consultants and other dependent standards

##### Mechanics:

- a. Establish compatible EXCEL file format for data reporting
- b. Establish test years for proper data comparison
- c. Using load profile data to develop the data
- d. Use the neutral clearing house of EEI for collection of the data

##### Milestones:

- a. The task force will be organized at this meeting by the signup sheets which are located at the front.
- b. The Task Force will establish the final data format by Task Force meeting via Web/Conference call.

- c. Data collection by Fall ,2016
- d. First report by Spring, 2017
- e. First pass at documentation by Fall, 2017

The following example data set was presented.

Load Type	Avg kVA	Date	Time	PU Load	Time	PU Load
Residential	25	7/3/16	8:00 AM	0.7	8:00 PM	0.6
			9:00 AM	0.6	9:00 PM	0.4
			10:00 AM	0.5	10:00 PM	0.3
			11:00 AM	0.5	11:00 PM	0.2
			12:00 AM	0.6	12:00 PM	0.1
			1:00 PM	0.4	1:00 AM	0.1
			2:00 PM	0.4	2:00 AM	0.1
			3:00 PM	0.4	3:00 AM	0.1
			4:00 PM	0.5	4:00 AM	0.1
			5:00 PM	0.6	5:00 AM	0.2
			6:00 PM	0.8	6:00 AM	0.8
			7:00 PM	0.7	7:00 AM	0.7

Computations                      Peak, Min, RMS-Equivalent, Average PU Loads

- Phil Hopkinson presented a need to reinstitute the steep front wave test on as vacuum breakers are increasing in interrupting rating that he believes is causing increased failures due to the interaction of transformers and vacuum breakers. Phil asked the members to consider specifying a shield to increase the transformer capacitance to mitigate these failures.

### C.5 Chairman’s Closing Remarks and Announcements

Steve had no closing comments to the SC except to see them in Vancouver in the fall.

### C.6 Adjournment

Steve adjourned the meeting as provided in the meeting agenda at 10:28am.