# Distribution Subcommittee – Chair: Ed Smith

**October 19, 2022**

**Charlotte, North Carolina**

**Chair: Ed Smith
Vice-Chair: Jerry Murphy**

**Secretary: Josh Verdell**

## General Opening

Ed opened the meeting welcoming everyone to the meeting. To establish a quorum, a list of members was displayed, and a quorum poll was made. We did have a quorum with 50 members in attendance by count of those identified on a slide presented in the meeting. Recorded attendance gave 124 in attendance and 60 members. List of attendees and affiliation attached below.

The agenda was reviewed, a motion was made to approve by Dan Sauer, seconded by Al Traut, and approved by unanimous acclamation of the members in attendance.

The Spring 2022 meeting minutes were reviewed, a motion was made to approve by Gale Kennedy, seconded by Dan Sauer, and approved by unanimous acclamation of the members in attendance.

At this time, Josh Verdell reviewed the membership changes. A slide was presented welcoming the new member of the subcommittee. Before proceeding with the working group and task force reports Ed Smith reminded the group about the working group chair training.

## Working Group and Task Force Reports

### C57.12.20 – Overhead Distribution Transformers – Al Traut

Al presented the following minutes from the working group meeting on October 17, 2022 at 11:00 a.m. with 72 in attendance. This working group voted to move Draft 9 of their document to ballot and this motion was brought to the Subcommittee. The motion received unanimous approval.

1. Call to order

The meeting was called to order by the Chair (Al Traut) at 11:00AM EDT on Monday, October 17, 2022.

1. Essential patent statement and copyright slides.

There was a call for essential patent claims by the Chair. There were none brought forward. The IEEE copyright slides were shown to the WG.

1. Attendance and Quorum

The list of current members list was displayed, and members were counted. **30** of **42** members were present. A Quorum was declared. 6 of the 42 guests in attendance requested membership. The total attendance is recorded below. Guests requesting membership are shown as Guest-R.



1. Approval of agenda for this meeting

The Chair sent out the agenda prior to the meeting for review. Agenda was approved without any opposition.

1. Approval of minutes of the previous meeting

The Chair sent out the minutes of the Spring 2022 Denver unapproved minutes prior to the meeting for review. Minutes were approved without any opposition.

1. Chair Report

The active PAR expires 12/31/2023. The present 2017 document expires 12/31/2027.

1. Old Business – Review of Draft 8.
2. Discussion – Clause 1.1 Scope.
	1. Proposal made to change 34 500V to 19 920/34 500Y V. Since this is the maximum high-voltage rating in the scope, the WG felt that 34 500V was more appropriate.
	2. Steve Shull motions to leave primary and secondary voltages as-is in the scope. Seconded by Josh Verdell. Motion passed unanimously.
3. Discussion - Clause 1.3 Word Usage
	1. This new clause was added to meet IEEE style guide requirements.
	2. The document was corrected for instances of “must” or “will” and changed to “shall” or “should” as appropriate (editorial).
4. Discussion – Section 5.1 Basic lightning impulse levels
	1. Proposal made to re-word the second sentence for clarity. WG agreed. Editorial change so no motion required.
5. Discussion - Section 6.2 Dielectric tests
	1. Editorial change from “will” to “shall”. No motion necessary
6. Discussion – Section 7.4.1 Insulating liquid
	1. Proposal made to change “mineral oil” to “insulating liquid”.
	2. Motion by Steve Shull to change “mineral oil” to “insulating liquid”. After discussion Steve withdraws his motion.
	3. WG felt that leaving “mineral oil” clearly establishes miner oil as the standard insulating liquid. The clause further allows users to specify other insulating liquids shown in C57.12.00.
	4. Josh Verdell motions to leave statement as-is. Steve Shull seconds. Motion passes unanimously.
7. Discussion – Section 7.5.7 Tank ground connector
	1. Proposal made to add “support short-circuit current” to the first sentence. *The tank grounding connector shall be a solderless connector that shall support short-circuit current and accommodate conductor size Number 8 AWG solid to Number 2 AWG stranded…*
	2. WG decided to leave as-is because we do not have any information supporting the short circuit capability of the tank ground connector.
8. Discussion – Figure 4
	1. Proposal to add a column for vector group i.e. “Dd0”, “Dy1”, etc.
	2. WG agreed. A. Traut will add to Figure 4 to draft 9.
9. Discussion – Annex B
	1. Table 2 - Footnote on voltage requirements will be changed to an informative note
10. New Business
	1. Gail Kennedy motions to send Draft 9 to ballot. Seconded by Steve Shull. Motion passes unanimously.
	2. Comment Resolution Group was formed. Al Traut (chair), Josh Verdell, Carlos Gaytan, Bruce Webb, and Steve Shull. The CRG will determine which comments need to be brought back to the WG for approval.
11. Next meeting--date and location

SPRING 2023 MEETING

MILWAUKEE, WISCONSIN, USA

MARCH 19 – 23, 2023

1. **Adjournment**

**The meeting was adjourned at 12:10 PM EDT.**

Submitted by: Kendrick Hamilton

Date: October 21, 2022

### C57.12.28, .29, .30, .31 & C57.12.32 – Enclosure Integrity – Dan Mulkey

Jeremy Van Horn, for Dan Mulkey, presented the following minutes from the working group meeting on October 18, 2022, at 8:00 a.m. in with 67 in attendance. The working group voted to take draft 5 of the C57.12.28 and C57.12.29 documents to ballot. This motion was brought to the subcommittee and was approved unanimously.

**List of Members:**

Martin Bachand (Cloverdale Paint Inc.)

David Blew (Retired (PSE&G))

Darren Brown (Howard Industries)

John Chisholm (IFD Technologies)

Rhett Chrysler (ERMCO)

Douglas Craig (Richards Manufacturing Co.)

Michael Dahlke (Central Moloney, Inc.)

Thomas Dauzat (General Electric)

Benjamin Garcia (Southern California Edison)

Carlos Gaytan (Prolec GE)

Ali Ghafourian (H-J Enterprises, Inc.)

Chris Guertin (Cloverdale Paint Inc.)

Jane Hall (Cloverdale Paint Inc.)

Ramadan Issack (American Electric Power)

Gary King (Howard Industries)

Brian Klaponski (Carte International Inc.)

Andrew Larison (Hitachi Energy)

Alejandro Macias (CenterPoint Energy)

Justin Minikel (EATON Corporation)

Michael Morgan (Duke Energy)

Jerry Murphy (Reedy Creek Energy Services)

Dwight Parkinson (EATON Corporation)

James Ratty (Electronic Technology Inc.)

Robert Reepe (Georgia Power Co.)

Jeffrey Schneider (Power Partners/Spire Power Solutions)

Pugal Selvaraj (Virginia Transformer Corp.)

Avijit Shingari (Pepco Holdings Inc.)

Stephen Shull (BBC Electrical Services, Inc.)

Audrey Siebert-Timmer (IFD Technologies)

Edward Smith (H-J Family of Companies)

Travis Spoone (EATON Corporation)

Michael Thibault (Pacific Gas & Electric)

Alan Traut (Howard Industries)

Reinaldo Valentin (Duke Energy)

Jeremy Van Horn (IFD Technologies)

John Vartanian (National Grid)

Joshua Verdell (ERMCO)

Alan Wilks (Consultant)

Michael Zarnowski (Carte International)

**List of Guests:**

Nabi Almeida (Prolec GE)

Glenn Andersen (Fayetteville PWC)

Gregory Ante (Southern California Edison)

Alex Ayala (Power Partners)

Thomas Callsen (Weldy-Lamont Associates)

Noah Chesser (Oncor Electric Delivery)

Eun Young Cho (HIW-America)

Craig Derouen (ERMCO)

Antonio Dibiase (Tempel Steel)

Jeffrey Door (H-J Family of Companies)

Mark Faulkner (EATON Corporation)

Luke Grandbois (IFD Technologies)

Zach Hall (Fayettteville PWC)

Garza Hector (Orto de Mexico)

Javier Hernandez (Orto de Mexico)

Gilbert Kozer (Northeast Transformer Services, LLC)

Patrick Kozer (Northeast Transformer Services, LLC)

Parry Lively (Tempel Steel)

Timothy Menter (Lincoln Electric System)

Kent Miller (T&R Electric Supply Co.)

Tim Morris (Walton EMC)

Daniel Posadas (Prolec CELECO)

Mason Rush (Central Moloney Inc)

Fernando Salinas (Power Partners)

Albert Sanchez (Knoxville Utilities Board)

Adrian Silgardo (IFD Technologies)

Bruce Webb (Knoxville Utilities Board)

Zachery Weiss (WEG Transformers USA Inc.)

Meeting Minutes:

1. Jeremy Van Horn called the meeting to order at 8:01 AM EST. Group introductions were made.
2. Opening remarks and announcements
	1. Dan Mulkey asked Jeremy Van Horn to run this meeting as he was unable to attend.
	2. AMS system has been discontinued. Paper rosters were circulated.
3. Jeremy Van Horn reviewed IEEE SA Copyright Policy and Essential Patent Claims. No issues were raised.
4. Membership changes were noted:
	1. Added: Pugal Selvaraj, Vinay Patel
	2. Changed to Guest: Thomas Callsen, Israel Barrientos
5. Quorum was verified. The working group consisted of 58 members, requiring 30 for quorum. 33 members were counted at the start of the meeting. Attendance records later confirmed 39 members attended.
6. Jeremy Van Horn requested approval of the Fall 2022 Agenda as amended to review Draft 4 of the standards rather than Draft 3. Jerry Murphy made a motion, second by Steve Shull. Agenda was unanimously approved.
7. Jeremy Van Horn requested approval of the Spring 2022 Minutes. Steve Shull made a motion, second by Al Traut for approval of the minutes. Minutes were unanimously approved.
8. Status of Standards:
	1. C57.12.28 Standard for Pad-Mounted Equipment – Enclosure Integrity, Published July 15, 2014
		1. Expires: 12/31/2024
		2. PAR expiration: 12/31/2024
		3. Status: in progress, Draft 4
	2. C57.12.29 Standard for Pad-Mounted Equipment – Enclosure Integrity for Coastal Environments, Published August 8, 2014
		1. Expires: 12/31/2024
		2. PAR expiration: 12/31/2024
		3. Status: in progress, Draft 4
	3. C57.12.30 Standard for Pole-Mounted Equipment – Enclosure Integrity for Coastal Environments, Published March 4, 2021
		1. Expires: 12/31/2030
	4. C57.12.31 Standard for Pole Mounted Equipment – Enclosure Integrity, Published February 26, 2021
		1. Expires: 12/31/2030
	5. C57.12.32 Standard for Submersible Equipment – Enclosure Integrity, Published Aug 8, 2019
		1. Expires: 12/31/2029
9. Old business:
	1. Jeremy Van Horn reviewed status of standards.
		1. There is one meeting left to finish current drafts for C57.12.28 and C57.12.29.
		2. The PAR modifications with previously approved scope changes are on the Nescom agenda for Oct 25, 2022.
	2. Jeremy Van Horn reviewed changes proposed by Dan Mulkey for C57.12.28 and C57.12.29 including:
		1. Participants list: updated to reflect current working group membership list
		2. Introduction: updated to include summary of significant changes
		3. Acronyms: updated to include AWG, SCAB and removed QUV
		4. Footnotes in Section 4.1.10 and 4.1.1.1: added footnote referring to Annex C, commonly used substate steels
		5. Footnotes in Section 5.3: added footnote referring to Annex D, substrate surface preparation
		6. Temperature warning: add approved warning in Section 5.4.4
			1. Group discussed if that is the right placement in the document.
			2. Mike Thibault made a motion to move the warning to Section 6.2. Second by Martin Bachand. The group voted on the motion: 6 members for, 25 members opposed, 0 members abstained. Motion did not pass.
			3. Jerry Murphy made a motion to move the warning to Section 4.1.3. Seconded by Steve Shull. The group voted on the motion: 30 members for, 1 member opposed, 0 members abstained. Motion passed.
		7. Figure 5 and 6 edits: split figures so they were no longer side by side and changed normative note numbering from “#1” to “a”, etc.
			1. Justin Minikel pointed out ASTM 1654-08 is referred to in Figure 5 and that the group had previously discussed referencing ASTM 1654-05 due to more strict test requirements.
			2. Justin Minikel made a motion to change the ASTM reference from 1654-08 to 1654-05. Second by Steve Shull. Motion passed unanimously.
		8. Jerry Murphy made a motion to accept recommended changes including participant list, introduction, acronyms and footnotes (see points athrough to e above). Second by Mike Thibault. Motion passed unanimously.
	3. Justin Minikel asked the group for feedback on changing Section 5.2 to reference CIELAB rather than Hunter as CIELAB is more commonly used.
		1. Justin Minikel made a motion to change the reference from Hunter to CIELAB in both C57.12.28 and C57.12.29 in Section 5.2. Seconded by Jerry Murphy.
		2. Group discussed and drafted an informative note to include under Section 5.2 as follows: “Note: CIELABS uses ΔE\* to distinguish CIE 1976 L\*a\*b\* scale in 1976 (Supplement No.2 to CIE Publication No. 15, Colorimetry) from previous versions. CIELAB is more commonly used that than Hunter.”
		3. Just Minikel amended his motion to include the above informative note that described the reason for using an asterisk as well as the reason for removing the Hunter reference. Second by Jerry Murphy. Motion passed unanimously.
	4. Jeremy Van Horn brought up that the Tank Touch Temperatures Task Force met at 4:45 on Monday, Oct 18th and encouraged members to participate in future meetings.
10. New business:
	1. Martin Bachand asked the group if we could evaluate bulb / lamp selection. Group discussed that there is not enough time to include these changes in this draft but is something we should start looking at in C57.12.32.
		1. A taskforce was formed review lamp choices and to present findings to the group in the Spring 2023 meeting. Taskforce members include Justin Minikel, Martin Bachand, Jane Hall. Other paint manufacturers are encouraged to join.
	2. Josh Verdell made a motion to go to ballot for Draft 5 of C57.12.28 and C57.12.29which includes all discussed changes. Seconded by Ed Smith. The group voted on the motion: 33 members were for, 0 opposed, 0 abstained. Motion passed unanimously.
11. Next meeting: is planned for March 21, 2023 in Milwaukee, WI, USA
	1. The following attendees requested membership and will be added to membership for the Spring 2023 meeting: Craig Derouen
12. The meeting was adjourned at 9:13 AM EST.

Submitted by: Audrey Siebert-Timmer

Date: October 18, 2022

### C57.12.34 – Three Phase Pad-Mount Transformers – Steve Shull

Scott Dhalke, for Steve Shull, presented the following minutes from the PAR study meeting on October 17, 2022 at 3:15 p.m. with 69 in attendance. The consensus of the PAR study group was to seek a motion to apply for a new PAR. Scott Dhalke made this motion and it was seconded by Dan Saur. During discussion, it was clarified that this would be a full revision PAR. This motion was approved unanimously by the subcommittee.

**Attendance:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| NAME | Company |  | NAME | Company |  | NAME | Company |
| Glenn Andersen | Fayetteville PWC |  | Ramadan Issack | American Electric Power |  | Mason Rush | Central Moloney, Inc. |
| Jhala Anirudhdhsinh | Transformers & Rectifiers Co. LTD. |  | Gael Kennedy | GR Kennedy & Associates LLC |  | Fernando Salinas | Power Partners |
| Gregory Ante | Southern California Edison |  | Gary King | Howard Industries |  | Albert Sanchez | Knoxville Utilities Board |
| Jared Bates | Oncor Electric Delivery |  | Patrick Kozer | Northeast Transformer |  | Jeffrey Schneider | Power Partners/Spire Power Sol. |
| Kevin Biggie | Weidmann Electrical Technology |  | Gilbert Kozer | Northeast Transformer Services, LLC |  | Michael Shannon | Rea Magnet Wire |
| Thomas Callsen | Weldy-Lamont Associates |  | Andrew Larison | Hitachi Energy |  | Avijit Shingari | Pepco Holdings Inc. |
| Raymundo Chapa | WEG Transformers USA Inc. |  | Weijun Li | Braintree Electric Light Dept. |  | Stephen Shull | BBC Electrical Services, Inc. |
| Noah Chesser | Oncor Electric Delivery |  | Alejandro Macias | CenterPoint Energy |  | Audrey Siebert-Timmer | IFD Corporation |
| John Chisholm | IFD Corporation |  | Lee Matthews | Howard Industries |  | Edward Smith | H-J Family of Companies |
| Eunyoung Cho | HICO-America |  | Tim Menter | Lincoln Electric System |  | Craig Tennant | H-J Family of Companies |
| Rhett Chrysler | ERMCO |  | Kent Miller | T&R Electric Supply Co. |  | Eric Theisen | Metglas, Inc. |
| Michael Cook | Dominion Energy |  | Justin Minikel | EATON Corporation |  | Michael Thibault | Pacific Gas & Electric |
| Michael Dahlke | Central Moloney, Inc. |  | Rhea Montpool | Schneider Electric |  | Timothy Tillery | Howard Industries |
| Thomas Dauzat | General Electric |  | Michael Morgan | Duke Energy |  | Reinaldo Valentin | Duke Energy |
| Craig DeRouen | ERMCO |  | Tim Morris | Walton EMC |  | Jeremy Van Horn | IFD Corporation |
| William Elliot | Crescent Power Systems |  | Hugo Murillo | H-J Family of Companies |  | John Vartanian | National Grid |
| Benjamin Garcia | Southern California Edison |  | Jerry Murphy | Reedy Creek Energy Services |  | Joshua Verdell | ERMCO |
| Carlos Gaytan | Prolec GE |  | Stephen Oakes | WEG Transformers USA Inc. |  | Pragnesh Vyas | Sunbelt-Solomon Solutions |
| Ali Ghafourian | H-J Enterprises, Inc. |  | Tyler Parenti | Cargill, Inc. |  | Bruce Webb | Knoxville Utilities Board |
| Richard Grandbois | IFD Corporation |  | Dwight Parkinson | EATON Corporation |  | Zachery Weiss | WEG Transformers USA Inc. |
| Zach Hall | Fayetteville PWC |  | George Payerle | Carte International Inc. |  | Alan Wilks | Consultant |
| Kendrick Hamilton | Power Partners, Inc. |  | Robert Reepe | Georgia Power Co. |  | Joshua Yun | Virginia Transformer Corp. |
| Giovanni Hernandez | Virginia Transformer Corp. |  | Kevin Riordan | WEG Transformers USA Inc. |  | Michael Zarnowski | Carte International |

**Meeting Minutes:**

The Chair called the meeting to order at 3:15 P.M. EST on October 17, 2022. Attendees identified themselves by name and affiliation verbally.

1. Agenda Review

The Chair displayed the agenda for this meeting.

1. Confirmation of IEEE SA Essential Patent Statement

The patent information request was displayed. The chair provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or if a participant is personally aware of patent claim(s)/patent application claim(s) that may be essential for the use of this standard. There were no responses to this request so no patent claim(s)/patent application claim(s) were identified.

1. IEEE SA Copyright Policy Statement

IEEE-SA’s copyright policy is described in Clause 7 of the *IEEE-SA Standards Board Bylaws* and Clause 6.1 of the *IEEE-SA Standards Board Operations Manual*. The Chair stated that any material submitted during standards development, whether verbal, recorded, or in written form, is a Contribution and shall comply with the IEEE-SA Copyright Policy. The Chair displayed this copyright policy.

1. Old Business

The Chair stated that the IEEE C57.12.34 Working Group document had been approved by the SAB and has been sent to editorial for review. This should be in print next year. The Chair stated that permission was given to make this meeting a PAR Study Group, therefore all attendees have voting privileges at this meeting.

The Chair presented a table displaying four major bullets that were brought forward from the ballot comments.

1. Update all references to latest revision of IEEE 386.
2. Update secondary voltages to include > 600V. Many renewables are at 690Y/398 and they are constructed like 480Y/277 ratings.
3. Revise A.10.2 Hot spot thermal sensor-Resistor temperature detector (RTD) to add more detail.
4. Is it beneficial to add references to Wind Power (IEEE/IEC 60076-16) and Distributed Photovoltaic (IEEE Std.C57.159) transformers to Annex B. Both of these applications often use pad-mount transformers. A reference to these standards would provide guidance for their application.

The Chair asked for any other items that would need to be considered. Gary King suggested we review the values for the Induced voltage test using a three phase testing system. Joshua Yun added that many data center specializing in Bitcoin Mining request secondary voltages of 415Y/240. He suggested that this might be added when item b was investigated. Jeff Schneider suggested that in conjunction Gary’s suggestion that we add a review of the impulse testing procedure of all secondary voltages above the 600 volt threshold. The thought was that we need to make sure that these testing values conform to any values in IEEE Std. C57.12.00 particularly as they might pertain to this standard.

1. New Business

The Chair asked the Par Study Group if a motion to create a PAR for the revision of IEEE Std. C57.12.34 be prepared to address these issues. Jeremy Van Horn made a motion to this effect. The motion was seconded by Jerry Murphy. There was much discussion pertaining to PAR Title and Scope as well as the need for this. In the end the title, scope and purpose stayed the same and a vote was taken and it was unanimous to pursue a new PAR.

The Chair stated he would introduce a motion in the Distribution Transformers Subcommittee to create a PAR with same title scope and purpose as the present document.

1. The meeting adjourned at 3:45 P.M. EST.

Submitted by: Scott Dahlke.

Date: 10/18/2022

### C57.12.36 – Distribution Substation Transformers – Jerry Murphy

This working group did not meet.

### C57.12.38 – Single-Phase Pad-Mounted Transformers – Ali Ghafourian

Ali Ghafourian presented the following minutes from the working group meeting on October 17, 2022, at 1:45 p.m. with 42 in attendance. It was reported that the current draft of the standard has gone through MEC review and that the WG had voted to move draft 2.8 of the document to ballot. This motion was approved unanimously by the subcommittee.

1. **Presiding Officer and Secretary responsible for Meeting Minutes**

Ali Ghafourian (Chair) – Presiding Officer and Jarrod Prince (Secretary) are responsible for Meeting Minutes.

1. **Call to order, Verification of Quorum, and Chair’s remarks**

The meeting was called to order by the Chair, Ali Ghafourian, at 1:47 p.m. EDT on Monday, October 17th, 2022, held at the Sheraton/Le Méridien Hotel in room, Mecklenburg III.

Quorum was established with 29 out of 53 Working Group members present by a show of hands counted at beginning of the meeting. Per paper rosters, we had 31 members accounted for as being present during the meeting.

The Chair announced that a two-year PAR extension expires at the end of 2023. The current Draft is ready for the Working Group to vote on to go to ballot based on all the corrections that were brought forth during the Spring 2022 Meeting in Denver, CO including the recent changes required by MEC. After the Draft review of the corrections made during the meeting a vote will be taken which requires 2/3 majority of Members present (minimum of 21 voting Members’ approval to pass).

1. **Presented required IEEE SA Patent and Copyright Policies Slides, Call for Patents**

The essential Patent and Copyright presentation slides were shown as required. During the review of the Patent and Copyright Policy slides, the Chair called for all essential Patents and Copyrights amongst the Working Group. No essential Patent or Copyright claims were brought forth to the Chair.

1. **Approval of agenda**

The agenda (AGENDA C57.12.38 October 17-2022 Charlotte NC (R1).pdf) was issued to the Working Group prior to the meeting for review.

Jerry Murphy made the first Motion to approve the agenda.

Kent Miller seconded the Motion.

The Chair asked the Working Group members for the unanimous approval of the agenda and the agenda was unanimously approved.

1. **Approval of minutes of previous meeting**

The Spring 2022 meeting minutes (S22-C57.12.38-UnapprovedMinutesR0.pdf) were posted to the Distribution Subcommittee website after the meeting for the Working Group members to review.

Kent Miller made the first Motion to approve the Spring 2022 meeting minutes.

Stephen (Steve) Shull seconded the Motion.

The Chair asked the Working Group members for the unanimous approval of the Spring 2022 meeting minutes and the meeting minutes were unanimously approved.

1. **Draft review (MEC and Annex A)**

Within the MEC document (PC57.12.38\_D2.7\_MEC.pdf) two topics were addressed during the meeting. The first topic of concern was the Scope and Purpose of the Draft being swapped from PAR. Documentation was submitted back to MEC by email (External Re MEC Review of IEEE PC57.12.38 - Scope and Purpose.msg) showing that the Scope and the Purpose has not changed from the last publication of the Standard in 2014, in the current PAR, or in the current Draft 2.7 – June 2022. MEC noted this to be a mistake and the Scope and Purpose was approved “as is”. The second topic was concerning the usage of the words “minimize” and “prevent”. A document (PC57.12.38 D2.7 (MECReview).docx) concerning these findings by MEC was provided to the WG before the meeting. The proposed changes within the document were reviewed and the changes were made and incorporated into D2.8 (C57 12 38 D2.8 June 2022(Comments-Old Format-MEC).docm) during the meeting.

The following are the changes that were made within Draft 2.8:

Clause 7.4 (line 31) “prevent” – Stephen (Steve) Shull made motion to remove wording “prevent accidental” and replace with “inhibit”. Jerry Murphy seconded the motion. The motion passed by unanimous approval of the WG Members.

Clause A.2.2.1 (line 7) “prevent” – No change made. WG Members unanimously agreed to no change. No motion required.

Clause A.2.3.1.1 (line 24) “Spill Prevention” – No change made to the title of this Annex clause. WG Members unanimously agreed to no change.

Clause A.2.3.1.1 (line 26) “minimize” – Jerry Murphy made motion to change the word “minimize” to “reduce”. Joshua (Josh) Verdell seconded the motion. The motion passed by unanimous approval of the WG Members.

Clause A.2.4 (line 14) “preventing” – No change made. WG Members unanimously agreed to no change. No motion required.

Clause A.5 (line 28) “prevent” – Joshua (Josh) Verdell made motion to change the wording “to prevent” to “to reduce the chance of”. Jerry Murphy seconded the motion. The motion passed by unanimous approval of the WG Members.

Clause A.8 (line 33) “prevent” – WG changed entire sentence concerning the word “prevent” to “Arrester shall be incorporated in the design with over current protection to reduce the possibility of tank rupture.” Benjamin (Ben) Garcia made motion to accept entire sentence as written. Jerry Murphy seconded the motion. The motion passed by unanimous approval of the WG Members.

Clause A.10.2 (line 26) “prevent” – Joshua (Josh) Verdell made motion to change the wording “to prevent” to “to reduce”. Benjamin (Ben) Garcia seconded the motion. The motion passed by unanimous approval of the WG Members.

Chair asked amongst the WG Members to entertain a motion for D2.8 to go to Ballot and that 2/3 Majority of WG Members (21 required) presented was required to pass. Jerry Murphy made the motion. Stephen (Steve) Shull seconded the motion with 31 out of 31 WG Members voting approval of D2.8 to go to ballot with no objections, no abstentions, and no discussion recorded.

Chair asked the WG for volunteers for the Ballot Resolution Committee. The Chair will lead the Ballot Resolution Committee along with the Vice-Chair and Secretary.

Volunteers are listed as follows:

Joshua (Josh) Verdell ERMCO

Ramadan Issack American Electric Power

Robert Reepe Georgia Power Co.

Andrew Larison Hitachi Energy

Chair stated that the WG’s request for approval to go to ballot will be brought forth to the Distribution Subcommittee meeting on Wednesday, October 19th.

1. **Old Business**

No old business items were brought forth to the Working Group during the meeting.

1. **New Business**

No new business items were brought forth to the Working Group during the meeting.

1. **Next meeting – Date and Location**

The Chair announced the next meeting for Spring 2023 will be held at the Hyatt Regency in Milwaukee, Wisconsin (USA).

Dates: March 19th – 23rd, 2023

1. **Adjournment**

The Chair adjourned the meeting at approximately 2:45 p.m. EDT.

**List of Attendees, Affiliations, Membership Status:**

\*\* 2 New Members were introduced to the Working Group.

\* A total of 4 guests requested Working Group membership which will be reviewed to determine who is eligible for membership before the Spring 2023 meeting.

1 Jared Bates\*\* Oncor Electric Delivery Member

2 Thomas Callsen Weldy-Lamont Associates Member

3 Michael Dahlke Central Moloney, Inc. Member

4 Craig DeRouen ERMCO Member

5 Benjamin Garcia Southern California Edison Member

6 Carlos Gaytan Prolec GE Member

7 Ali Ghafourian (Chair) H-J Enterprises, Inc. Member

8 Kendrick Hamilton Power Partners, Inc. Member

9 Michael Hardin H-J Enterprises, Inc. Member

10 Ramadan Issack American Electric Power Member

11 Andrew Larison Hitachi Energy Member

12 Kent Miller T&R Electric Supply Co. Member

13 Jerry Murphy Reedy Creek Energy Services Member

14 Dwight Parkinson EATON Corporation Member

15 Jarrod Prince (Secretary) ERMCO Member

16 Robert Reepe Georgia Power Co. Member

17 Albert Sanchez\*\* Knoxville Utilities Board Member

18 Jeffrey Schneider Power Partners/Spire Power Solutions Member

19 Avijit Shingari Pepco Holdings Inc. Member

20 Stephen Shull BBC Electrical Services, Inc. Member

21 Audrey Siebert-Timmer IFD Corporation Member

22 Edward Smith H-J Family of Companies Member

23 Michael Thibault Pacific Gas & Electric Member

24 Alan Traut Howard Industries Member

25 Reinaldo Valentin Duke Energy Member

26 Jeremy Van Horn IFD Corporation Member

27 John Vartanian National Grid Member

28 Joshua Verdell ERMCO Member

29 Pragnesh Vyas Sunbelt-Solomon Solutions Member

30 Bruce Webb Knoxville Utilities Board Member

31 Alan Wilks Consultant Member

32 Glenn Andersen Fayetteville PWC Guest

33 Gregory Ante Southern California Edison Guest

34 Kush Arora Reinhausen Mfg. Guest

35 Alex Ayala Power Partners, Inc. Guest

36 Jim Cai JSHP Guest

37 Noah Chesser Oncor Electric Delivery Guest

38 Eun Young Cho HZW-America Guest

39 Michael Cook Dominion SC Guest

40 Thomas Dauzat\* Prolec GE Guest

41 Antonio Di Biase Tempel Guest

42 Hector Garza Orto de Mexico Guest

43 Richard Grandbois IFD Technologies Guest

44 Zach Hall Fayetteville PWC Guest

45 Paul Henault IFD Corporation Guest

46 Javier Hernandez Orto de Mexico Guest

47 Traci Hopkins H2scan Corp. Guest

48 Jose Hora GlobeCore Guest

49 Karl Jakob Cargill, Inc. Guest

50 Gilbert Kozer Northeast Transformer Services, LLC Guest

51 Patrick Kozer Northeast Transformer Services, LLC Guest

52 Parry Lively\* Tempel Guest

53 Tim Menter Lincoln Electric System Guest

54 Justin Minikel EATON Corporation Guest

55 Martin Munoz Molina Orto de Mexico Guest

56 Hugo Murillo H-J Family of Companies Guest

57 Tyler Parenti Cargill, Inc. Guest

58 Daniel Posadas\* PROLEC S.A. DE C.V. Guest

59 Afshin Rezaei-Zare\* York University Guest

60 Mason Rush Central Moloney, Inc. Guest

61 Fernando Salinas Power Partners, Inc. Guest

62 Pugal Selvaraj Virginia Transformer Guest

63 Adrian Silgardo IFD Corporation Guest

64 Craig Tennant H-J Family of Companies Guest

65 Timothy Tillery Howard Industries Guest

66 Malia Zaman IEEE Guest

Submitted by: Ali Ghafourian (Chair) and Jarrod Prince (Secretary)

Date: Wednesday, October 26, 2022

### C57.12.39 – Tank Pressure Coordination – Carlos Gaytan

This working group did not meet

### Task Force on Transformer Efficiency and Loss Evaluation – Phil Hopkinson

Phil Hopkinson presented the following minutes from the working group meeting on October 17, 2022, at 9:30 a.m. with 141 in attendance.

The Fall meeting of the task force met on Monday, October 17, 2022, at 9:30 AM. The meeting was chaired by Philip Hopkinson, the task force chairman. Prior to the meeting, the unapproved agenda and a Power Point presentation addressing several DOE related organizations on distribution transformer loading was circulated to the entire Distribution Transformer membership. By count from the circulated rosters, 141 persons were in attendance. Without comment on the proposed agenda, the technical presentation was started. A copy of the Power Point presentation is contained in the Distribution Transformer section of the committee website. The chairman made opening comments regarding the previous meeting looking at dual-nameplate rating of transformers, while the focus of this meeting was on future load growth.

When the slide showing peak versus average loading was discussed, several comments regarding the difference between the peak and average from various regions and even individual meters. This ratio might vary between five and ten. It was stated that the Dan Mulkey slide has an X-axis of percent loading and is slight skewed giving a mode value which would differ from the average value.

The discussion on the possible efficiency increases of 20% from a possible NOPR from the DOE showed the probable solution may only be possible with an amorphous core steel. A slide with calculations on a 25 kVA and 50 kVA, with the current 2016 DOE limits, showed the no load and load loss values at 100% and 50% loading comparing M3 steel and amorphous steel. The possible effect of this increase may mean only copper windings and amorphous core steel would be needed.

A projection from the EIA indicates that only a 1% per year growth rate in energy may exist until the year 2050. A comment on demographics would certainly permit levels in many regions of the country to exceed this rate by a significant factor. Other projections indicate growth could be as high as 50% by the year 2050. This rate could still be achieved with M3 core steel.

With the push to reduce hydrocarbon fuels, three electric growth markets were presented. One of these is transportation electrification. With the average home consumer driving 12000 miles per year and the average of 4 miles per KWH might yield each EV adding about 4000 KWH per year. Heavier vehicles average about 3 miles per KWH. Building electrification is headed to reduce natural gas with heating being replaced by heat pumps. Codes and standards are well underway to promote this growth. The result of this will be to thermally stress transformers on the grid and will be more critical in the future. One challenge in the final conversion to electric vehicles will be the current inability to provide this power in the regions presently unable to provide what will be needed.

Meeting Attendance Follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Last Name** | **First Name** | **Company** |  |
| Almeida  | Nabi  | Prolec GE  |  |
| Andersen  | Glenn  | Fayetteville PWC  |  |
| Arteaga  | Javier  | Hitachi Energy  |  |
| Ayala  | Alex  | Power Partners, Inc.  |  |
| Ayers  | Donald  | Ayers Transformer Consulting  |  |
| Ballard  | Casey  | Dupont  |  |
| Bargune  | Gilles  | FISO  |  |
| Bates  | Jared  | Onkor Electric Delivery  |  |
| Beaster  | Barry  | H-J Family of Companies  |  |
| Biggie  | Kevin  | Weidmann Electrical Technology  |  |
| Blew  | David  | Retired (PSE&G)  |  |
| Boettger  | William  | Boettger Transformer Consulting LLC  |  |
| Britton  | Jeffrey  | Phenix Technologies, Inc.  |  |
| Brown  | Darren  | Howard Industries  |  |
| Callsen  | Thomas  | Weldy-Lamont Associates  |  |
| Cheim  | Luiz  | Hitachi Energy  |  |
| Chisholm  | John  | IFD Corporation  |  |
| cho  | Eunyoung  | HICO America  |  |
| Chrysler  | Rhett  | ERMCO  |  |
| Cresser  | Noah  | Onkor Electric Delivery  |  |
| Da Silva  | Roberto  | Cargill  |  |
| Dahlke  | Michael  | Central Moloney, Inc.  |  |
| DeRouen  | Craig  | ERMCO  |  |
| Di Biase  | Antonio  | Tempel  |  |
| Door  | Jeffrey  | The H-J Family of Companies  |  |
| Elliott  | William  | Prolec GE  |  |
| Fang  | Zhu  | R.E. Uptegraff  |  |
| Frimpong  | George  | Hitachi Energy  |  |
| Fyrer  | Bob  | Dupont  |  |
| Gamboa  | Jose  | H-J Family of Companies  |  |
| Garcia  | Benjamin  | Southern California Edison  |  |
| Gaytan  | Carlos  | Prolec GE  |  |
| Ghafourian  | Ali  | The H-J Family of Companies  |  |
| Giraldo  | Orlando  | The H-J Family of Companies  |  |
| Granbois  | Richard  | IFD Technologies  |  |
| Guerrero  | Johnny  | Con Edison  |  |
| Gupta  | Ravi  | Megger  |  |
| Hall  | Zach  | Fayetteville PWC  |  |
| Hall  | Zach  | Fayetteville PUC  |  |
| Hamilton  | Kendrick  | Power Partners, Inc.  |  |
| Henault  | Paul  | IFD Corporation  |  |
| Hernaidez  | Sergio  | Hammond Power Solutions  |  |
| Hernandez  | Giovanni  | Virgina Transformer  |  |
| Herron  | John  | Raytech USA  |  |
| Hopkinson  | Philip  | HVOLT Inc.  |  |
| Iman  | Mohammad  | MGM Transformer Company  |  |
| Issack  | Romadan  | AEP  |  |
| John  | John  | Virginia Transformer Corp.  |  |
| Klaponski  | Brian  | Carte International Inc.  |  |
| Kopp  | Alvin  | HVTE Inc.  |  |
| Kozer  | Gillbert  | Northeast Transformer  |  |
| Kozer  | Patrick  | Northeast Transformer  |  |
| Lachman  | Mark  | Doble Engineering Co.  |  |
| Larison  | Andrew  | Hitachi Energy  |  |
| Lawless  | Andrew  | Potencia Partners  |  |
| Lee  | Moonhee  | Hammond Power Solutions  |  |
| Levin  | Aleksandr  | Weidmann Electrical Technology  |  |
| Lively  | Parry  | Tempel  |  |
| Lovins  | Colby  | Federal Pacific  |  |
| Macias  | Alejandro  | CenterPoint Energy  |  |
| Malde  | Jinesh  | M & I Materials  |  |
| Menter  | Tim  | Lincoln Electric System  |  |
| Meyers  | Aaron  | EATON Corporation  |  |
| Miller  | Kent  | T & R Electric Supply  |  |
| Minikel  | Justin  | EATON Corporation  |  |
| Montpool  | Rhea  | Schneider Electric  |  |
| Morgan  | Michael Tyler  | Duke Energy  |  |
| Morris  | Tim  | Walton EMC  |  |
| Murillo  | Hugo  | The H-J Family of Companies  |  |
| Mushill  | Paul  | AMEREN  |  |
| Naderian  | Ali  | Metsco  |  |
| Naranyo  | Volney  | Megger  |  |
| Neder  | Frank  | Trench Germany  |  |
| Num  | Shawn  | Hitachi Energy  |  |
| Oakes  | Steven  | WEG Transformers USA Inc.  |  |
| Parkinson  | Dwight  | EATON Corporation  |  |
| Patel  | vinaybhai  | Con Edison  |  |
| Payerle  | George  | Carte International Inc.  |  |
| Pepe  | Harry  | Phenix Technologies, Inc.  |  |
| Ploetner  | Chris  | Siemens Energy  |  |
| Prince  | Jarrod  | ERMCO  |  |
| Radu  | Ion  | Hitachi Energy  |
| Rashid  | Adnan  | Measurement Canada / ISED  |
| Reepe  | Robert  | GA Power Co  |
| Rezai  | Hossein  |  XF Consultant  |
| Riordan  | Kevin  | WEG Transformers USA Inc.  |
| Rush  | Mason  | Central Moloney, Inc.  |
| Sampat  | Mahesh  | EMS Consulting Inc.  |
| Sanchez  | Albert  | Knoxville Utilities Board  |
| Sannrinberg  | Brian  | General Electric  |
| Saraf  | Manisn  | MPS  |
| Sawant  | Anil  | Virgina Transformer  |
| Sbravati  | Alan  | Hitachi Energy  |
| Schneider  | Jeff  | Power Partners, Inc.  |
| Selvaraj  | Pugazhenthi  | Virginia Transformer  |
| Sewell  | Russell  | Quality Switch, Inc.  |
| Shannon  | Michael  | Rea Magnet Wire  |
| Sharifi  | Masoud  | Siemens Gamesa  |
| Shingari  | Avijit  | PEPCO Holdings  |
| Shrewsbary  | Justin  | AMR PEMCO  |
| Shull  | Stephen  | BBC Electrical Services, Inc.  |
| Siebert-Timmer  | Audrey  | IFD Technologies  |
| Silgardo  | Adrian  | IFD Technologies  |
| Simons  | Andre  | Cogent Power Inc.  |
| Skinger  | Kenneth  | Scituate Consulting Inc.  |
| Smith  | Edward  | H-J Family of Companies  |
| Snyder  | Steven  | Hitachi Energy  |
| Sohail  | Muhammad Abdullah  | Trench Canada  |
| Spurlock  | Mike  | Spurlock Engineering Services, LLC  |
| Staley  | Brad  | Leeward Renewable Energy  |
| Stankes  | David  | 3M  |
| Streich  | Kerwin  | Siemens Energy  |
| Tatu  | Val  | Powersmitus  |
| Taylor  | Marc  | JFE Shoji Power  |
| Tedesco  | Joseph  | Hitachi Energy  |
| Tennant  | Craig  | The H-J Family of Companies  |
| teNyyenhuis  | Ed  | Hitachi Energy  |
| Thenser  | Eric  | Metglas, Inc.  |
| Thibault  | Michael  | Pacific Gas & Electric  |
| Traut  | Alan  | Howard Industries  |
| Trifunoski  | Risto  | Trench Canada  |
| Tyler  | Lee  | WARCO, Inc  |
| Valentin  | Reinaldo  | Duke Energy  |
| Van Horn  | Jeremy  | IFD Corporation  |
| Vanderwalt  | Alwyn  | ECI  |
| Vartanian  | John  | National Grid  |
| Verdell  | Joshua  | ERMCO  |
| Vyas  | Pragnesh  | Sunbelt Soloman  |
| Walder  | Urek  | EATON Corporation  |
| Walker  | David  | MGM Transformer Company  |
| Wallach  | David  | Duke Energy  |
| Webb  | Bruce  | Knoxville Utilities Board  |
| Weiss  | Zachery  | WEG Transformers USA Inc.  |
| Wilks  | Alan  | Consultant  |
| Zarnowski  | Michael  | Carte International Inc.  |

### PC57.167 – Guide for Monitoring Distribution Transformers – Gary Hoffman

Gary presented the following minutes from the working group meeting on October 18, 2022 at 4:45 p.m. This document is currently going through ballot.

● 29 members - quorum achieved

● Ballot processing ○ 231 comments being resolved by Ballot Resolution Committee

○ 10-3-22 recirculating resulted in 4 comments and 92% approval

○ Plan on 2nd recirculating on 10-10-22 which will include the rosters

○ January 2023 to RevCom

○ Plan on PAR extension request - just in case

● Question asked by Brian Klaponski in regards to Utility acceptance

○ Impression that not many due to costs involved

○ Suggestion of a potential tutorial at future meetings

### C57.12.35 – Bar Coding for Transformers and Regulators– Rhett Chrysler

Rhett Chrysler presented the following minutes from the working group meeting on October 18, 2022 at 1:45 p.m. with 24 in attendance. During the WG meeting the group voted to move the current document to ballot. This motion was brought to the subcommittee where it was approved unanimously.

1. Chair called the meeting to order at 1:45pm. Members introduced themselves with their affiliation.
2. Total attendance of 24 is listed below. 14 of 19 members present and quorum was verified (73%). 1 guest requested membership.

|  |  |  |  |
| --- | --- | --- | --- |
| **First Name** | **Last Name** | **Company or Affiliation** | **Current Role** |
| Glenn | Andersen | Fayetteville PWC | Member |
| Jared | Bates | Oncor Electric Delivery | Guest\* |
| Jim | Cai | JSMP Transformer | Guest |
| Noah | Chesser | Oncor Electric Delivery | Guest\* |
| Rhett | Chrysler | ERMCO | Member |
| Michael | Cook | Dominion Energy | Guest |
| Craig | DeRouen | ERMCO | Guest |
| Carlos | Gaytan | Prolec GE | Guest |
| Zach  | Hall | Fayetteville PWC | Guest |
| Ramadan | Issack | American Electric Power | Member |
| Gary | King | Howard Industries | Member |
| Alejandro | Macias | CenterPoint Energy | Member |
| Lee | Matthews | Howard Industries | Member |
| Jerry | Murphy | Reedy Creek Energy Services | Member |
| Dwight | Parkinson | EATON Corporation | Guest |
| Robert | Reepe | Georgia Power Co. | Member |
| Stephen | Shull | BBC Electrical Services, Inc. | Member |
| Adrian | Silgardo | IFD Corporation | Guest |
| Edward | Smith | H-J Family of Companies | Member |
| Craig | Tennant | H-J Family of Companies | Guest |
| Michael | Thibault | Pacific Gas & Electric | Member |
| Alan | Traut | Howard Industries | Member |
| Joshua | Verdell | ERMCO | Member |
| Alan | Wilks | Consultant | Member |

Guest\* = Requesting Membership

Chair Report

* 1. PAR for revision of C57.12.35 approved on 6/13/19 with an expiration date of 12/31/2023. The current published document C57.12.35-2013 also expires 12/31/2023.
1. Chair called for identification of essential patents pertaining to the work of this WG. None brought forward. Copyright policy presented. No issues identified.
2. Motion to approve meeting agenda (Steve Shull/Mike Thibault). Approved unanimously.
3. Motion to approve Spring 2021 Denver meeting minutes (Jerry Murphy/Lee Matthews/). Approved unanimously.
4. Old Business
	1. Added 4.3.4 for the temporary label utilizing the QR code per TF recommendation. This is an alternate to the existing temporary label utilizing bar code.
		1. 4.3.4.5 Change the location of the human readable interpretation on the temporary label from beneath the QR code to adjacent the QR code.
		2. QR code dimensions 2” X 2”. Label dimensions are 3” X 5” minimum.
		3. Ed Smith/Gary King move to include 4.3.4 and the definition of QR code in definitions. Unanimous approval.
	2. Figure 5 thru 13 - change Temporary Bar Code Location to Temporary Label Location.
5. New Business
	1. Motion to ballot draft 5 (Steve Shull/Jerry Murphy) including revisions as noted in this meeting. Unanimous approval of members present.
	2. Comment resolution group formed. Rhett Chrysler (chair), Jerry Murphy, Steve Shull, Robert Reepe, Lee Matthews. CRG is authorized to provide responses and to determine which comments need to be brought before the entire WG for approval.
6. Next meeting – Milwaukee, WI March 19-23, 2023
7. Meeting adjourned at 2:19pm.

Submitted by: Alan Traut, Secretary

Date: 10/18/2022

### Task Force Tank Touch Temperature – Bruce Webb

Bruce Webb presented the following minutes from the working group meeting on October 17, 2022 at 4:45 p.m. with 36 in attendance.

1. Call to order

The meeting was called to order by the Chair (Bruce Webb) with Vice-Chair (Ali Ghafourian) and Secretary (Albert Sanchez) in attendance on Monday October 17, 2022, at 4:45 PM.

1. Approval of agenda

As this was the very first meeting of the Distribution Transformer SC TF on Tank Touch Temperature, the meeting attendees were provided the Chair’s proposed agenda for their consideration and approval. The agenda was approved without any opposition.

1. Welcome and Introduction

The Chair identified the meeting topic, welcomed the attendees and allowed the attendees to identify themselves and their affiliations.

1. Attendance and Contact Sheets

The Secretary (Albert Sanchez) distributed attendance sheets and the Chair requested that attendees provide clear and legible email addresses to address the ongoing 123Signup platform issues. Thirty-six (36) attendees completed this request with twenty-eight (28) requesting the automatic membership and the remaining seven (7) participating as guests.

1. Participant Behavior

The Chair displayed several slides identifying the IEEE Codes of Ethics & Conduct expectations and specifically asked the attendees to maintain responsible behavior during the meeting, to treat one another nicely and with respect, and to avoid injuring others reputation or employment. There was no opposition to the requirements or request.

1. Essential Patent Claims

There was a call for essential patent(s) by the Chair. There were none brought forward. The Chair announced if there was one to let the Chair, Vice Chair, or Secretary know. The IEEE essential patient claim slides and guidelines were shown to the TF attendees, and this was recorded by the Secretary.

1. Copyright Policy

The IEEE copyright slides and guidelines were shown to the TF attendees without further discussion, and this was recorded by the Secretary.

1. Chair’s Brief History Leading to this Meeting

The attendees indulged the Chair and allowing him to relay his personal experience and observations relative to tank touch temperatures and leading to the creation of this TF. In brief, this included:

1. Westinghouse Electric transformer design experience: a concentration on temperature rises and not limits,
2. An open letter to the C57.154 WG with concern for an allowable 135 °C top-oil temperature rise,
3. TF work within the C57.12.38 WG resulting in a presentation citing expectant temperatures with supporting research on the matter from various references including ASTM, UL and NASA,
4. TF work within the Enclosure Integrity suite of standards which resulted in the development of a Warning note being added to the C57.12.28 and .29 Standards, and
5. Lastly, the creation of this SC following extensive discussion in the S22 Denver Committee meeting
6. Introduction of TF Directive

The Chair proposed a TF directive developed from the S22 Denver SC minutes Annex C.4 New Business. It read as follows and there was no opposition to its use:

‘… the Task Force is to further investigate perceived safety concerns regarding tank touch temperatures for transformers that are accessible to the public by…

* + - exploring input and feedback from outside resources and experts,
		- evaluating opportunities to specifically address such concerns, and
		- making recommendations to the SC for next steps, if any.’
1. Open Discussion

… things we might consider:

* + Are we truly concerned?
	+ Do we need a Standard limit?
	+ What impact to existing Standard values, if a change is recommended, should we consider?
	+ What other experts might be available to assist the TF: UL, ASTM, NASA, etc.
	+ Should we consider any specific equipment protection(s): design/construction, guarding, labeling, etc.
	+ Ought we consider component and accessory issues: gasketing, bushings, gauges, paint, labeling, etc.
	+ Other

**Discussion**

* + Chair – is the Standards operational limit 105 °C? We can boil water at 100 °C. With C57.154, the allowable top oil temperature is 135 °C (275 °F).
	+ S. Shull/J. Murphy - It is a concern.
	+ S. Shull - it is concern particularly with dual nameplate rated transformers on the horizon. It may not be as big of a concern with overhead units or three-phase units compared with single-phase pad-mounted units used in residential situations. … an extreme concern.
	+ J. Arteaga (Hitachi) OSHA guidelines brought up. They set a limit, a maximum skin limit of 60°C after 5 seconds. Our standard temperature may be higher than that with the answer being safety cages to protect the workers. Fencing? Would it apply to pad mounts? Is it applicable here?
	+ Small children are a likely concern if they were to sit on or come in contact with a hot transformer.
	+ We appear to allow a higher temperature in our standard for allowable temperature rise exceeding OSHA.
	+ Chair – No apparent TOSHA requirement. Would have thought there would be something related to boiler/boiler piping safety efforts, but nothing yet found.
	+ Chair - UL1561 suggests that dry type enclosure temperatures not exceed 50°C
	+ UL is not a standard... They are for insurance underwriter’s purposes
	+ Chair/Vice-Chair – D. Mulkey has suggested we investigate guidelines from the automotive industry where consideration for black vehicles in the hot sun like in places like Arizona might be considered? Is there a standard here?
	+ Impacts on equipment loading over the next 5 years from EV deployments could be significant, adding to our risk
	+ R. Hogg (Bureau of Reclamation) - Colorado painting transformers. Making them attractions. Risk of drawing people to hot equipment.
	+ M. Thibault (PG&E) - Good points. What do you do about it? Perhaps a baffle added to your construction standard that reduces exposure to the hot transformer. Add it to requirement to not exceed “x” amount of temperature... a big lift!
	+ Only utilities install transformers. Touching transformers and getting a burn is the concern. Fencing could be a solution? Labeling may be the more direct/immediate solution?
	+ S. Shull - Consider UL and other discussed standards as situational standards, and not work standards. UL is for insurance and may or may not apply.
	+ M. Thibault – asked for a raise of hand to determine if any attendant utilities were regulated. Requirements may need to meet state regulator requirements... like Public parks & playgrounds? For example, shades for slides. Like poke and prod requirements for tamper resistance. It may be situational.
	+ Contribute. Hazard Wheel for safety operation. More investigation. A sub-task force? Red tag events for utilities?
	+ Sbravati (Hitachi) - perhaps if the average temperature rise is 25 °C it may not be an issue, but for units at 120 °C it may be
	+ M. Thibault – check for red tags. Check with peers and legal staff.
	+ Chair – recollection of utility using placards for safety purposes to protect personnel working on network transformers in vaulted locations.
	+ A. Sbravati (Hitachi) - using coatings to improve insulation, but at a cost.
	+ It’s situational, rural locations vs. Metropolitan areas/public parks... 175% loaded units likely pose a risk with EV applications
	+ Is a feasibility study needed to determine how to proceed?
	+ T. Tillery (Howard) - May be a non-issue at present, but we may need to look ahead to a future where design alternatives may be needed in 5 years. Better to prepare just in case. Perhaps a heat run test at 100% for evaluation purposes needs consideration. Suggestion to create a guide with criteria and risk assessments for locating transformers?
	+ A. Sbravati (Hitachi) - One things is consideration for construction workers while another thing is consideration for the public. Insulation? Assuming there will be added cost to address this... top-oil limit or guarding.
	+ R. Reepe (Georgia Power) - This topic started on DOE activity with dual nameplating and 85 °C rise along with the potential increase in load by 2030.
	+ No reason to address this. Qualified workers must be trained to address high temperature units when working behind the fence, etc. High energy areas. Hazard Wheel for safety operation. K. Biggie (Weidman) - Perhaps do heat run tests for padmounted transformers, like power transformers?
	+ J. Verdell (Ermco) - transformers get hot from simply sitting on a yard in a de-energized state. Heat run is at 100% load.
	+ Chair - can we standardize a temperature limit at the factory in a lab environment without consideration of abnormal operating conditions like sunlight, emissivity matters, and other that may elevate their temperatures in their natural conditions for service?
	+ Chair – at KUB, we find many of our distribution transformers to be lightly loaded, on average around 50%.
	+ J. Murphy (RCES) - Influx of EVs is to be expected in the not-too-distant future adding to load and extra unit heating.
	+ J. Arteaga - Reference to the DOE study work and distribution transformers being on average around 44%.
	+ T. Tillery – what can we do? Make the lids dome shaped? In Australia, the hot portion of the unit is often protected and shielded. Perhaps a Guide is needed to assess situational risk.
	+ S. Shull - More investigation. A sub-task force? Controlled spaces vs. Public spaces?
	+ **Motion M. Thibault (PG&E) - Recommendation for members to go back to their individual or company situational conditions for any incidents or actions taken related to tank touch temperatures and share them with the TF during the next meeting.**
	+ G. Ante (SCE) – The issue? Burn protection? Wouldn’t liability be placed on affected parties.
	+ S. Shull brought up a case that utility was liable for an individual going through 3 substation barriers and was awarded damages despite a breach of their security measures. A $1.5M penalty was assessed.
	+ Chair – a reminder to review the C57.12.28 Tank Touch Temperature report on the Committee website. Burn risk... ASTM/NASA.
	+ E. Theisen (Metglas) - high temperature danger to wildlife? The new temperatures are hotter than most things accruing in nature. Another concern of hot temperature is pole mounted units for qualified personnel.
	+ Chair – Similarly mobile transformers are often designed with insulation systems that allow for higher than standard temperature rises, albeit they are typically utilized in applications subject to access by qualified personnel only.
	+ Fenced. Proper PPE?
	+ G. Ante (SCE) – The issue? Burn protection? Wouldn’t liability be placed on affected parties.
	+ S. Shull brought up a case that utility was liable for an individual going through 3 substation barriers and was awarded damages despite a breach of their security measures
	+ T. Callsen (Weldy Lamont) – If using dual rated Bayonet fuses melt... those melt at 145 °C. Perhaps we need to look at that as an upper limit.
	+ Research at NEETRAC may have performed long ago (circa 2004) to understand temperature levels of unloaded, energized no-load, capacity loaded/overloaded? , and with a protected cover (cooked). It was understood that at some point there was a consensus from participating parties to terminate the research and the reporting effort.
	+ Chair – so then there was no concern.
	+ Now it is a different time.
	+ A. Sbravati (Hitachi) - Design conditions allow for 95 °C, but it appears that 50 °C is perhaps a limit. Are we opening a pandora’s box?
	+ Who bears the responsibility for this, Users, vendors, other?
	+ Raymundo Chapa (WEG) - Should we consider adding a warning label(s) to address the matter without adding excessive costs to the User and difficulties for the Manufacturers?
	+ Not an engineered solution, but a great first step.
	+ Fencing? Likely an untenable solution.
	+ 1960’s no seatbelts, now seatbelts mandated.
	+ A motion is on the table to go back home and determine their own situations.
	+ **5:45 Second - J. Van Horn (IFD Tech.)**
	+ **Any Objections? One (1) objection** J. Arteaga
	+ **Any Abstentions? None**
	+ **Motion passes by attendee majority.**
	+ Moving forward - Ask the group for ideas on situational conditions of any incidents and share with the group.
	+ Chair - We will be requesting feedback regarding your/your utilities experiences on the matter, if any via an email survey to attendee email addresses
	+ R. Hogg (Bureau of Reclamation) - perhaps consideration should be given to a virtual brainstorming meeting be held between the fall and spring meetings to discuss possible solutions to hot tank touch temperatures?
1. Next Steps

The Chair resolved to reach out to attendees via email for potential remote activities prior to the next in-person meeting without attendee objection.

1. Next meeting--date and location

The Next meeting will the **Spring 2023 Meeting Milwaukee, Wisconsin, USA**

1. **Adjournment**

**The meeting was adjourned by the Chair at 5:55 PM**

Submitted by: Albert Sanchez

Date: October 19, 2022

ATTENDANCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Last Name** | **First (Given) Name** | **Company (Affiliation)** | **Requesting Membership** **Yes No** |
| **1** | **Ante** | **Greg** | **So. California Edison** | **X** |  |
| **2** | **Arteaga** | **Javier** | **Hitachi Energy** | **X** |  |
| **3** | **Ayala** | **Alex** | **Power Partners** | **X** |  |
| **4** | **Bates** | **Jared** | **Oncor Electric Delivery** | **X** |  |
| **5** | **Biggie** | **Kevin** | **Weidmann Electrical Technology** | **X** |  |
| **6** | **Brown** | **Darren** | **Howard Industries** | **X** |  |
| **7** | **Callsen** | **Thomas** | **Weldy Lamont** | **X** |  |
| **8** | **Chapa** | **Raymundo** | **WEG** | **X** |  |
| **9** | **Chesser** | **Noah** | **Oncor Electric Delivery** | **X** |  |
| **10** | **Cook** | **Michael** | **Dominion SC** |  | **X** |
| **11** | **Cruz Valdes** | **Juan Carlos** | **Prolec GE** | **X** |  |
| **12** | **Dahlke** | **Michael** | **Central Moloney, Inc.** | **X** |  |
| **13** | **Felton** | **Todd** | **MVA** |  | **X** |
| **14** | **Grandbois** | **Richard(Luke)** | **IFD Technologies** | **X** |  |
| **15** | **Guerrero** | **Johnny** | **Con Edison** |  | **X** |
| **16** | **Henault** | **Paul** | **IFD Technologies** |  | **X** |
| **17** | **Hogg** | **Ryan** | **Bureau of Reclamation** | **X** |  |
| **18** | **Kennedy** | **Gael** | **GRKennedy & Associates LLC** | **X** |  |
| **19** | **Kozer** | **Patrick** | **Northeast Transformer** | **X** |  |
| **20** | **Menter** | **Tim** | **Lincoln Electric System** |  | **X** |
| **21** | **Minikel** | **Justin** | **Eaton** | **X** |  |
| **22** | **Murphy** | **Jerry** | **RCES** | **X** |  |
| **23** | **Parkinson** | **Dwight** | **Eaton** | **X** |  |
| **24** | **Reepe** | **Robert** | **GA Power Co.** | **X** |  |
| **25** | **Sbravati** | **Alan** | **Hitachi Energy** |  | **X** |
| **26** | **Schneider**  | **Jeff** | **Power Partners** | **X** |  |
| **27** | **Shull** | **Stephen** | **BBC Electrical Services** | **X** |  |
| **28** | **Stankes** | **Dave** | **3M** | **X** |  |
| **29** | **Theisen** | **Eric** | **Metglas** |  | **X** |
| **30** | **Thibault** | **Mike** | **PG&E** | **X** |  |
| **31** | **Tillery** | **Tim** | **Howard Industries** | **X** |  |
| **32** | **Valentin** | **Reinaldo** | **Duke Energy** | **X** |  |
| **33** | **Van Horn** | **Jeremy** | **IFD Technologies** | **X** |  |
| **34** | **Verdell** | **Joshua** | **ERMCO** | **X** |  |
| **35** | **Wang** | **Evanne** | **Dupont** | **X** |  |
| **36** | **Wilks** | **Alan** | **Consultant** | **X** |  |

## Old Business

* Phil Hopkinson brought up a discussion point on transformers connected to inverters.
	+ He gave a presentation on this topic during this committee meeting (Monday 10/17 at 4:45)
	+ Inverters can be bad for transformers.
		- Core lamination to lamination voltage can build up.
		- This can cause partial discharge which causes hydrogen to build up
		- Also causes heating and carbon build up
	+ Proposal is to add a core shield to mitigate.
	+ Recommend adding a core ground to the solar document.
	+ PCS is considering this.
	+ Also noted that Natural Esters somehow help mitigate some of this issue.
		- Higher dissipation factor?
		- Draining the charge from the core laminations?
* No other old business

## New Business

* Al Traut brought up that C57.138 was started back up and urged this SC to participate.
* Phil brought up a discussion on transformer classification.
	+ Distribution has grown from 500 kVA to 10 MVA
	+ Distribution is what DOE covers
	+ Power is above that
	+ The thought is is that we need to establish some definitions to ensure people get what they want.
	+ Motion to organize a TF to define what a distribution transformer is with Phil being the chair. Motion made by Ali Ghafourian and seconded by Dan Sauer. Motion passes unanimously.
	+ Dan asked if this belongs here or in 12.80.
	+ Ed made the comment that we can figure that out within the task force.
	+ Bruce Forsyth noted that this discussion was needed but to make any changes of this nature it would have to go up a level, to the full committee.
* No additional New Business was brought forward.

## Chairman’s Closing Remarks and Announcements

Ed had no closing comments to the SC.

## Adjournment

Ed adjourned the meeting as provided in the meeting agenda at 10:44am.

List of Attendees and Affiliations:

|  |  |  |  |
| --- | --- | --- | --- |
| **Last Name** | **First Name** | **Role** | **Company** |
| Abdullah | Ahmad | Guest | Martenson |
| Almeida | Nabi | Member | Prolec GE |
| Ante | Gregory | Guest | Southern California Edison |
| Antweiler | Irving | Guest | Retired Schneider Electric |
| Arteaga | Javier | Member | Hitachi Energy |
| Ayala | Alex | Guest | Power Partners |
| Bargone | Gilles | Guest | FISO Technologies Inc. |
| Bates | Jared | Guest | Oncor Electric Delivery |
| Baumann | Brian | Guest | Cargill, Inc. |
| Benach | Jeff | Guest | Megger |
| Biggie | Kevin | Member | Weidmann Electrical Technology |
| Blaszczyk | Piotr | Guest | Specialty Transformer Components LLC |
| Britton | Jeffrey | Guest | Phenix Technologies, Inc. |
| Callsen | Thomas | Member | Weldy-Lamont Associates |
| Chapa | Raymundo | Guest | WEG Transformers USA Inc. |
| Chesser | Noah | Guest | Oncor Electric Delivery |
| Chisholm | John | Member | IFD Corporation |
| Chrysler | Rhett | Member | ERMCO |
| Colopy | Craig | Member | Retired (Eaton) |
| Cook | Michael | Guest | Dominion Energy SC |
| Dahlke | Michael | Guest | Central Moloney, Inc. |
| Dauzat | Thomas | Member | General Electric |
| DeRouen | Craig | Guest | ERMCO |
| Di Biase | Antonio | Guest | Tempel |
| Dulac | Hakim | Member | APT (Qualitrol) |
| Dutta Roy | Samragni | Guest | Siemens Energy |
| Elliott | William | Guest | Crescent Power Systems (Prolec GE) |
| Forsyth | Bruce | Guest | Bruce Forsyth and Associates PLLC |
| Frimpong | George | Guest | Hitachi Energy |
| Frye | Rich | Guest | EATON |
| Garcia | David | Guest | EATON Corporation |
| Gaytan | Carlos | Member | Prolec GE |
| Ghafourian | Ali | Member | H-J Enterprises, Inc. |
| Giraldo | Orlando | Guest | H-J Family of Companies |
| Gonzalez | Luis | Guest | Canduct Industries Limited |
| Gonzalez Ceballos | Jose Antonio | Guest | Georgia Transformer |
| Grabdbois | Richard | Guest | IFD Technologies |
| Hamilton | Kendrick | Member | United STd Electric (Power Partners, Inc.) |
| Heiden | Kyle | Member | EATON Corporation |
| Hernandez Cano | Sergio | Member | Hammond Power Solutions |
| Hoffman | Gary | Member | Advanced Power Technologies |
| Hogg | Ryan | Guest | Bureau of Reclamation |
| Hopkinson | Philip | Member | HVOLT Inc. |
| Issack | Ramadan | Member | American Electric Power |
| Jakob | Karl | Guest | Cargill, Inc. |
| John | John | Member | Virginia Transformer Corp. |
| Kelly | Joe | Guest | TCI |
| Kennedy | Gael | Member | GR Kennedy & Associates LLC |
| King | Gary | Member | Howard Industries |
| Klaponski | Brian | Member | Carte International Inc. |
| Larison | Andrew | Member | Hitachi Energy |
| Leal | Gustavo | Guest | Dominion Energy |
| Leal | Fernando | Guest | Prolec GE |
| Lee | Moonhee | Member | Hammond Power Solutions |
| Levin | Aleksandr | Guest | Weidmann Electrical Technology |
| Li | Weijun | Member | Braintree Electric Light Dept. |
| Lovins | Colby | Guest | Federal Pacific |
| Machain | Jose | Guest | Prolec GE |
| Macias | Alejandro | Member | CenterPoint Energy |
| Mai | Tim-Felix | Member | Siemens Energy |
| Matthews | Lee | Member | Howard Industries |
| McBride | Brian | Member | Cargill, Inc. |
| Mellin | Toni | Guest | Vaisala |
| Menter | Timothy | Guest | Lincoln Electric System |
| Meyers | Aaron | Guest | EATON Corporation |
| Miller | Kent | Member | T&R Electric Supply Co. |
| Minikel | Justin | Guest | EATON Corporation |
| Mora | Jose | Guest | GlobeCore |
| Murphy | Jerry | Vice-Chair | Reedy Creek Energy Services |
| Naderian | Ali | Guest | METSCO Energy Solutions Inc. |
| Neild | Kristopher | Guest | Megger |
| Oliveira | Jonas | Guest | Hitachi Energy |
| Parkinson | Dwight | Member | EATON Corporation |
| Patel | Vinay | Guest | Consolidated Edison Co. of NY |
| Pepe | Harry | Guest | Phenix Technologies, Inc. |
| Prince | Jarrod | Member | ERMCO |
| Radu | Ion | Member | Hitachi Energy |
| Rashid | Adnan | Guest | Measurement Canada / ISED |
| Reepe | Robert | Member | Georgia Power Co. |
| Riordan | Kevin | Guest | WEG Transformers USA Inc. |
| Rush | Mason | Guest | Central Moloney, Inc. |
| Salinas | Fernando | Guest | Power Partners |
| Sanchez | Albert | Member | Knoxville Utilities Board |
| Sauer | Daniel | Member | EATON Corporation |
| Sbravati | Alan | Guest | Hitachi Energy (Cargill, Inc.) |
| Schneider | Jeffrey | Member | Power Partners/Spire Power Solutions |
| Selvaraj | Pugal | Guest | Virginia Transformer Corp. |
| Shaikh | Abdulmalid | Guest | Delta Star Inc. |
| Shannon | Mike | Guest | Rea Magnet Wire |
| Shertukde | Hemchandra | Member | University of Hartford |
| Shingari | Avijit | Member | Pepco Holdings Inc. |
| Siebert-Timmer | Audrey | Member | IFD Corporation |
| Silgardo | Adrian | Member | IFD Corporation |
| Simons | Andre | Guest | JFE Shoji |
| Smith | Edward | Chair | H-J Family of Companies |
| Snyder | Steven | Member | Hitachi Energy |
| Solano | William | Guest | Instrument Transformer Equip Corp |
| Stank | Markus | Member | Maschinenfabrik Reinhausen |
| Stankes | David | Guest | 3M |
| Stretch | Kerwin | Member | Siemens Energy |
| Subramany | Shankar | Guest | KEMA Labs |
| Szczechowski | Janusz | Member | Maschinenfabrik Reinhausen |
| Taylor | Marc | Guest | JFE Shoji Power Canada Inc. |
| Tendulkar | Vijay | Member | EATON (Power Distribution, Inc. (PDI))  |
| Thibault | Michael | Member | Pacific Gas & Electric |
| Tillery | Timothy | Member | Howard Industries |
| Tostrud | Mark | Guest | Dynamic Ratings, Inc. |
| Traut | Alan | Member | Howard Industries |
| Van Horn | Jeremy | Member | IFD Corporation |
| Vartanian | John | Guest | National Grid |
| Verdell | Joshua | Secretary | ERMCO |
| Verdolin | Rogerio | Member | Verdolin Solutions Inc. |
| Vyas | Pragnesh | Member | Sunbelt-Solomon Solutions |
| Walden | Mick | Guest | EATON Corporation |
| Washburn | Alan | Guest | Burns & McDonnell |
| Webb | Bruce | Member | Knoxville Utilities Board |
| Weiss | Zachery | Guest | WEG Transformers USA Inc. |
| Whitehead | William | Guest | H2scan Corporation |
| Wilks | Alan | Member | Consultant |
| Williams | Trenton | Member | Advanced Power Technologies |
| Yang | Baitun | Member | R.E. Uptegraff |
| Yun | Joshua | Member | Virginia Transformer Corp. |
| Zaman | Malia | Guest | IEEE |
| Zarnowski | Michael | Member | Carte International |