

ANNEX A Bushings Subcommittee

October 30, 2019
Columbus, Ohio, USA

Chair: Peter Zhao
Secretary: Eric Weatherbee

A.1 Opening of the Meeting

A.1.1 Introductions

The Chair opened the meeting and declared we would forgo group introductions to allow more time for discussions.

A.1.2 Attendance

Membership count was taken from the sign-in roster with the following results: 54 of 75 members were present for a quorum, with 73 guests for a total of **127 attendees**. There were 13 new membership requests.

A.1.3 New Members

Eight new members were introduced to the SC and added to the roster. The new members were Mr. Sanket Bolar, Mr. Jorge Cruz, Mr. Darrell Mangubat, Mr. Leslie Recksiedler, Mr. Pierre Riffon, Mr. Mark Shem-Tov, Mr. Thomas Spitzer, Mr. Peter Werelius.

A.1.4 Meeting Minutes Approval

The Chair asked for a motion to approve the S19 minutes which are hosted on the IEEE Transformer website. A motion was made to approve the minutes and seconded with no objections.

A.1.5 Chairman's Remarks

The Chair reminded the WG and TF Chairs that they must notify any intent for PAR extensions early.

A.1.6 Status of Bushing Standards

The Chair presented the Standards Status Report for bushings, see [Appendix A](#).

The Chair noted that timing with 19.02 will be critical to include this new bushing standard into 19.00 within the current revision cycle and asked WG Chair of 19.02, Mr. Stephen Shull, to submit a disposition and comment page on what their WG sees as needing to be updated to include bushings addressed in their new standard into 19.00. Mr. Shull was unsure of the process and said he will discuss with Mr. Zhao after the conference.

A.2 Working Group and Taskforce reports

A.2.1 PC57.19.00-2004 – Peter Zhao, Chair; Eric Weatherbee, Secretary

See complete WG minutes in [Appendix B](#) of this report.

A.2.2 C57.19.100-2012 – Tommy Spitzer, Chair; Jeff Benach, Secretary

. See complete WG minutes in [Appendix C](#) of this report.

A.2.3 WG PC57.19.01-2017 – Dr. Shibao Zhang, Chair; David Wallach, Secretary

Dr. Zhang stated he will seek feedback starting in 2020 and plans to start work on the next revision cycle of the document in 2021 if any revisions are needed with a Draft target completion date of 2026.

No meeting held as the latest revision was published July 2018.

A.2.4 WG PC57.19.02 Distribution Transformer Bushings – Steven Shull, Chair; Ed Smith, Vice Chair, Rhett Chrysler, Secretary

See complete WG minutes in [Appendix D](#) of this report.

A.2.5 WG C57.19.04-2018 – Scott Digby, Chair; JD Brafa, Vice Chair; Rich vonGemmingen, Secretary

Mr. Digby stated he continues to work with the 19.00 WG to incorporate 19.04.

No meeting was held as the document was published June 2018.

A.2.6 IEC/IEEE 65700.19.03 – Les Recksiedler (IEEE) and Lars Jonsson (IEC), Co-Chairs; J. Arturo Del Rio, IEEE Secretary

See complete TF minutes in [Appendix E](#) of this report.

A.2.7 TF Bushing Overload – Matthew Weisensee, Chair; Alwyn VanderWalt, Secretary

Mr. Weisensee stated that the TF has determined their recommendation for the Subcommittee is to have a section included into the 19.100, the Bushing Application Guide, regarding bushing overload guidance with references in C57.91 and C57.19.00. Dr. Shibao Zhang made a motion to accept the TF recommendation and was 2nd by Ms. Sue McNelly which passed unanimously with no further discussions. Ms. McNelly stated she will set the status of the TF to closed on the website.

See complete minutes in [Appendix F](#) of this report.

A.3 External Liaison Reports

A.3.1 IEC Bushing Standards Activity – Bruno Mansuy, IEEE/IEC Liaison

Mr. Mansuy was not in attendance but submitted a report which can be seen in [Appendix G](#) of this report.

A.3.2 WG PC57.160 Guide for PD Meas. in Bushings and Inst. Trans. – Thang Hochanh, Chair

No meeting was held due to the status of the document. The guide is currently in process of ballot comment resolution.

A.4 Unfinished Business

A.4.1 Dielectric Frequency Response (DFR) Test for Bushings, C57.12.200 – TF Entity Ballot Oversight

The Chair for the TF, Ms. Poorvi Patel, stated that the WG is meeting this November in China and will be present at the 2020 IEEE Transformer Spring meeting. Ms. Patel stated that the TF reviewed numerous cases and that most are involving OIP bushings but there were a few polymer dry bushings. She asked if anyone can provide information on other bushings types besides OIP it would be appreciated.

A.4.2 CIGRE Reference 755, Transformer Bushing Reliability, WG A2.43

Mr. Durand Stacy provided detailed information on what topics are included in the CIGRE document at the Spring 2019 meeting. The Chair asked Mr. Stacy if he could find some common field issues that he could present to the subcommittee at the next meeting which Mr. Stacy agreed to provide.

A.4.3 PC57.165 Temperature Measurement

The Chair asked Mr. Leslie Recksiedler if there was any new information. Mr. Recksiedler stated that he did not receive any contact from the WG so he has no updates.

A.5 New Business

A.5.1 Composite Bushings – J. Arturo Del Rio

The Chair stated that Mr. John Graham led a TF looking into composite bushings for the subcommittee and submitted a final report 3 years ago. The Chair asked that Mr. Del Rio review the report as there were many unresolved issues. Mr. Del Rio asked that the Chair send him a copy of TF report and then presented several slides showing several types of “Dry Type” composite bushings designs and opened the floor to comments and questions.

- Mr. Robert Middleton stated that their company manufactures a similar product to RIS (Resin Impregnated Synthetics) that they call RIF (Resin Impregnate Fiberglass). He would like a definition to not be dependent on the manufacturing process.
- Mr. Dave Geibel stated that new technologies are always evolving and asked if is necessary to categorize each new type or just stick to making classes with performance levels?
- Mr. Egon Kirchenmayer stated as a transformer manufacturer there is plenty of information on OIP bushings but nothing for “Dry” designs. Users need to understand what the differences are. We need to come to agreement on limits instead of seeking out each individual manufacture for information.
- Mr. Arup Chakraborty stated that as a transformer OEM he finds it confusing. Unless a user specifies what they want for a bushing type his only options is to review all the different literature available from all the manufacturers. No existing guide exists for a transformer manufacturer, having a guide developed would be very helpful.
- Mr. Geibel stated he believes we should help to promote innovation, reduce lead-times, improve on-time delivery and quality and warns that the standard should not limit this by going to deep into the details which may stifle innovation.
- The Chair agreed stating that performance is key, which materials are used are not critical.
- One commenter asked if any of the bushing manufactures are making bushings using natural ester fluid, and if not, can anyone tell him why?
 - The Chair stated none are using ester fluids they are all based on mineral oil.
- Dr. Shibao Zhang stated he agrees performance is key and performance wise it's basically all covered in the standards If the transformer is operating per the standard application requirements. If there are special requirements, then they may have to go back to the bushing manufacturer for additional information.
- Mr. Huan Dinh stated he was recently tasked with specifying a polymer insulator and said it was a difficult task as there are so many materials and differences. Some materials are not even compatible with oil. It is very hard to find the required information to correctly select the proper product for the application.
- Mr. Florian Costa stated that we should not forget there are now plug-in bushings in the market.

- Mr. Kumar Mani made a motion to establish a TF to determine classification and performance requirements for dry type bushings which was 2nd and passed. The Chair asked Mr. Del Rio if he would Chair this new TF and he accepted the role.

A.5.2 Announcement – Peter Zhao, Subcommittee Chair

- The Chair stated that after serving as a subcommittee officer for such a long period of time he has decided it is time step down and that current Secretary, Mr. Eric Weatherbee, would serve as the Subcommittee Chair starting in 2020. Mr. Scott Digby will assume the role of Vice Chair and the Secretary position is currently open. Any interested parties should contact Eric Weatherbee or Scott Digby for more information or to apply for that role.

A.6 Other

A.7 Adjournment

Bushings Standards Status F19 (unofficial-reference only)

SubCommittee Chair - Peter Zhao, peter.zhao@HydroOne.com

Standard Project	Title	WG Chair	Pub Year Rev. Due Date	PAR Issue Par Expiration	Comments
PC57.19.00	IEEE Standard General Requirements and Test Procedure for Power Apparatus Bushings	P. Zhao	2004 12/2020	2018 12/2022	WG Draft Development
C57.19.01	IEEE Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings	S. Zhang	2017 12/2027		IEEE Std C57.19.01-2017 (12 July 2018)
PC57.19.02	Standard for the Design and Performance Requirements of Bushings Applied to Liquid Immersed Distribution Transformers	Ed Smith	New	2016 12/2020	WG Draft Development
65700-19-03	IEC/IEEE International Standard -- Bushings for DC application	L. Rechsiedler	2014 12/2024		Off-Schedule Meeting was held Tuesday 10/29/19 , open to all interested
C57.19.04	Standard Performance Characteristics and Dimensions for High Current Power Transformer Bushings with Rated Continuous Current in Excess	S. Digby	2018 12/2028		IEEE Std C57.19.04-2018 (6 June 18)
PC57.19.100	IEEE Guide for Application of Power Apparatus Bushings	T. Spitzer	2012 12/2022	2019 12/2023	PAR was approved by NesCom 5/1/19

**PC57.19.00 - WG for the Revision of
IEEE Standard General Requirements and Test Procedure for
Power Apparatus Bushings**

11:00 AM to 12:15 PM, Monday October 28, 2019
Hyatt Regency Columbus Hotel, Columbus, Ohio USA

Unapproved Meeting Minutes

WG Chair Peter Zhao presided over the meeting, with Eric Weatherbee as Secretary. Introductions were made, and meeting rosters were circulated to record the attendance.

Total Attendance	72
Members in Attendance	31 out of 44 members, quorum attained
Guests in Attendance	41
Guests Requesting Membership	6

The WG Chair presented the agenda with the call for patents, none were received, and that copyright information can be found on the Transformer Committee website. The remaining meeting time focused on review of the comments received from the review group with the attendees. The following is a summary of those discussions and resulting disposition or follow up action to be taken:

Review Section: 7. Test Procedure: Page 10, Table 2, 7.2.1.5 – Comment from Mr. David Geibel: description of test should include PD measurement. **Proposed Change:** Revise to: Rated frequency dry withstand with partial discharge measurement.

Discussion, disposition, and/or follow up action:

- [Accepted](#)

Review Section: 7. Test Procedure: Page 10, Table 2, 7.2.1.1 & 4 – Comment from Mr. Geibel: description of both tests in Table 2 and the tests themselves should either use kV Class or BIL to be consistent. **Proposed Change:** Revise table description to use BIL - 900 BIL and below, above 900 BIL

Discussion, disposition, and/or follow up action:

- [Accepted](#)

Review Section: 7. Test Procedure: Pages 11 & 12, Subclauses 7.1.4, 7.2.1.1, 2, 4 – Comment from Mr. Geibel: Std. 4 has changed, and these subclauses should be updated to correlate. **Proposed Change:** **TBD**

Discussion, disposition, and/or follow up action:

- The Chair asked for manufacturers to take the lead to review Std. 4 and 19.00 for any discrepancies or issues.
 - Mr. Duran Stacy and Dr. Shibao Zhang volunteered to review the two documents.
 - Ms. Ashley Moran stated IEEE will provide IEEE Std. 4 and the redline version so that this task can be completed.

Review Section: 7. Test Procedure: Page 12, Subclause 7.2, Line 20 – Comment from Mr. Geibel: Remove RIV or allow it only for 34kV class and below. **Proposed Change:** above 350 BIL must use apparent charge

Discussion, disposition, and/or follow up action: [Accepted](#)

- The following is some of the discussion that took place regarding this proposal:
 - Suggestion was made to make the limit 46kV
 - Suggestion was made to make the limit 69kV, which is the cutoff for test tap and is the traditionally considered the low voltage bushings.
 - Suggestion we should follow the transformer standard, some bushings do not have taps so measuring RIV is often done.
 - Suggestion was made that we could differentiate if using a test tap or voltage tap.

- Comment was made that we should avoid specifying per the type of tap as some bushings are manufactured that require a voltage tap per standard but are using test taps.
- It was decided that it should specify BIL as the limit to be consistent. A motion was made and passed to accept that RIV is allowable for 350 BIL and below. Or above 350 BIL must use apparent charge.

Review Section: 7. Test Procedure: Page 13, Subclause 7.2.1.3, Line 3 – Comment from Mr. Geibel: Propose to follow IEC and type test for margin of 5% over for negative chopped waves. **Proposed Change:** Crest voltage for positive polarity is per Table 1 in 19.01 and 5% higher for negative polarity.

Discussion, disposition, and/or follow up action: **TBD**

- Mr. Geibel, the original commenter, stated he wishes to review the other standards before presenting the comment to the WG for consideration. Due to the time difference in the original submittal he must review the material before a proper discussion can take place.

Review Section: 7. Test Procedure: Page 13, Subclause 7.2.1.5 – Comment from Mr. Geibel: Remove RIV and add it to the appendix. **Proposed Change:** Withdrawn, due to previous agreement, limit RIV to allowed for 350 BIL and below.

Discussion, disposition, and/or follow up action: **Withdrawn**

- Mr. Geibel withdrew this proposal based on the previous agreement to allow RIV for bushings 350 BIL and below.

Review Section: 7. Test Procedure: Page 13, Subclause 7.2.3.a Line 34 – Comment from Mr. Geibel: Hot spot detection is not what we want here. **Proposed Change:** Replace detected with determined and measured

Discussion, disposition, and/or follow up action: **Accepted**

Review Section: 7. Test Procedure: Page 14, Subclause 7.2.3.d, Line 9 – Comment from Mr. Geibel: “300mm away” is vague. **Proposed Change:** Revise to 300mm plus ½ the “D” dimension from the bushing’s centerline (+/-50mm)

Discussion, disposition, and/or follow up action: **Accepted**

Review Section: 7. Test Procedure: Page 14, Subclause 7.2.3, Line 23 – Comment from Mr. Geibel: Add a note to reference 19.04. **Proposed Change:** “Note: for temperature rise testing of bushings rated over 5000 Amps and operating within an enclosure, see C57.19.04.”

Discussion, disposition, and/or follow up action: **Accepted**

Review Section: 7. Test Procedure: Page 14, Subclause 7.2.3.f, Line 17, 18 – Comment from Dr. Shibao Zhang: Change in ambient temperature affects the temperature **Proposed Change:** Change 1°C to 1K rise

Discussion, disposition, and/or follow up action: **Accepted**

Review Section: 7. Test Procedure: Page 14, Subclause 7.3.1, Line 36 – Comment from Mr. Geibel: “300mm away” is vague. **Proposed Change:** Revise to 300mm plus ½ the “D” dimension from the bushing’s centerline (+/-50mm)

Discussion, disposition, and/or follow up action: **Accepted**

Meeting was adjourned, 12:15pm

Respectfully Submitted,

WG Secretary Eric Weatherbee

C57.19.100 Bushing Application Guide Unapproved Meeting Minutes – 10/28/19 Fall Meeting

The meeting was called to order at 3:20 with 86 people present, 19 members 28 guests 37 new guests with 4 requests for membership. Quorum was achieved.

After introductions, a request for patent disclosures was made and none were presented.

Minutes from the Spring 2019 meeting minutes were approved. Motion by Fabian Stacey second by Dave Geibel .

All copied or used information must be copyrighted and referenced in all releases of distributed documents.

The PAR has been approved, a first draft should be available by the Spring 2020 meeting.

Suggested additions/comments approved this meeting to the document:

- Acknowledge that breaker bushings are no longer included in this guide C57.19.01-2017 Annex A should be referred to for TBI bushings. (Transformer Breaker Interchangeable).
- It was suggested to add that they are subject to solar radiation and harmonics.
- New technology allows for higher thermal insulation classes
- Insulation system types and fluid types are changing and should be included in this Guide. David Stockton has agreed to provide examples before next meeting.
- A note will be added about derating bushings if not capable of 65C rise
- It should be secured that bushing hot spot temperature doesn't exceed 105C for standard applications for max overload current of the transformer at the lowest tap to be considered to determine the bushings application. (Much discussion on how this applies to different types of bushing construction types). The chair requested the manufacturers send wording on how best to select different bushing types.
- The drawlead should be dimensioned to the max overload current of the transformer.
- Thermal coordination between the bushings and the top terminal connection.

The meeting was adjourned at 4:12 PM

Tommy Spitzer, Chair
Jeff Benach, Secretary
October 28, 2019

Distribution Transformer Subcommittee Task force / Working Group Report

Document #: PC57.19.02

Document Title: Standard for Design and Performance Requirements for Bushings
Applied to Liquid Immersed Distribution Transformers

Chair: Steve Shull Vice-Chair: Ed Smith

Secretary: Rhett Chrysler Percent Complete: 70

Current Draft Being Worked On: D1.4 Dated: October 09, 2019

Meeting Date: October 29, 2019 Time: 11:00 am – 12:15 pm

Attendance:	Members	<u>27</u>
	Guests	<u>40</u>
	Total*	<u>67</u>

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

Meeting Minutes:

Meeting was called to order by the Chair at 11:00am, the roster was circulated followed by introduction of members and guests.

Quorum was verified with 27 members.

Motion to approve the meeting agenda by Jerry Murphy, second by Marty Rave with unanimous approval.

Motion to approve Spring 2019 meeting minutes (Anaheim, CA) by Jerry Murphy, second by Eric Weatherbee with unanimous approval.

Chair made a call for any Essential Patent Claims and Copyright materials with none brought forward.

Old Business

Taskforce report – Figure 4 – Luis Osorio

Task force presented test results comparing tri-clamp bushing orientation. The single hole was located at the 6 o'clock position and 12 o'clock position.

Test 1 (Carlos Gaytan) and 2 (Luis Osorio) was completed for 1" stud LV bushing in both orientations. Conclusion determined that either orientation passed proposed PC57.19.02 cantilever requirements. However, the failure point did vary between the two orientations.

Task force recommendation was that either 6 o'clock or 12 o'clock positions could be used and would fulfill standard requirements and some type of comment be added that the 6 o'clock position has better cantilever performance. It was suggested a note be placed in the standard document to highlight this. Steve Shull compose the note and place it in the next revision of the document.

Taskforce report – Section 5.3.1 – Barry Beaster

Task force presented draft proposal for Section 5.3.1. Task force determined that stud diameter was not appropriate for rating requirements and should reference thermal performance instead. Proposed section was tabled for approval pending completion of short circuit temperature rise section 5.2.X. This was discussed later in the meeting.

Taskforce report – Two Hole Spade Figure – Al Traut

Distribution Transformer Subcommittee Working Group Report

Task force presented proposed Figure 8 – “G” Pad Termination Configuration.

Barry Beaster motioned to accept Figure 8 as presented, second by Al Traut. Discussion followed for whether proposed physical dimensions represented minimum or specific values. Jerry Murphy proposed a friendly amendment to revise the title of the A/B/C/E dimensions to be minimum requirements keeping D and the hole diameter specific. Amendment was accepted by Barry. Further discussion expressed concerns with interchangeability and potential for variation between dimensions that would violate other dimensional requirements (Dave Geibel and Zane Kornowski). Gary King referenced similar requirements in C57.12.34 where all dimensions represent minimum requirements. Jerry Murphy proposed additional friendly amendment to change proposed A/B/C/D/E dimensions to minimum requirements, keep hole diameter specific, denoting it with a diameter symbol, and adding another D dimension to show that the holes would be equidistant on the pad. Barry accepted this friendly amendment. The motion was called to vote and passed with unanimous approval. The group noted that similar revisions would be required for Figure 7. Steve Shull would incorporate these in the next revision.

Taskforce report – Table 5 – Lee Tyler

Task force presented proposal for Table 5 – Performance Characteristics.

A column for Maximum Line to Ground was included. Lee noted that it was previously included in prior revisions to C57.12.00 but is no longer included in current revision.

Rows with footnote “a” represent values pulled from Class 1 Power performance requirements and vary from distribution requirements.

Wet withstand column requirements proposed for 1 min duration for consistency with IEEE Std4 requirements.

Further discussion for Table 5 was tabled for offline discussion to preserve time. This table would be circulated as an inclusion in the next revision and comments would be solicited from the group between now and the next meeting for discussion at the spring meeting.

New Business

Quick tutorial on Short Circuit Bushing Ratings (Section 5.2.X) – Barry Beaster

Barry presented a general background discussion of IEC 60137 (2017) methodology for calculation of terminal temperature of bushings under short-circuit conditions. Comments included that the α factor is assumed to be 0.8 per IEC methodology where copper alloy CDA110 should actually be 0.78.

Two alternatives were proposed to IEC methodology with a comparison of variable values vs. final temperature. With this information, Steve Shull, Chair, created a taskforce to be chaired by Barry Beaster and having the following members: Dave Geibel, Lee Tyler, Carlos Gaytan, Larry Dix, and Marek Kornowski. They will develop a section on short circuit bushing testing.

Due to lack of time the meeting was adjourned at 12:17 pm. The next meeting will be held in Charlotte, NC during the Spring 2020 meeting.

Submitted by: Rhett Chrysler

Date: 10/29/2019

IEC/IEEE 65700_19_03 DC Bushings TF

Minutes of 2019 Fall Meeting – Columbus, OH

Tuesday, October 29, 2016 4:45PM -

Morrow Room

Les Recksiedler – Chair, Email - lrecksiedler@hvdc.ca

XXXXXX – Vice Chair

J. Arturo Del Rio – Secretary

1. **Attendees Roster Sign In as RFID not available** - Indicate Guest (G), membership request (M) or Corresponding Member (CM): CM cannot make most of the meetings but wants to participate. Make sure email is legible

Seven memberships, one Corresponding Member, six Guests

2. **Still looking for a Vice Chair Volunteer**

3. **Agenda – Any additions**

- **Patents – No Declarations**
- **Copy write issues:** Use of wording or figures from other IEEE standards, papers or other organizations need written permission from them. See IEEE website for details.
- **Joint IEC IEEE standard - Mr. Lars Jonsson, IEC Chairperson-** IEC is surveying their member for the areas needing revision, results expected for Spring IEEE meeting in Charlotte
- **Malia Zaman** give us information on the dual logo process

Major areas needing standard revision to be identified

- PAR to be created to move from Task Force to Working Group in conjunction with IEC– Tile, Scope and Purpose
- **Current Title:** IEEE 65700-19-03-2014 - IEC/IEEE International Standard -- Bushings for DC application, IEEE need to be completed by 2024. IEC by 2022
- VSC to be moved from Annex to inside standard
- 800 kV DC and 1100 kV DC bushings to be included – Any changes to the standard to accommodate
- Resin Impregnated Synthetic (RIS) Bushings to be included. The bushing's core is wound with synthetic fabrics
- Hybrid Insulation Bushings if required
- Extended DC polarity reversion test to conform with the revised test in the converter Transformers standard

4. **New Business – None**

5. Start working via Emails:

Informal meetings by email to start of a list of issues and possible resolution will be done between now and Spring meeting

6. Meeting Adjournment @ 5:15 Approximately

Ldr/

2019 10 29

IEEE/PES Transformer Committee
Bushing Overload Task Force

Meeting Minutes
Hyatt Regency Hotel
Columbus, OH USA
Monday, October 28, 2019
4:45 PM – 6:00 PM

The meeting was called to order by Chair Matt Weisensee at 4:48 pm. Secretary Alwyn VanderWalt was also present. The Vice-chair position is vacant.

Agenda:

1. Welcome
Attendance roster sign-in
2. Determination of a Quorum
3. Approval of TF Spring meeting minutes in Anaheim, CA
4. Approval of F19 Agenda
5. Discuss where the “Guide for Selecting a Bushing to Meet Transformer Overload Conditions” should be located.
 - a. C57.91 - Guide for Loading Mineral Oil-Immersed Transformers and Step-Voltage Regulators
 - b. C57.19.100 - Guide for Application of Power Apparatus Bushings
 - c. Other New or Existing IEEE Document
6. Discuss topics and sections which should be included in the Guide
7. Adjournment

The Chair introduced himself and the secretary, then provide a short history of the scope of the task force and the activities to date.

After doing a headcount, a quorum was reached. The RFID system confirmed that there were 27 members present of a total of 39, for a 69.2% attendance rate. There were 65 attendees to the meeting.

The minutes of the previous meeting were approved by unanimous consent. The chair presented the agenda, which was approved by unanimous consent.

The chair discussed the results of the email survey that was sent out to the members of the TF to select which of three potential guides the new bushing overload guidance should be included. The guides are:

- a. C57.91 - Guide for Loading Mineral Oil-Immersed Transformers and Step-Voltage Regulators
- b. C57.19.100 - Guide for Application of Power Apparatus Bushings
- c. C57.19.00 General Requirements and Test Procedures for Power Apparatus Bushings

The TF members proceeded to discuss various technical considerations that relates to bushing design and bushing overload as it relates to transformer overload.

Toby Johnson made a motion to recommend to the Bushing SC to include bushing overload guidance in C57.19.100, with references in C57.91 and C57.19.00. Motion was seconded by Richard Amos.

Discussion:

Peter Zhao, chair of the Bushing Subcommittee stated that before the bushing overload guide can be created the language related to bushing overload in C57.91 should be modified first to correct in apparent error in that guide. The relevant section of C57.91 references C57.19.100, which had also recently been changed. Dave Wallach stated that the WG are already working on making changes to C57.91

After further discussion, the motion made by Toby Johnson was approved with 27 votes. There were no opposing votes or abstentions.

Following the approval of the motion, the chair presented slides from a user perspective on what topics should be included in the guide.

After further discussion, Dave Geibel made a motion to adjourn, which was seconded and unanimously approved.

The meeting was adjourned at 17:59 pm.

TF Chair: Matt Weisensee, PacifiCorp

TF Vice-chair: Vacant

TF Secretary: Alwyn VanderWalt, PNM

FALL 2019 MEETING OF IEEE TRANSFORMER BUSHINGS

Location: Columbus, Ohio, USA

Date: October 27 – 31, 2019

BUSHINGS SUBCOMMITTEE WORKING GROUP AND TASK FORCE MEETINGS

Liaison Reports - IEC Bushing Standardization Activities

**INTERNATIONAL ELECTROTECHNICAL COMMISSION
TECHNICAL COMMITTEE No.36A: Insulated Bushing**

IEC TS61464	Start the revision of IEC60599 (Mineral oil-filled electrical equipment in service – Guidance on the interpretation of dissolved and free gases analysis)
TC14/36A Bushing dimensional standardization	Decision to start a PWI with the collaboration of TC14 to evaluate a possible standardization of the transformer bushings in the three categories LV/MV/HV.
Guide of application for power apparatus bushings (IEEE C57.19.100)	Study the feasibility of this document and the opportunity to approach IEEE for a dual logo new work