**Standards Subcommittee**

April 28, 2021 Virtual meeting

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| **Standards Subcommittee** |
| **Chair: Daniel Sauer** | **Vice-Chair: Marcos Ferreira** | **Secretary: Ajith Varghese** |
| **Standards Coordinator: Steve Shull** |
| Room: Virtual  | Date: April 28th, 2021 | Time: 3:45 PM to 04:45 pm |
| Members: 67 | Present at time of quorum check: 36 | Attended per WebEx Record: 39 |
| Guests present: 109 | Membership requested: 28 | Membership accepted: 20 |

# L.1 Meeting Attendance

The Standards Subcommittee met on Wednesday; April 28th, 2021 and started at 3:45 PM (CST). **36 of 67** members were in attendance at the beginning of the meeting which met the quorum requirement.

Overall, the attendance roll showed according to WebEx pool: there were **148** attendees, **39** members and **109** guests (**28** guest requested membership and **20** met attendance requirement and will be granted membership).

# L.2 Chair’s Remarks

The Chair welcomed members and guests to the virtual meeting. The Chair thanked Jerry Murphy for the service provided in past as chair and congratulated Steve Shull in moving into new role of standards coordinator. With this change, Marcos moved to position of vice chair and Ajith Varghese, will be the new secretary.

Chair briefly highlighted the requirement that while introducing one need to state their affiliation. Chair noted the meeting is recorded for the purpose of minutes and will be deleted after that.

The Agenda for the Spring 2021 meeting was moved by Jerry Murphy and seconded by Steve Snyder. The motion was carried with unanimous consent. The Minutes for fall 2020 was moved by Kris Zibert and seconded by Kris Neild. The motion was carried with unanimous consent.

Chair presented the IEEE requirement for patent and copyrights. The Chair reminded WGs that call of the patent is required a during every WG meetings including on-line/Teleconference meeting. If there are any patent claim, it shall be noted but not discussed at the working group meetings

The Chair reminded the WG and TF leaders to submit their minutes from the meetings within **15 days** to the SC secretary. The SC Secretary then must submit the SC minutes within 45 days of the SC meeting.

# L.3 Working Group and Task Force Reports

## L.3.1 Standards Working Group on the Continuous Revision of C57.12.00

Standards Subcommittee

IEEE/PES Transformers Committee

WG Chair: Steven L. Snyder

April 28, 2021

The purpose of this WG is to compile all the work being done in various TF/WG/SC’s for inclusion in the continuous revision of C57.12.00 in a consistent manner. This WG coordinates efforts with the companion Standard C57.12.90 so that they publish together.

Standard C57.12.00 was last published in 2015. A revision ballot was initiated in March 2021 with the following key points from the ballot :

 Ballot Opened 3 -19- 2021

 Ballot Closed 4 -19- 2021

Number in the Ballot Pool 231

Affirmative Votes 156

Negative Votes with Comment 13

Negative Votes without Comment 2

Abstentions 5

Total Votes Received 176

Total Comments 176

Return Rate 76%

Affirmative Rate 92%

I have begun going through the comments and addressing the editorial issues, and have forwarded some material to PCS Audible Sound WG for their inputs. Most of the technical issues have yet to be sorted before the Ballot Resolution Committee can begin addressing them. I hope to have this sorted and that work to begin within 2 weeks.

Respectfully submitted,

Steven L. Snyder, WG Chair

April 28, 2021

## L.3.2 WG Standard Terminal Markings and Connections for Transformers C57.12.70

WG on C57.12.70 did not meet during Spring 21 TF Meeting.

## L.3.3 WG Standard Transformer Terminology for Transformers C57.12.80

|  |  |
| --- | --- |
| Document #: | C57.12.80 |

|  |  |
| --- | --- |
| Document Title: | Standard Terminology for Distribution and Power Transformers |

|  |  |  |  |
| --- | --- | --- | --- |
| Chair: | James Graham | Vice-Chair | Open |
| Secretary | Richard vonGemmigem |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Current Draft Being Worked On: | 1.0 | Dated: | NA |

|  |  |  |  |
| --- | --- | --- | --- |
| Meeting Date: | 2021-04-26 | Time: | 9:10 AM |

|  |  |  |
| --- | --- | --- |
| Attendance: | Members | 13 |
| Guests: | 12 |
| Total | 25 |

**Meeting Minutes / Significant Issues / Comments:**

The Chair opened the meeting at 9:10 a.m. (Central) on Monday 26 April, 2021.

1. Quorum Check

Quorum was achieved with 13 of 15 members present. 12 non-voting participants also attended. Six new members have been added since the last meeting.

1. Approval of the Agenda

The agenda was approved as presented with no objections.

1. Approval of the Fall 2020 minutes

A reference to one member in the minutes was corrected. The revised Fall 2020 meeting minutes were approved unanimously.

1. Call for Essential Patents

A call for essential patents was made. No essential patent issues were reported.

1. Copyright policy

The IEEE copyright policy was briefly reviewed.

1. Unfinished Business
	1. Core Form and Shell form definitions

The chair of the task force assigned to develop revised definitions for core form and shell form transformers gave a status report. Consensus was not reached on revised definitions and further work is needed. Points of contention include a performance-based vs. construction-based basis for the definitions, and whether the definitions should cover both power and distribution transformers.

* 1. GSU transformer definition

This was not discussed and is a closed item.

7) New Business

1. Dry type definitions review

Proposed definition additions from the dry type transformer standards were submitted by Tim-Felix Mai and reviewed. A motion to accept the proposed dry type definitions to the draft standard was made by Jerry Murphy and seconded by Tim-Felix Mai. The motion passed unanimously.

1. Transformer Class Designations

A request was received to consider creating definitions of Class 1 transformers to clarify the difference between distribution transformers and Class 1 (small power) transformers. The concern is the overlap of transformers defined by C57.12.34 and C57.12.36 may expose distribution substation type transformers to DOE efficiency regulations. This was discussed but no action was taken. This could affect several transformer standards, and may need to be considered at the subcommittee or main committee level.

1. Class 2 transformer definition

The existing definition of a Class 2 transformer was discussed. This definition applies to low energy components included in power supplies and is referenced by the National Electrical Code (NEC). It was determined this definition is out of scope and could be confused with the definition of a Class II transformer as defined in C57.12.00. A motion to delete definition 3.49 for Class 2 transformers was made by Jerry Murphy and seconded by Dan Sauer. The motion passed with 12 for, 1 against, and no abstentions.

1. Standards Review – Volunteers

Volunteers to review standards from the Bushings, Dielectric Test, Distribution, and Performance Characteristics Subcommittees.

1. The meeting was adjourned at 10:35 a.m. (Central)

Next meeting –June 2021 via Webex

Submitted by: Jim Graham, Chair

Date: 04/26/2021

**WG C57.12.80 Meeting Attendance List**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role** | **Last Name** | **First Name** | **Company** | **4/26/2021** |
| Chair | Graham | James | Weidmann Electrical Technology | X |
| Member | Betancourt | Enrique | Prolec GE | X |
| Member | Heiden | Kyle | EATON Corporation | X |
| Member | Hoffman | Gary | Advanced Power Technologies | X |
| Member | Li | Weijun | Braintree Electric Light Dept. | X |
| Member | Mai | Tim-Felix | Siemens Energy | X |
| Member | Matthews | Lee | Howard Industries | X |
| Member | Murphy | Jerry | Reedy Creek Energy Services | X |
| Member | Musgrove | Ryan | Oklahoma Gas & Electric | X |
| Member | Nambi | Shankar | Bechtel | X |
| Member | Sauer | Daniel | EATON Corporation | X |
| Member | Wright | Jeffrey | Duquesne Light Co. | X |
| Member | Zibert | Kris | Allgeier, Martin and Associates | X |
|  |  |  | **Members attending** | 13 |
|  |  |  |  |  |
| **Role** | **Last Name** | **First Name** | **Company** | **4/26/2021** |
|  |  |  |  |  |
| Guest | Bernesjo | Mats | Hitachi ABB Power Grids | X |
| Guest | Clift | Bobby | Xcel Energy | X |
| Guest | Cruz Valdes | Juan Carlos | Prolec GE | X |
| Guest | Ferreira | Marcos | Beale AFB | X |
| Guest | Gonzalez | Luis | Canduct Industries Limited | X |
| Guest | Herron | John | Raytech USA | X |
| Guest | Issack | Ramadan | American Electric Power | X |
| Guest | McNelly | Susan | Xcel Energy | X |
| Guest | Shingari | Avijit | Pepco Holdings Inc. | X |
| Guest | Shukla | Kunal | PECO Energy Company | X |
| Guest | Webb | Matthew | SPX Transformer Solutions, Inc. | X |
| Guest | Zaman | Malia | IEEE | X |
|  |  |  | Nonvoting attendees | 12 |

## L.3.4 WG Standards Transformer on Continuous Revision for C57.12.90

Standards Working Group on the Continuous Revision of C57.12.90

Standards Subcommittee

IEEE/PES Transformers Committee

WG Chair: Stephen Antosz

Spring 2021, April 28, 2021

***Introduction***

This is a working group by committee of task forces, for continuous revision of C57.12.90. The purpose of the WG is to keep track of the work being done in various TF/WG/SC’s for inclusion in the continuous revision of C57.12.90 in a consistent manner.

Currently there are five Task Forces in three different Subcommittees, as follows:

1. PCS – Cont Rev to Test Code C57.12.90 Clauses 5-9, & 12, TF Chair: Hakan Sahin
2. PCS – Audible Sound Revision Clause 13, TF Chair: Ramsis Girgis
3. Dielectric Test – Cont Rev to Impulse Tests in Clause 10, TF Chair: Pierre Riffon
4. Dielectric Test – Cont Rev to LowFrequency Tests Clause 10, TF Chair: Bill Griesacker
5. Insulation Life – Cont Rev to Temperature Test Clause 11, TF Chair: Dinesh Sankarakurup

***Summary***

The revised document was published in March 2016 as IEEE Std C57.12.90-2015. Shortly after the document was published, one error and one omission were discovered, so a Corrigendum was done and published on March 23, 2017. Revision work ensued.

***Status*** as of April 20, 2021

Mandatory Editorial Coordination (MEC) began in Jan 2021 and completed Feb 2021.

The ballot group formation was launched on Jan 25, 2021. It closed on Feb 24, 2021. It was extended for 10 days on Mar 1, 2021 to allow some stragglers to sign up.

The ballot was launched on March 18, 2021, for 30 days. The ballot group consisted of 219 volunteers. It closed on April 18, 2021 but did not receive the required 75% Response Rate. We were short by 4 votes, so it was extended for 5 days, and a message sent out seeking more votes. Within one day, the 4 votes were submitted and the ballot automatically closed successfully on April 19, 2021.

Return rate 75% (166 of 219)

Abstentions 2% (4 of 219)

Approvals 94% Approval rate must be at least 75%

 153 Approved without comment

 9 Disapproved with comments

 4 Abstained

 166 Total votes

There were 101 comments. The Ballot Resolution Committee has already begun working to address the comments. An update will be provided as soon as available.

***Pending Work***

As agreed at the Fall 2016 Standards Subcommittee meeting, any new material provided by the various Task Forces to this WG Chair for inclusion in the next revision, will first be approved by the responsible technical subcommittee (Diel Test, PCS, Dist, IL, etc) and then presented to the Standards Subcommittee for the “official” vote of approval.

Since this is a continuous revision document, there continues to be ongoing work in the various Task Forces.

1. Possible future revisions from Hakan Sahin’s PCS TF for Revision of C57.12.90.
2. to add a new clause 4.5 in General Section that a transformer be tested with the same insulation liquid that it will use in service.
3. Load Tap Changer performance 8.7 voltage test and 9.6 current test.
4. OLTC continuity tests.
5. Discussed at Fall 2019 and Fall 2020 meetings.
	1. Number of short-circuit tests under subclause 12.3.4.
	2. Ratio test voltage and frequency under subclause 7.1.2. Request to change frequency bandwith.
	3. Request to revise the Ratio test methods under subclause 7.3, since these are not used any more. Mostly, ratio meters are used. .
6. Possible changes to Clause 13 sound test from Ramsis’ TF
7. Nothing new from Pierre Riffon’s TF regarding impulse tests
8. Other possible revisions to subclauses 10.5 to 10.10 from Bill Griesacker’s TF for revision of low frequency tests. Ongoing work continues.
	* Class I transformer PD test revision to the test procedure
	* Clarification of measuring voltage during low frequency tests
	* Venting bushings during PD test,
9. Revise to subclause 11.1 from Dinesh Sankarakurup TF under Insulation Life SC
	* 11.1.2.2.c and 11.3.2. Defining the top oil rise as the last reading at the end of the stabilization period of the total loss run, not an average.
	* Possible revision to 11.4.1 and 11.4.2, regarding K and L type insulating fluids for temperature rise test corrections.

Respectfully submitted,

Stephen Antosz, WG Chair

May 10, 2021

## L.3.5 WG Standards Transformer on Revision for C57.152, Guide of Field Tests

*Standards Subcommittee,
WG – C57.152 Revision
IEEE / PES Transformers Committee*

*April 26, 2021, 12:55PM – 2:10PM, CT
Virtual meeting*

***UNAPPROVED MINUTES***

**Welcome**

The chair, Marcos Ferreira, opened the meeting at 1:00PM.

1. **Attendance and Attendance for Quorum**

At the time of the meeting there are 57 Members, including Chair, Vice Chair and Secretary. The poll registered 79 participants, where 34 Members,14 Guests requesting membership and 27 Guests. No answer from 4.

34 members present of 57 mean requirements for quorum was fulfilled. The list of attendees is shown below:

|  |  |  |
| --- | --- | --- |
| Name | Affiliation | Status |
| Ferreira, Marcos | Beale AFB | Chair |
| Werelius, Peter | Megger | Secretary |
| Binder, Wallace | WBBinder Consultant | Member |
| Denzer, Stephanie | Alliant Energy | Member |
| Dorris, Don | Nashville Electric Service | Member |
| Dutta Roy, Samragni | Siemens Energy | Member |
| Foata, Marc | Maschinenfabrik Reinhausen | Member |
| Griesacker, Bill | Duquesne Light Co. | Member |
| Gustavsson, Niklas | Hitachi ABB Power Grids | Member |
| Hayes, Roger | General Electric | Member |
| Heiden, Kyle | EATON Corporation | Member |
| Herron, John | Raytech USA | Member |
| Lejay, Olivier | Huaming USA Corp. | Member |
| Locarno, Mario | Doble Engineering Co. | Member |
| McFadden, Matthew | Oncor Electric Delivery | Member |
| McNelly, Susan | Xcel Energy | Member |
| Milojevic, Goran | DV Power | Member |
| Murray, David | Tennessee Valley Authority | Member |
| Musgrove, Ryan | Oklahoma Gas & Electric | Member |
| Naderian, Ali | Metsco | Member |
| Patel, Poorvi | Electric Power Research Institute (EPRI) | Member |
| Plath, Cornelius | OMICRON Energy Solutions GmbH | Member |
| Raymond, Timothy | Electric Power Research Institute (EPRI) | Member |
| Reed, Scott | MVA | Member |
| Robalino, Diego | Megger | Member |
| Saad, Mickel | Hitachi ABB Power Grids | Member |
| Servaraj, Pugal | Virginia Transformer Corp. | Member |
| Shertukde, Hemchandra | University of Hartford | Member |
| Sweetser, Charles | OMICRON Electronics Corp USA | Member |
| Szczechowski, Janusz | Maschinenfabrik Reinhausen | Member |
| Tanaka, Troy | Burns & McDonnell | Member |
| teNyenhuis, Ed | Hitachi ABB Power Grids | Member |
| Verdolin, Rogerio | Verdolin Solutions Inc. | Member |
| Walia, Sukhdev | New Energy Power Co. | Member |
| Welton, Drew | Intellirent | Member |
| Amarasinghe, Dinu | Bruce Power | Guest |
| Ayers, Donald | Ayers Transformer Consulting | Guest |
| Benach, Jeff | Consultant | Guest |
| Benedict, Ramon | SPX Transformer Solutions, Inc. | Guest |
| Bishop, Ryan | Minnesota Power | Guest |
| Boettger, William | Boettger Transformer Consulting LLC | Guest |
| Bolar, Sanket | Megger | Guest |
| Boman, Paul | Hartford Steam Boiler | Guest |
| Buchgeher, Erich | Siemens Energy | Guest |
| Cheim, Luis | Hitachi ABB Power Grids | Guest |
| Davis, Eric | Burns & McDonnell | Guest |
| Doak, Eric | D4EnergySolutions LLC | Guest |
| Emakov, Evgenii | Hitachi ABB Power Grids | Guest |
| Fausch, Reto | RF Solutions | Guest |
| Garcia Wild, Eduardo | Siemens Energy | Guest |
| Gray, Taylor | Portland General Electric (PGE) | Guest |
| Guner, Ismail | Hydro-Quebec | Guest |
| Harley, John | FirstPower Group LLC | Guest |
| Hollrah, Derek | Burns & McDonnell | Guest |
| Kessler, Stacey | Basin Electric Power Cooperative | Guest |
| Klempner, Dmitriy | Southern California Edison | Guest |
| Knapek, William | OMICRON Electronics Corp USA | Guest |
| Lamontagne, Donald | Arizona Public Service Co. | Guest |
| Mangubat, Darrell | Siemens Power Operations Inc. | Guest |
| Mani, Kumar | Duke Energy | Guest |
| Mayer, Robert | Siemens Energy | Guest |
| McBride, James | JMX Services, Inc. | Guest |
| Melle, Thomas | HIGHVOLT | Guest |
| Millard, Zachary | Great River Energy | Guest |
| Nabi-Bidhendi, Hossein | ABB Inc. | Guest |
| Nesvold, Brady | Xcel Energy | Guest |
| Panesar, Parminder | Virginia Transformer Corp. | Guest |
| Patel, Vinay | Consolidated Edison Co. of NY | Guest |
| Reeder, Perry | SPX Transformer Solutions, Inc. | Guest |
| Reimer, Jonathan | FortisBC | Guest |
| Rock, Partick | American Transmission Co. | Guest |
| Rodriguez, Leopoldo | Transformer Testing Services LLC | Guest |
| Roizman, Oleg | IntelliPower Pty Ltd | Guest |
| Sarkar, Amitabh | Virginia Transformer Corp. | Guest |
| Sinclair, Jonathan | PPL Electric Utilities | Guest |
| Snyder, Steven | Hitachi ABB Power Grids | Guest |
| Stacy, Fabian | Hitachi ABB Power Grids | Guest |
| Steeves, Gregory | Baron USA, LLC | Guest |
| Thompson, James | T&R Service Company | Guest |
| Trifunoski, Risto | Trench Limited | Guest |
| Walder, Nicholas | EATON Corporation | Guest |
| Zanwar, Anand | Siemens Energy | Guest |

1. **Approval of Agenda**

After a motion by Wallace Binder, and seconded by Rogerio Verdolin, the group unanimously approved the Agenda.

1. **Approval of Minutes of Meeting from Fall 2020**

After a motion by Shertukde Hemchandra, and seconded by Wallace Binder, the group unanimously approved Meeting from Fall 2020.

1. **Call for Patents**

The chair presented slide 1-4, dated January 2, 2018 informing the IEEE patent policy and participants duty to inform. There were no issues related to patent assurance brought up by attendees in the meeting.

1. **IEEE Copyright Policy**

The chair presented IEEE-SA Copyright Policy slides 1-2 informing the audience of the policy.

1. **Chair’s Remarks**

“Welcome to the STD. WG C57.152 to work on revision. This is second meeting virtually and we are going to try to provide the latest on working progress of each task force**.”**

“Raka Levi will be announcing his decision to step down as vice chair of this WG. This meeting will be his last one. As a chair I would like to take this opportunity to thank Raka, as my good friend, and I have the privilege to work with him for the last 23 years. Raka is one of most knowledgeable and kind that I have known. Let us give a hand to Raka for all his contribution to this WG as well as IEEE as whole**.** Thank you Raka”.

“We would like to introduce our new Secretary Goran Milojevic. Peter Werelius will take over the role as Vice Chair.”

1. **Task Forces Working Progress Report**

**TF-1: Section 7.2 – Main Tank Volunteers**

Charles Sweetser (team leader)

Charles referred to the decision on F20 meeting.

The text from the F20 MoM:

“**Motion** by Chuck Sweetser “Send the list of comments to the WG (Guests and Members) for Members to Vote if the group should proceed with draft changes. Wallace Binder seconded the motion. The members unanimously approved the motion.”

The WG officers will re-send the list of comments to the WG (Guests and Members) for Members to Vote if the group should proceed with draft changes. Response time 30 days.

**TF2: Section 7.3 – Bushings Volunteers**

Mario Locarno (team leader)

Mario briefly described the work on the section. It is time to send out the draft to the WG for comments.

The WG officers will re-send or post the TF2 draft WG (Guests and Members) to get comments and suggestion to improve the section. Response time 30 days.

**TF3: Section 7.4 – Tap Changers Volunteers**

Marcos Ferreira (team leader)

Marcos briefly described the work on the section. It is time to send out the draft to the WG for comments.

The WG officers will re-send or post the TF3 draft documents WG (Guests and Members) to get comments and suggestion to improve the section. Response time 30 days.

**TF4: New Annexes: Dynamic Resistance and Vibroacoustic Measurements**

Goran Milojevic

Goran briefly described the work on the two Annexes. The Annexes were sent out and posted prior the meeting. The WG officers will re-send or post the two Annexes to the WG to get comments and suggestion to improve the section. Response time 30 days.

1. **New Businesses (Secretary did recorded any decisions)**

New team leaders and task force volunteers are needed for the following sections:

- Section 3 - Definitions

- Section 5 - Maintenance test and information (table 5.1 excluded)

- Section 5 - Maintenance test and information (table 5.1)

- Section 6 - Safety

- Section 7 - Test and Test Techniques

- Section 7.1 - Periodic General Inspections

- Section 7.5 - Auxiliary Equipment

- Section 8 - Diagnostic Chart (Table 20)

- Annexes C and G

Diego Robalino volunteered lead Annex G, DFR Annex. Cornelius, Evgenii, Maria and Poorvi volunteered contribute the DFR section at the meeting. The Secretary has an earlier record Ronald Hernandez has also volunteered to the DFR section.

Also, it was presented as new business to create new annex (L) for, “Diagnostic Test Procedure for LTC Reactors and Series Transformer Devices”.

The Chair asked WG members volunteers are interested in working on any above sections and annexes:

Chair: Marcos Ferreira: mdferreira@comcast.net

Vice-Chair: Peter Werelius: peter.werelius@megger.com

Secretary: Goran Milojevic: goran@dv-power.com

1. **Meeting Adjournment**

A motion to adjourn the meeting was raised by Diego Robalino and seconded by Poorvi Patel. The meeting adjourned at 2:05PM

Respectfully submitted,

Marcos Ferreira – Chair Peter Werelius – Secretary

## L.3.6 WG PC57.163 IEEE Guide for Establishing Power Transformer Capability while under Geomagnetic Disturbances

*PC57.163 - WG for the Revision of IEEE Guide for Establishing Power Transformer Capability while under Geomagnetic Disturbances*

10:50 AM to 12:05 PM Central, April 27, 2021 (Virtual Session)

***Unapproved Meeting Minutes***

The WG Chair Dan Blaydon presided over this virtual WG meeting with both the Vice-Chair, Ramsis Girgis, and Secretary, Scott Digby, in attendance. This was the second meeting of this new Working Group. Attendance numbers are as follows:

|  |  |
| --- | --- |
| Total Attendance | 99 |
| Members in Attendance | 47 (out of 62 members, **quorum was achieved**) |
| Guests in Attendance | 52 |
| Guests Requesting Membership | 4 (3 meeting membership eligibility requirement of attendance at 2 of last 3 meetings) |

Guests Requesting Membership (attendance at 2 out of 3 meetings required to qualify for membership):

|  |  |
| --- | --- |
|  | Membership Granted?(effective after this meeting) |
| Evgenii Ermakov | Yes |
| Raymond (Curtiss) Frazier | Yes |
| Balakrishnan Mani | Yes |
| Emilio Morales-Cruz | No |

Participants were advised that membership requests could also be made via email requests from attendees to the WG Chair and/or Secretary.

The requisite patent and IEEE-SA copyright policy slides were reviewed. The agenda and the minutes to the Fall-2020 meeting were approved via unanimous consent. The project milestones were reviewed, with key dates being the PAR expiration date of December-2024 and the published document’s expiration date of December-2025.

The Chair noted that several documents were posted under the WG section of the Standards SC website. This included the published version of the document (accessed via special password) as well as a proposed reorganization of the document that had recently been circulated to the WG for review.

The Chair provided a review of the proposed reorganization of the document, with key points being to expand the content of the background section, including bringing the content related to the GIC signature/profile and definition of effective GIC as sub-sections of the background section to have it more in the forefront of the document, and then having two completely separate sections focusing on the Magnetic response and then the Thermal response rather than their content being included amongst various other sections. The Chair asked if there was any discussion concerning the proposed reorganization but there was none noted.

The WG Vice-Chair then presented an overview of proposed modifications and updates, noting that the industry has made advancements and has learned much since the initial publication of the document since quite a significant number of transformer studies have now been performed, and there is a need to incorporate this new information into the Guide. This material had been circulated to the WG prior to this meeting. Some highlights from the Vice Chair’s discussion include:

* that modelling techniques are much improved from when the original document was written such that many of the figures in the current guide show effects to be more than actual occurs, reflecting the more conservative approach used in the development of the original content due to the tight time constraint existing at the time (specific content discussed as included Figure 5, Figure 6, Table 1, Figure 19, Figure 21, Figure 22, and Figure 23).
* that shell form transformer behavior has been further studied and calculations improved, including tank temperature heating at different DC current levels
* that the GIC signature in the current guide should be replaced with the NERC TPL-007 GIC signature (then what to do with the GIC signature in the current IEEE Guide, such as moving to an Annex, will need to be determined)
	+ An attendee noted that users need the complete data file rather than just a graph, to which the VChair noted that such data file had been provided to utilities by their RTO.
* adding a real example of a utility’s fleet GIC susceptibility assessment using the indexing/categorizing method of section 8 of the published Guide might be beneficial to users
* input from manufacturers is requested.

There was a discussion concerning the type of information related to the modeling techniques themselves that should be included in the Guide. It was noted that specific modeling techniques that companies develop tend to be proprietary in nature, cannot be overgeneralized, and wouldn’t be able to be included in a Guide, but that some high-level modelling methodology might be considered for inclusion. This might include discussion of some of the more impacting or significant parameters and their influence.

The current, published version of the Guide had been circulated to the WG prior to this WG meeting to begin collecting suggestions for needed revisions and additional content to the Guide. The collection of the revisions proposed by the Vice-Chair were also circulated to the WG to begin soliciting thoughts and comments. The WG officers have responded to reviewer comments received thus far, and the comments and responses have begun to be consolidated into spreadsheets for tracking. These will be posted to the WG’s area of the SC website.

The VChair responded to a question by a WG Member that the impact of GIC on oil temperature during a GMD event is negligible since the GIC signature is characterized by short duration pulses.

The Chair made a call for participants to provide and contribute relevant data to further assist in development of the new and/or revised content.

The Chair also made a call for participants to volunteer to assist in the work on expanding the Background section content if interested in contributing.

Under New Business, a WG Member noted the need to discuss Equation 1, to which the Chair requested an associated comment be submitted by email as a follow up item for review and discussion.

The next planned meeting of the WG will be during the Fall Transformers Committee meetings, scheduled to be held in Milwaukee, however, the Chair noted that intermediate, virtual meetings could potentially be scheduled but that proper notification of such would be transmitted.

The meeting adjourned at its scheduled ending time of 12:05 pm central time.

Respectfully Submitted,

Scott Digby, WG Secretary

|  |  |  |  |
| --- | --- | --- | --- |
| Role | First Name | Last Name | Affiliation |
| Chair | Daniel | Blaydon | Baltimore Gas & Electric |
| Vice-Chair | Ramsis | Girgis | Hitachi ABB Power Grids |
| Secretary | Scott | Digby | Duke Energy |
| Member | Hugo | Avila | Hitachi ABB Power Grids |
| Member | Suresh | Babanna | SPX Transformer Solutions, Inc. |
| Member | Jeff | Benach | Consultant |
| Member | Mats | Bernesjo | Hitachi ABB Power Grids |
| Member | Enrique | Betancourt | Prolec GE |
| Member | William | Boettger | Boettger Transformer Consulting LLC |
| Member | Eric | Doak | D4EnergySolutions LLC |
| Member | Hakim | Dulac | Qualitrol Company LLC |
| Member | Anthony | Franchitti | PECO Energy Company |
| Member | Ismail | Guner | Hydro-Quebec |
| Member | Gary | Hoffman | Advanced Power Technologies |
| Member | Saramma | Hoffman | PPL Electric Utilities |
| Member | Akash | Joshi | Black & Veatch |
| Member | Kurt | Kaineder | Siemens Energy |
| Member | Stacey | Kessler | Basin Electric Power Cooperative |
| Member | Zan | Kiparizoski | Howard Industries |
| Member | Moonhee | Lee | Hammond Power Solutions |
| Member | Xose | Lopez-Fernandez | Universidade de Vigo |
| Member | Kumar | Mani | Duke Energy |
| Member | Vinay | Mehrotra | SPX Transformer Solutions, Inc. |
| Member | Thomas | Melle | HIGHVOLT |
| Member | Martin | Munoz Molina | Orto de Mexico |
| Member | Ali | Naderian | Metsco |
| Member | Anastasia | O'Malley | Consolidated Edison Co. of NY |
| Member | Nitesh | Patel | Hyundai Power Transformers USA |
| Member | Patrick | Picher | Hydro-Quebec IREQ |
| Member | Ion | Radu | Hitachi ABB Power Grids |
| Member | Afshin | Rezaei-Zare | York University |
| Member | Steven | Schappell | SPX Transformer Solutions, Inc. |
| Member | Markus | Schiessl | SGB |
| Member | Eric | Schleismann | Southern Company Services |
| Member | Cihangir | Sen | Duke Energy |
| Member | Hemchandra | Shertukde | University of Hartford |
| Member | Marc | Taylor | Cogent Power Inc. |
| Member | Mark | Tostrud | Dynamic Ratings, Inc. |
| Member | Jason | Varnell | Doble Engineering Co. |
| Member | Kiran | Vedante | Ritz Instrument Transformers |
| Member | Jos | Veens | SMIT Transformatoren B.V. |
| Member | Rogerio | Verdolin | Verdolin Solutions Inc. |
| Member | David | Wallach | Duke Energy |
| Member | Joe | Watson | JD Watson and Associates Inc. |
| Member | William | Whitehead | Siemens Energy |
| Member | Trenton | Williams | Advanced Power Technologies |
| Member | Waldemar | Ziomek | PTI Transformers |
| Guest | Kayland | Adams | SPX Transformer Solutions, Inc. |
| Guest | Edmundo | Arevalo | Bonneville Power Administration |
| Guest | Gilles | Bargone | FISO Technologies Inc. |
| Guest | Olle | Benzler | Megger |
| Guest | Thomas | Blackburn | Gene Blackburn Engineering |
| Guest | Jeremiah | Bradshaw | Bureau of Reclamation |
| Guest | John | Crouse | Roswell Alliance |
| Guest | Marco | Espindola | Hitachi ABB Power Grids |
| Guest | Evgenii | Ermakov | Hitachi ABB Power Grids |
| Guest | Roger | Fenton | Fenton Solutions |
| Guest | Raymond | Frazier | Ameren |
| Guest | Jeffrey | Gragert | Xcel Energy |
| Guest | Bill | Griesacker | Duquesne Light Co. |
| Guest | Thomas | Hartmann | Pepco Holdings Inc. |
| Guest | Roger | Hayes | General Electric |
| Guest | Derek | Hollrah | Burns & McDonnell |
| Guest | Philip | Hopkinson | HVOLT Inc. |
| Guest | Paul | Jarman | University of Manchester |
| Guest | Anton | Koshel | Delta Star Inc. |
| Guest | Axel | Kraemer | Maschinenfabrik Reinhausen |
| Guest | Donald | Lamontagne | Arizona Public Service Co. |
| Guest | Aleksandr | Levin | Weidmann Electrical Technology |
| Guest | Balakrishnan | Mani | Virginia Transformer Corp. |
| Guest | Rogelio | Martinez | Georgia Transformer |
| Guest | James | Mciver | Siemens Energy |
| Guest | Susan | McNelly | Xcel Energy |
| Guest | Zachary | Millard | Great River Energy |
| Guest | Paul | Morakinyo | PSEG |
| Guest | Emilio | Morales-Cruz | Qualitrol Company LLC |
| Guest | Anthony | Natale | HICO America |
| Guest | Frank | Neder | Trench Germany GmbH |
| Guest | Kristopher | Neild | Megger |
| Guest | Brady | Nesvold | Xcel Energy |
| Guest | Sanjay | Patel | Royal Smit Transformers |
| Guest | Brian | Penny | American Transmission Co. |
| Guest | Christoph | Ploetner | Hitachi ABB Power Grids |
| Guest | John | Reagan | Oncor Electric Delivery |
| Guest | Larry | Rebman | EMLS, Inc. |
| Guest | Perry | Reeder | SPX Transformer Solutions, Inc. |
| Guest | Mickel | Saad | Hitachi ABB Power Grids |
| Guest | David | Sheehan | HICO America |
| Guest | Adam | Smith | Commonwealth Associates, Inc. |
| Guest | Brad | Staley | Salt River Project |
| Guest | Kerwin | Stretch | Siemens Energy |
| Guest | Troy | Tanaka | Burns & McDonnell |
| Guest | Vijay | Tendulkar | Power Distribution, Inc. (PDI) |
| Guest | Kannan | Veeran | Georgia Transformer |
| Guest | Nicholas | Walder | EATON Corporation |
| Guest | Michael | Warntjes | American Transmission Co. |
| Guest | Alan | Washburn | Burns & McDonnell |
| Guest | Jeffrey | Wright | Duquesne Light Co. |
| Guest | Peter | Zhao | Hydro One |

## L.3.7 IEEE / IEC Continuous Cross Reference

TF did not meet during spring 2021 Transformer Committee.

# L.4 Old Business

There was no old business to discuss.

# L.5 New Business

There was no items to discuss per approved agenda, however there was a short discussion on need to clarify definition between Class I transformer and distribution transformer. There was questions on how were this should be addressed – Standard SC, WG C57.12.80, Distribution SC or Transformer committee itself. Josh Verdell, who is secretary to distribution SC informed that Distribution SC have decided to setup a Task Force to go into this. Based on this it was agreed that no further action is needed from Standard SC at this time and will wait for TF under distribution SC comes up with its report/recommendation.

# L.6 Adjournment

The meeting was adjourned by a motion made by Sanjib Som at 4:45 PM CST. The second was by Rogerio Verdolin, and was carried unanimously.

Respectfully submitted,

Ajith M. Varghese

Standards SC Secretary

**Standards SC S21 Attendances List**

