

Annex M Subsurface Transformers & Network Protectors Subcommittee

March 27, 2019
Anaheim, CA
Chair: George Payerle
Vice Chair: Tony Reiss

M.1 Meeting Administration

Introductions – The meeting was called to order at 11:00 AM Wednesday, March 27, 2019 in the California room of the Hilton Anaheim in Anaheim, CA The meeting agenda was approved.

Quorum – The members were listed on the screen and by a show of hands, it was determined that there was a quorum in attendance.

Members and Guests --There were 27 members and 28 guests in attendance. Pre-meeting membership changes: Tom Dauzat, Gary Hoffman, Brad Kittrell, Juan Ramirez, Fred Friend, Ben Garcia, James Ratty, and Dan Schwartz are now approved for membership.

Members in attendance:

Jason	Attard	Consolidated Edison Co. of NY
Israel	Barrientos	Prolec GE
David	Blew	PSE&G
Douglas	Craig	Richards Manufacturing Co.
Thomas	Dauzat	General Electric
Larry	Dix	Quality Switch, Inc.
James	Dorsten	Alabama Power
Fredric	Friend	American Electric Power
Carlos	Gaytan	Prolec GE
Said	Hachichi	Hydro-Quebec
Gary	Hoffman	Advanced Power Technologies
Brad	Kittrell	Consolidated Edison Co. of NY
Brian	Klaponski	Carte International Inc.
Alejandro	Macias	CenterPoint Energy
Daniel	Mulkey	Mulkey Engineering Inc.
George	Payerle	Carte International Inc.
James	Ratty	Electronic Technology Inc.
Clemens	Reiss IV	Custom Materials, Inc.
Pedro	Salgado	Electronic Technology Inc.
Dan	Schwartz	Quality Switch, Inc.
Jeremy	Sewell	Quality Switch, Inc.
Adam	Sewell	Quality Switch, Inc.
Igor	Simonov	Toronto Hydro
Alan	Traut	Howard Industries
John	Vartanian	National Grid
Joshua	Verdell	ERMCO

Guests in attendance

Nitin	Adishesadrirao	Power Partners, Inc.
Glenn	Andersen	Fayetteville PWC
Kevin	Biggie	Weidmann Electrical Technology
David	Blew	PSE&G
Christopher	Bolduc	HUBWorks Consulting
Eric	Bradford	General Electric
Mirvil	Bruno	ABB Inc.
Jennifer	Corvigno	Consolidated Edison Co. of NY
Yuanzhong	Cui	TBEA Shenyang
William	Elliott	General Electric
Roger	Fenton	Fenton Solutions
Benjamin	Garcia	Southern California Edison
Rob	Ghosh	Transformers & Rectifiers (India) Ltd
Orlando	Giraldo	The H-J Family of Companies
Kenneth	Hampton	Baltimore Gas & Electric
Jeffery	Henry	Mapes & Sprowl
Robert	Kinner	FirstPower Group LLC
Parry	Lively	Tempel
Daniel	Martinez	Lamination Specialties
Justin	Minikel	EATON Corporation
Matthew	Mollenkopf	Oncor Electric Delivery
Russell	Sewell	Quality Switch, Inc.
James	Spaulding	Fort Collins Utilities
Liz	Sullivan	Dominion Energy
Babanna	Suresh	Southwest Electric Co.
Timothy	Tillery	Howard Industries
Leon	White	Qualitrol Company LLC
Armond	Wilson	Mitsubishi Electric Power Products

Agenda – the agenda was approved. Gary Hoffman made the motion and Fred Friend seconded.

Approval of Minutes – The minutes from the Fall 2018 meeting in Jacksonville, FL were approved. They were motioned for approval by Jeremy Sewell and seconded by Brian Klaponski. The subcommittee approved these without opposition.

The chair suggested that those making and seconding motions do not have to be named in the minutes. Gary Hoffman said that may not be the case according to the rules. He will check and advise.

M.2 Working Group and Task Force Reports

M.2.1 C57.12.23 Working Group Report – Single-Phase Submersible Transformer

Alan Traut, Chairman, Jermaine Clonts, Secretary.

Revision Due Date: **3/19/2019**

PAR Approval Date: **8/21/2014**

PAR Expiration Date: **12/31/2018**

12.23 is on hiatus

M.2.2 Continuous Revision of C57.12.24 – Three-Phase Submersible Transformers

Giuseppe Termini, Chairman; George Payerle Secretary

Approved: **12/7/2016**

Revision Due Date: **6/17/26**

PAR Approval Date:

PAR Expiration Date: 12/31/23

The meeting was called to order at 9:30 am in the Capistrano Room at the Hilton Anaheim on Tuesday March 26, 2019. In the Chair's absence, Dan Mulkey filled in. George Payerle served as secretary. Dan presented an agenda. Kent Miller moved to approve it. Tom Dauzat seconded. The minutes were approved unanimously again with Kent Miller making the motion and Tom Dauzat seconding.

Introductions were made. The Chair noted that the Par for this group was approved. It now expires December 23, 2023.

At the previous meeting, Israel Barrientos and Jeremy VanHorn took on the task of revising Table 6 to harmonize the metric and English values. Israel presented their suggestion for the new table of minimum tank thicknesses. Tom Dauzat mentioned that there is testing going on in 12.32 that is relevant here as it will overlap with this standard.

Dan explained that for normal corrosive areas, whatever your substrate is, it has to meet or beat the weight loss criteria of 409 stainless steel. If you are in a heavily corrosive area, then your bare substrate has to meet or beat 304 stainless steel.

C57.12.40 and C57.12.44 call for CU bearing steel. There is probably a minimum thickness that will have less weight loss than 409 or 304. There will probably be 2 different thicknesses. Currently GE is running tests to make that determination. Tom Dauzat stated that the testing will take 6 to 10 months. He expects to have results for the spring 2020 meeting. Tom suggested that another manufacturer do the same testing. We will proceed with the decimal change in table 6 for now and await the test results. Dan noted that the standard needs to go to ballot by fall of 2022.

Brian Klaponski noted that in C57.12.40 we got a negative comment by a corrosion expert that has kicked off a good effort in adding significant helpful information to several standards.

Table 2 was discussed. The title should be changed from "Primary Insulation Level" to "Winding Insulation Level". Additions should be made for insulation levels above 600 volts.

The figure under 7.1 needs to have a figure number. The tables under 7.1 need to have numbers. It was noted that IEEE would want two separate numbers in this case, Table 3 for rectangular transformers and table 4 for round transformers. These new designations will of course change the figure and table numbers below that point. Also, add 5000 kVA under 150 kV BIL. That line will also need dimensions. Brian Klaponski will help with table revision. There is a figure for rectangular transformers. Should there be a figure for round transformers?

There was a discussion as to whether table 2 should include winding voltages above 600 volts. It was determined that the BIL of winding voltages above 600 volts should be in table 2. Below 600 v the BIL should be 30 and these numbers should be either in another table or added to table 2. If anyone wants to add voltages to table 2, they should send them to George or Giuseppe. Also send any desired changes to table 3 impedance voltages to George or Giuseppe.

Also, we should change the title of table 2 to 'Winding Insulation Level'. And make other changes within the table to match the table in C57.12.00.

We need to amend Table 6 minimum thickness to take into account the minimum thicknesses to roll round tanks.

Table 3, impedance, members should also send any changes or additions. We will also have to change the table title as well. Carlos Gaytan said to see the impedance table in 12.34 3ph pads and copy data from there. We will need to add a column.

Will Elliott then presented an excellent corrosion presentation that he and Tom Dauzat created. Liz Sullivan said that she has data on corrosion that she can supply. Tom Dauzat suggested that each utility find 5 vaults and record potential differences in them. A methodology for this would have to be developed.

After the presentation Brian Klaponki suggested that a task force be created at the subcommittee level to continue work on this and make an appendix that will be useful to many different working groups.

The meeting was adjourned at 10:52 AM. The next meeting will be in Columbus, OH on October 29, 2019.

Respectfully Submitted by: Dan Mulkey, Acting Chairman C57.12.24 Working Group

M.2.3 Continuous Revision of C57.12.40 – Secondary Network Transformers

Dave Blew, Chairman, Dan Schwartz, Secretary

Revision Due Date: **12/31/2027**

PAR Approval Date:

PAR Expiration Date: **N/A**

a. <u>Members Present</u>	<u>Company</u>
Dave Blew (Chairman)	PSE&G
Dan Schwartz (Secretary)	Quality Switch
Jason Attard	Consolidated Edison Co. of NY
Piotr Blaszczyk	The Specialty Switch Co LLC
Douglas Craig	Richards Manufacturing Co.
Larry Dix	Quality Switch
James Dorsten	Alabama Power
William Elliott	GE
Mark Faulkner	Eaton Corporation
Brian Klaponki	Carte International Inc
Alejandro Macias	CenterPoint Energy

Daniel Mulkey	Mulkey Engineering Inc.
George Payerle	Carte International Inc
James Ratty	Richards Manufacturing Co.
Pedro Salgado	Electronic Technology Inc.
Adam Sewell	Quality Switch
Jeremy Sewell	Quality Switch
Russell Sewell	Quality Switch
Igor Simonov	Toronto Hydro
Liz Sullivan	Dominion Energy
John Vartanian	National Grid

b.**c. Guests Present**

	<u>Company</u>
Jerry Allen	Metglas, Inc.
Kevin Biggie	Weidmann Electrical Technology
Poorva Bedge	Fort Collins Utilities
Alan Boege	Orto de Mexico
*Eric Bradford	GE
Jennifer Corvigno	Consolidated Edison Co. of NY
*Tom Dauzat	GE
Lee Doyle	Vaisala
Leonardo Galhardo	Dupont
Jonathan Garrity	Tagup Inc
Jorge Gonzalez	Orto de Mexico
*Brad Kittrell	Consolidated Edison Co. of NY
*Bene Martinez	Metglas, Inc.
Brian McBride	Cargill, Inc.
Kent Miller	T&R Electric Supply Co.
Justin Minikel	Eaton Corporation
Martin Munoz	Orto de Mexico
Patel Nitesh	Hyundai
Jonathan Reimer	Fortis BC
Eric Theisen	Metglas, Inc.
Justin Turner	GE
Jaber Shalabi	Vantran Industries
Jeff Valmus	Cargill, Inc.
Greg Virelli	Virelli & Associates Inc.
*Leon White	Qualitrol
*Requested Membership	

- 1) The group met on Tuesday, October 16, 2018 at 11:00 am with 21 members and 25 guests. Five (5) guests requested membership.
- 2) An agenda was presented and approved, and introductions were made.
- 3) The minutes of the October 16, 2018, meeting in Jacksonville, FL were reviewed. Mark Faulkner made a motion to approve those Minutes. Jeremy Sewell seconded the motion and the minutes were approved unanimously.

- 4) The Chair announced that due to late submittal of the PAR, this is not officially a Working Group meeting.
- 5) The Chair briefly noted that the PAR was submitted late and was not approved prior to this meeting.
- 6) The Chair opened up the meeting for discussion on topics to be addressed in the next revision of C57.12.40 and the following suggestions were made and discussed:
 - a. It was discussed that the formation of a Task Force on Corrosion and Cathodic Protection should be brought up at the SC meeting on March 27th as that discussion and findings would be applicable to both this WG and C57.12.24. This topic is seen as potentially included in the next revision of both standards, but more likely the revision after. This is a potential continuation from the TF created at the previous meeting in Jacksonville, FL.
 - b. Taking up a discussion on the standardization of throat and tank sizing to include potential figures in the standard.
 - c. Further improvement on Bushing Connection standardization and documentation within the standard.
 - d. It was also discussed that we should visit the addition of the primary switch location in the next revision of the standard. Among items applicable to this topic are allowing user choices of locating the switch in the tank, separate from the tank, and locating the switch in its own tank; the standard should provide guidance for all three. A concern was raised that the WG should focus on maintaining the safety aspect of the previous revisions when considering how to address these potential additions as work practice vs. equipment safety.
 - e.
- 7) The meeting was adjourned at 11:39 AM with the next meeting set for Columbus, OH on October, 29, 2019.

Respectfully submitted,
 D. Blew, Chairman
 D. Schwartz, Secretary

M.2.4 -C57.12.44 Working Group Report – Secondary Network Protectors

Mark Faulkner, Chairman, Alex Macias, Secretary
 Revision Due Date: **12/31/2024**
 PAR Approval Date: **3/26/2015**
 PAR Expiration Date: **12/31/2019**

Document #: **C57.12.44**

Document Title:

STANDARD REQUIREMENTS FOR SECONDARY NETWORK PROTECTORS

Chair: Mark Faulkner Vice-Chair Alex Macias
 Secretary n/a

M

Current Draft Being Worked On: DRAFT 10 Dated: October 15, 2018

Meeting Date: March 25, 2019 Time: 4:45PM

Meeting Attendance

Activity Name: C57.12.44 WG Secondary Network Protectors

Activity ID: 703

Number of Members in Activity = 19

Number of Members Present = 11

Quorum Present = 57.9%

Number of attendees = 26

NOTE: 2 WG MEMBERS REMOVED DUE TO RETIREMENT BEFORE THE MEETING; 3 GUEST REQUESTED TO BE ADDED TO WG

Meeting Minutes / Significant Issues / Comments:

The minutes shall record the essential business of the Working Group, including the following items at a minimum:

1. Call to order and any Chair's remarks
 - a. **4:47PM**
 - b. **Focus on review obtain input on 600V rated protectors**
 - c. **Draft for preparation for Ballot and MEC**
2. Quorum Verification
 - a. **Quorum was confirmed by show of hands**
3. Confirmation of the essential patent statement and responses
 - a. **No conflicts presented to group**
4. Approval of minutes of the previous meeting
 - a. **Motion made by Jim Dorsten, 2nd, Jason Attard**
 - b. **Minutes approved**
5. Approval of agenda for this meeting.
 - a. **Motion made to accept agenda, any opposed**
 - b. **No opposed; Agenda approved**
6. Technical topics
 - i. **Review issues of the addition of 600V table for protectors**
 1. **Impedances per C57.12.40 table 3 (300-1000kVA shall be 5% and 1500-2500kVA shall be 7%) with respect to 216V and 480V designs**
 2. **Douglas Craig noted that 600V shall be 6%**

3. **Brian Klaponski asked about network transformers built with 6% impedances; stated impedances are designed per impedances noted in C57.12.40**
4. **A decision was made to keep impedances per C57.12.40 for 600V protectors to compliance**
5. **It was determined that the KA ratings for 600V protectors will conform with the current standard requirements**
6. **Also noted that the throat size of 600V protectors will be in compliance with C57.12.40**
7. **A motion was placed to approved**
 - a. **No opposition, motion passed**
8. **Douglas Craig will revised Table 3 Network Protector Ratings for review by WG for inclusion into standard**
 - ii. **A PAR extension was submitted for 1 year; however, it will be revised for a 2 year period**
 - iii. **Meeting adjourned at 5:10pm**

7. **Fall meeting--date and locationn**
 - a. **Columbus, OH**
 - b. **Date: October 27-3128, 2019**

Copies of any handouts and/or subgroup reports will be made available as separate items but referenced by these minutes.

Submitted by: Mark Faulkner
 Date: 03/26/2019

M.2.5 -C57.167 Guide for monitoring distribution transformers

Gary Hoffman, Chairman, Gustavo Leal, vice chair, Mike Thibault, Secretary
 Revision Due Date:
 PAR Approval Date:
 PAR Expiration Date: 12/31/2022

This WG reports to both the distribution and STNP subcommittees

Document #: _____ PC57.167

Document Title: WG Guide for Monitoring Distribution Transformers

Chair: _____ Gary Hoffman **Vice-Chair** _____ Mike Thibault

Secretary _____ Gustavo Leal **Per Cent Complete** _____ 0

Current Draft Being Worked On: _____ NA (Working Group) **Dated:** _____ 26 March 2019

Meeting Date: 26 March 2019 Time: 4:45 till
5:50PM

Attendance:	Members	<u>34</u>
	Guests	<u>23</u>
	Total*	<u>57</u>

* For details of attendance, please refer to AMS system of the Transformers Committee

Annex N Working Group Report Draft Meeting Minutes / Significant Issues / Comments:

1. Call to order and Chair's remarks – Called to Order at 4:45PM by Gary Hoffman
 2. Quorum Verification – Took count with 34 members and had a Quorum. The Rosters was circulated.
 3. Approval of agenda for this meeting. No Objections. Motion by Marcus Ferreira, and Second by Stephen Shull– Unanimously Approved
 4. Approval of F18 PC57.167- Guide for Monitoring Distribution Transformer minutes Fall 2018. No Objections. Motion by Babanna Suresh, and Second by Marcus Ferreira – Unanimously Approved.
 5. Call for Patents was disclosed.
 6. Task Force Reports was presented as follows:
 - 6.1 Justification for Monitoring – Presented - Daniel Mulkey Comments:
 - a) Look at Hazard levels more closely
 - b) How does TIC A, TIC B apply better. Risk levels might need to be expanded better.
 - c) Gary to send the IEEE template.
 - d) Additional Risk Factors to consider Environmental Hazards like draught, fire, water shed, oil spills.
 - 6.2 Key monitoring parameters and their tolerance- Jerry Murphy Comments:
 - a) Should Sudden Pressure, PF, Phase Angle, PD be included
 - b) Why consider online monitoring? Why not off –line monitoring like DGA testing once a year with a portable DGA.
 - c) Discuss the need to include Tolerances.
 - 6.3 Methods of Alert – Gary Hoffman for Mike Thibault
- Comments: No Major comments.
7. Recap on user and producer presentations- No comments.
 8. New Business
 - 8.1 F18 Table Clause TF Comments:
 - a) Gary Hoffman made a clarification on the minutes of the meeting. The section 8.1.1 Telemetry would not be part of the Table Clause TF. Gary Hoffman to revise the minutes of the meeting.
 - b) Agreed to postpone the discussion of section 8.1.3 Installation for the Fall 2019 meeting.
 - c) Discuss adding Voltage Regulators. Agreed to postpone this item for discussion in the Fall 2019 meeting.
 - 8.2 Global outreach proposal was discussed by Gary Hoffman.
 9. Next meeting is in Columbus Ohio
 10. Adjournment

Questions/Comments:

There was a discussion about a conference call presentation that was done but not everyone was able to participate. There was interest in having time set aside at this meeting for the presentation but Gary didn't want to take away from WG activities. There was a suggestion to either arrange for a Thursday tutorial at a future meeting or arrange for a Thurs/Friday time slot.

N.1 Old Business

Nothing needed to be revisited

N.2 New Business

The chair mentioned that Don Platts raised an issue during the AdCom session about the use of "Liquid Immersed Transformers". It technically is not an accurate description and he used a photograph of a transformer that was dropped into a river to show what a "Liquid Immersed Transformer" looks like. This issue will be raised to the Standards Committee.

A motion was made by Brian Klaponski based on discussions coming out of the PC57.12.24 and PC57.12.40 meetings. The motion requested that a TF to be approved by this SC to continue the ongoing activities on corrosion during the Tuesday meeting schedule. The motion was presented on the overhead for the group to consider:

"I motion that this Subcommittee establish a new Task Force regarding corrosion prevention (including cathodic protection) associated with Network transformers, Submersible Transformers, and Network Protectors. The objective is to create a Guide or a Standard or an Annex on corrosion prevention for the equipment in our SC standards. Part of my motion is to allow this new TF to recommend whether the publication resulting from their work should be a Guide, Annex, or a Standard. Also as part of my motion is that in creating this TF we recognize that this TF is not a short term TF so the TF will exist for several years. To facilitate this work, this SC will request an ongoing slot for this TF to meet on Tuesday afternoons during our semiannual meetings starting in the Fall of 2019."

During the discussions Fred Friend from AEP offered to look into having his company make/sponsor a presentation during the Fall 2019 meeting in Columbus. Brian also noted that input from the other working groups, 12.24, 12.40, and 12.44 on the exact title for the new task force would be welcomed.

The motion was seconded by David Blew and was passed without opposition.

It was already determined that Will Elliott would Chair and Justin Minikel volunteered as Secretary. Additional volunteers were Jennifer Corvigno, Brad Kittrell and Jason Atard.

The meeting was adjourned at 11:37. Tom Dauzat made the motion and Jim Dorsten seconded. The next meeting will take place on October 30, 2019 in Columbus, Ohio.

Respectfully submitted,

George Payerle
Chairman - Subsurface Transformers & Network Protectors Subcommittee
03/28/2019