

IEEE Power and Energy Society Entity Annual Report

2020

Entity: Transformers Committee
Website: www.transformerscommittee.org
Chair: Bruce Forsyth
Vice-Chair: Ed teNyenhuis
Secretary: David Wallach
Immediate Past Chair: Susan McNelly

1. Significant Accomplishments:

1.1. *Committee Structure*

The Transformers Committee manages about 115 standards through 12 standards development subcommittees, 1 administrative subcommittee, and 1 meeting planning subcommittee. Despite the challenges presented by the COVID-19 pandemic, progress continued to be made on active standards during 2020 through the effective use of electronic (virtual) meetings by working groups and task forces. The following figure shows the current subcommittees. An asterisk (*) indicates a subcommittee that does not develop standards.

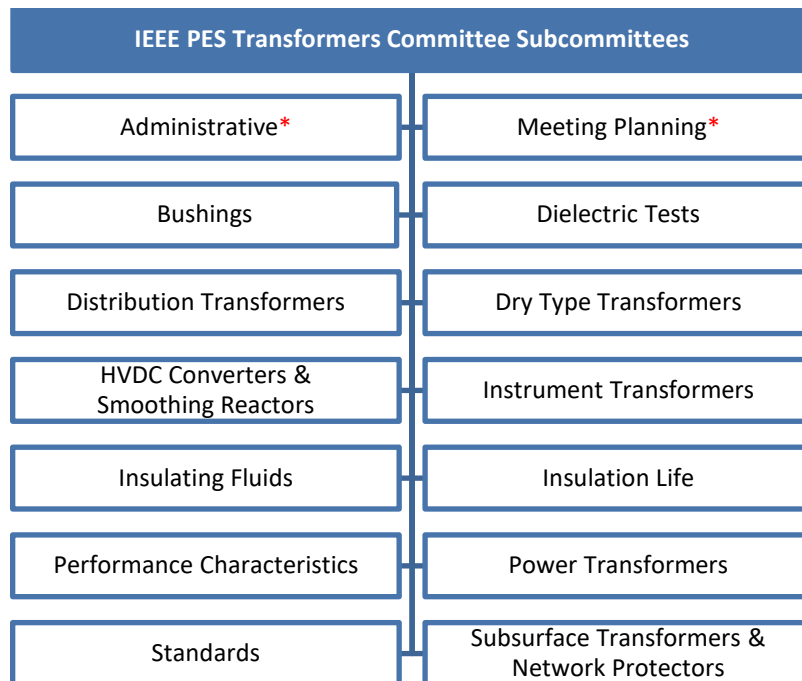


Figure 1: Transformers Committee Subcommittee List

1.2. First Virtual Committee Meeting

A primary accomplishment during 2020 was converting the fall Committee meeting from an in-person meeting to a virtual meeting. A small task force was formed after the sudden cancellation of the spring meeting to develop a contingency plan for a virtual meeting in the event the fall meeting could not be held in-person. By mid-summer it became obvious the fall meeting would have to be virtual, and the task force switched from contingency planning to making firm plans. An important decision made during this process was to hire an outside firm to assist activity leaders with the administration of the electronic portion of the meetings. Participant feedback from the fall meeting was overwhelmingly positive and the same meeting model is expected to be used for future virtual meetings. Attendance was excellent with over 500 registered participants. The format for this first virtual meeting will be used for future virtual meetings.

1.3. New Voting Members

Eleven new voting members were approved by the Administrative Subcommittee during 2020. Over the last 5 years an average of 15 new voting members were added each year. Although this year's new voting member growth is smaller than average, the Committee considers 11 a great number given the pandemic issues.

1.4. Standards Activity in 2020

During 2020, 9 revisions and 1 amendment to existing standards were completed and approved by the Standards Association Board. In addition, the Standards Association Board approved 7 PARs for revision, 8 PAR extensions, 1 PAR for an amendment, and 1 PAR corrigendum. As of December 31, 2020, there were 53 active PARs distributed as follows:

PARs – revision.....	36
PARs – new	14
PARs – corrigenda.....	2
PARs – amendments	1

During the Fall 2020 virtual Committee meeting (the only meeting in 2020) a total of 71 subcommittee, working group, and task force meetings were held over 3 ½ days. An Administrative Subcommittee meeting was held the week before the Committee meeting. A list of the activity groups that met during the Fall 2020 meeting is shown below (activities marked with an asterisk (*) are new and met for the first time):

GENERAL:

- Administrative SC
- Transformers Committee Main Meeting
- Newcomers Orientation
- Meetings Planning SC

WORKING GROUPS/TASK FORCES:

Bushing SC

- WG PC57.19.00 – Bushings Gen. Requirements
- WG PC57.19.02 – Distribution Transformer Bushings
- WG 65700.19.03 – Bushings for DC Applications
- WG PC57.19.100 – Bushing Application Guide
- TF on Dry Bushing Class and Perf. *

Distribution Transformers SC

- WG PC57.12.20 – Overhead Distr. Transf.
- WG Encl Int (C57.12.28, C57.12.29, C57.12.31, C57.12.32)
- WG PC57.12.34 – 3-ph Padmount Dist Transf.
- WG PC57.12.35 – Bar Coding for Dist Transf.
- WG PC57.12.38 – 1-ph Padmount Dist Transf.
- WG PC57.167 – Guide for Monitoring Distr Transf
- TF on Trans. Efficiency & Loss Eval. (DOE Activity)

Dielectric Test SC

- WG PC57.98 – Transformer Impulse Test Guide
- WG PC57.113 – Partial Discharge Test
- WG PC57.160 – PD Measurement in HV Bushings and Instrument Transformers
- WG PC57.168 – Low Frequency Test Guide
- TF on Cont. Revision to Low Frequency Tests
- TF on Winding Insulation PF
- TF on Partial Discharge Tests for Class I Transformers

Dry Type SC

- WG PC57.16 – Dry Type Reactors
- WG PC57.124 – Dry Type PD Detection
- TF on PC57.12.52 – PAR Development
- TF on PC57.12.96 – Guide for Loading Dry Type Trans.
- TF on PC57.134 – Guide for Hottest Spot in Dry Type
- TF on IEEE 259 – Std Test Procedures

Insulating Fluids SC

- WG PC57.166 – Consolidation Insulating Fluid Guides
- TF on C57.104 – Next Revision to C57.104 Guide for Interpretation of Gasses*
- TF on C57.146 – Guide for Interpretation of Gasses in Silicone*

Insulation Life SC

- WG PC57.91 – Loading Guide
- WG PC57.100 – Thermal Evaluation
- WG PC57.154 – High Temp Liquid Transformers
- WG PC57.162 – Moisture in Insulation
- WG PC57.165 – Temp Measurement
- WG PC57.169 – Determine Max Winding Temp Rise
- TF – Temp Rise Other than Windings (C57.12.00, Clause 5.11.1.4)

Instrument Transformers SC

- WG PC57.13.8 – Station Service Volt. Transf.
- WG PC57.13.9 – PLC Caps & CCVTs
- TF – Instrument Transformer Accuracy

HVDC Converters & Smoothing Reactors SC

- No WG or TF meetings

Performance Characteristics SC

- WG PC57.21 – Shunt Reactors
- WG PC57.142 – Transients Due to Breaker Interaction
- WG PC57.149 – Guide for FRA
- WG PC57.164 – Short Circuit Withstand
- TF on Continuous Revisions to C57.12.00
- TF on Continuous Revisions to C57.12.90
- TF on Audible Sound Level Revisions to C57.12.90

Power Transformers SC

- WG PC57.116 – Guide for Transformers Connected Directly to Generators*
- WG PC57.143 – Transformer Monitoring
- WG PC57.170 – Condition Assessment Guide
- TF on Volts per Hertz

Standards SC

- WG PC57.12.80 – Standard Transf. Terminology
- WG PC57.152 – Guide for Field Testing
- WG PC57.163 – Geomagnetic Disturbances*
- TF IEEE-IEC Cross Reference

STNP SC

- WG PC57.12.24 – Submersible Transformers
- WG PC57.12.40 – Liquid-immersed Secondary Network Transformers
- WG PC57.12.44 – Sec. Network Protectors

1.5. *Conference Papers Reviewed*

A total of 9 papers were assigned to the Transformers Committee for review for the 2020 T&D Conference and Exhibition prior to its cancellation. Of the 9 papers submitted, 7 were approved.

A total of 12 papers were assigned to the Transformers Committee for review for the 2020 General Meeting. Of the 12 papers submitted, 7 were approved.

1.6. *Meetings*

The Transformers Committee holds two meetings each year, one in the spring and one in the fall. Historically these have been in-person meetings, but due to the COVID-19 pandemic the Spring 2020 meeting was cancelled and the Fall 2020 meeting was converted to a virtual meeting. The Committee was incredibly pleased that about 516 participants registered to attend the Fall 2020 virtual meeting.

Attendance at each of the spring and fall Committee meetings has increased to well over 500 for the past several years and over 600 for some meetings. Locating venues that can accommodate meetings of 600+ attendees over a several day period at a reasonable cost can be a difficult challenge. To address this the Transformers Committee has had to book hotels over a year in advance and currently has contracts in place until the end of 2022. When the Spring 2020 meeting in Kansas City was cancelled an agreement was made to schedule a future meeting at the same Kansas City hotel. The specific meeting date has not been determined. The following list shows meetings that are now firm, subject to our ability to hold in-person meetings:

<u>Meeting</u>	<u>Location</u>	<u>Date</u>
Spring 2021	Toronto, ON, CANADA Virtual	April 26-29, 2021
Fall 2021	Milwaukee, WI USA	October 17-21, 2021
Spring 2022	Denver, CO, USA	March 27-31, 2022
Fall 2022	Charlotte, NC USA	October 16-20, 2022
TBD	Kansas City, MO	TBD

2. **Benefits to Industry and PES Members from the Committee Work:**

The Transformers Committee is one of the largest and most active technical committees of the IEEE Power and Energy Society (PES). The continuing scope of the Committee is to develop and update standards and guidelines for the design, testing, repair, installation, operation and maintenance of transformers, reactors and associated components that are used within electric utility and industrial power systems. The Committee is comprised of technical and managerial representatives from manufacturers, consultants, vendors and end users of electrical transformers and components. Participating in Transformer Committee activities provides the opportunity to network with industry experts from around the world, to share and learn about non-proprietary or otherwise unprotected technology, and to generally assist in the globalization of industry standards. This privilege allows participants to remain abreast of the latest trends and developments in the transformer industry.

Participants benefit from learning opportunities, such as sharing ideas and seeking input from other engineers and technical people facing similar technical challenges to their own. Tutorials are offered to provide growth opportunities as well as opportunities for participants to share their own knowledge and experiences by volunteering to be a tutorial presenter. Tutorials are recorded and available in a password-protected area of the Committee's website for reference by Committee participants and their sponsoring employers.

An important privilege and responsibility of Committee members and other participants is to review papers submitted for presentation at various IEEE PES sponsored events. Reviewing papers is an important service to authors and the industry and allows reviewers access to state-of-the-art information and developments.

3. Benefits to Volunteer Participants from the Committee Work:

A primary benefit to volunteer participants is the opportunity to actively participate in the development of the standards that govern the transformer industry. This participation leads to a well-deserved sense of pride as well as advanced awareness of upcoming changes during the development stages. Each of the 70+ active groups has a Chair and a Secretary, and most also have a Vice Chair. The Committee's Policies and Procedures for Standards Development manual includes term limits for responsible subcommittee Chair positions, so opportunities for new people to get involved at a higher level are periodically available. All subcommittee, working group, and task force activities are open to any volunteer who is interested in participating.

The ability to meet with other industry experts, hear about the challenges faced by others, and to listen to how problems were solved helps all volunteers grow technically and to be more effective at solving the challenges faced by their individual employers.

The Committee's Standards Coordinator typically offers presentations during one of the lunch breaks focused on providing subcommittee, working group, and task force current and future leaders with information related to standards development, such as the standards development processes, Roberts Rule of Order, and the 123Signup Association Management System (AMS) capabilities. These presentations help activity leaders become more effective in their respective roles and help to ensure the integrity of the standards development process is maintained.

4. Recognition of Outstanding Performance:

Transformers Committee awards are typically given to recipients during an awards luncheon at in-person meetings. During 2020 the only Committee meeting held was virtual, so the awards ceremony was recorded and made available to all registered participants. Award recipients were notified in advance and the physical awards were mailed to them directly. The following awards were made:

4.1. Meeting Host Team Certificate of Appreciation

The Spring 2020 meeting was originally scheduled to be in-person in Charlotte, NC and hosted by Duke Energy. A significant amount of work had already been completed by the time the meeting was

cancelled because of coronavirus concerns. A Host Team Certificate of Appreciation was awarded to the following Duke Energy employees:

David Wallach	Kumar Mani
Cihangir Sen	Reinaldo Valentin
Dinesh Sankarakurup	Scott Digby
Kevin Sullivan	Tyler Morgan

4.2. *Special Certificate of Appreciation*

A Special Certificate of Appreciation was presented to each member of the Administrative Subcommittee Virtual Meeting Task Force for their efforts to coordinate the Committee’s first virtual meeting. Certificates of Appreciation were awarded to the following:

<u>Name</u>	<u>Affiliation</u>
Ed teNyenhuis - TF Chair	Hitachi ABB Power Grids
Casey Ballard	DuPont
Tammy Behrens	SPX Transformer Solutions, Inc.
Jerry Murphy	Reedy Creek Energy Services
Tom Prevost	Weidmann Electrical Technology
Jennifer Quandel	HPN Global
Ed Smith	H-J Family of Companies
Dave Wallach	Duke Energy

4.3. *Outstanding Service Awards*

For long-term commitment, dedication, and contributions to the Transformers Committee, an Outstanding Service Award was given to the following recipients:

Tom Prevost	Weidmann Electrical Technology
Edward J. Smith	H-J Family of Companies

4.4. *IEEE Standards Association Standards Board Working Group Awards*

In addition to the Committee Awards above, the IEEE Standards Association Standards Board (SASB) presents its own award to the WG Chair upon publication of a new or revised document and offers the WG Chair the opportunity to nominate significant contributors to the project for an IEEE SASB Certificate of Appreciation. Awards were presented to the following for their contributions to the referenced document:

4.4.1. *IEEE Std C57.12.32™-2019 – IEEE Standard for Submersible Equipment – Enclosure Integrity*

Dan Mulkey (Chair)	Mulkey Engineering Inc.
Jerry Murphy (Vice Chair)	Reedy Creek Energy Services
Jeremy Van Horn (Secretary)	IFD Corporation
<i>Outstanding Contributors:</i>	

Scott Abbott	PPG
Darren Brown	Howard Industries
Carlos Gaytan	Prolec GE
Brian Klaponski	Carte International Inc.
Giuseppe Termini	PECO Energy Company
Mike Thibault	Pacific Gas and Electric
Al Traut	Howard Industries
Alan Wilks	Consultant

4.4.2. *IEEE Std C57.123™-2019 – IEEE Guide for Transformer Loss Measurement*

Ed TeNyenhuis (Chair)	Hitachi ABB Power Grids
Tony Franchitti (Secretary)	PECO Energy Company
<i>Outstanding Contributors:</i>	
Tauhid Ansari	ABB Inc.
Reto Fausch	RF Solutions
Ramsis Girgis	Hitachi ABB Power Grids
Mark Perkins	D4EnergySolutions LLC
Bertrand Poulin	Hitachi ABB Power Grids
Andy Steineman	Delta Star Inc.
Craig Stiegemeier	ABB Inc.
Ajith Varghese	SPX Transformer Solutions, Inc.

4.4.3. *IEEE 1277™-2020 – General Requirements and Test Code for Dry-Type and Oil-Immersed Smoothing Reactors and for Dry-Type Converter Reactors for DC Power Transmission*

Klaus Pointner (Chair)	Trench Austria GmbH
Pierre Riffon (Technical Editor)	Pierre Riffon Consulting Inc.
Ulf Radbrandt (Secretary)	Hitachi ABB Power Grids
<i>Outstanding Contributors:</i>	
David Caverly	Trench Limited
Solomon Chiang	The Gund Company
Domenico Corsi	Doble Engineering Co.
Eric Davis	Burns & McDonnell
Alexander Gaun	Coil Innovation GmbH
Monty Goulkhah	Kinectrics
Peter Heintzig	Weidmann Electrical Technology
John John	Virginia Transformer Corp.
Klaus Papp	Klaus Papp
Christoph Ploetner	Hitachi ABB Power Grids
Leslie Recksiedler	Manitoba Hydro
Alan Sbravati	Cargill, Inc.
Michael Sharp	Trench Limited
Waldemar Ziomek	PTI Transformers

4.5. *Memorials*

Sadly, during 2020 we lost 5 past participants for whom memorials were added to the Committee's Memorials page. Each of these great individuals contributed to the past success of the Transformers Committee and helped build the foundation upon which we continue to grow. Memorials were added for the following:

Ron Barker
David Harris
Anthony Jonnatti
John Sullivan
Robert Veitch

5. **Coordination with Other Entities (PES Committees, CIGRE, standards, etc.):**

The Transformers Committee coordinates with several other PES committees, national and international technical committees, and national and international standards development organizations (SDO's), including ASTM, CIGRE, IEC, CSA, NFPA, NEC, SCC4, Doble, NERC/FERC, and EPRI. This effort includes joint sponsorship of standards with IEC, and established liaisons with CIGRE, IEC TC14, ASTM D27, and SCC4 to support significant activity and the exchange of technical information and keeping each other informed of the latest technology advancements.

6. **New Technologies of Interest to the Committee:**

The major new technologies of interest to the transformers committee continue to be the ongoing growth and changes in monitoring systems and their application in relation to the transformer industry, as well as solid state transformer technologies. While solid state transformers incorporate traditional transformers, they also incorporate power electronics that are outside the scope of the Transformers Committee. Effective development of industry standards for these devices requires the coordination of multiple technical committees.

7. **Global Involvement**

The Transformers Committee has a diverse group of participants from all around the world. Table 1 shows a few participant statistics, with particular emphasis on regions 8, 9, and 10 (Africa, Europe, Middle East, Latin America, Asia and Pacific) which are target regions for PES to increase member involvement.

Table 1: Regions 8, 9, and 10 Participation Statistics

Total number of committee members	Officers from regions 8, 9 and 10	Subcommittee officers from regions 8, 9 and 10	Subcommittee members from regions 8, 9, and 10
228	0	1 SC, 8 WG	22

8. Problems and Concerns:

8.1. *New Voting Members*

Eleven new voting members were approved by the Administrative Subcommittee during 2020, with 5 approved at the Spring 2020 meeting and 6 at the Fall 2020 virtual meeting. This represents a 21% decrease from 2019 and the third year in a row that the number of new voting members has declined. Efforts will be taken to encourage the many regularly attending non-voting participants to consider applying for voting membership.

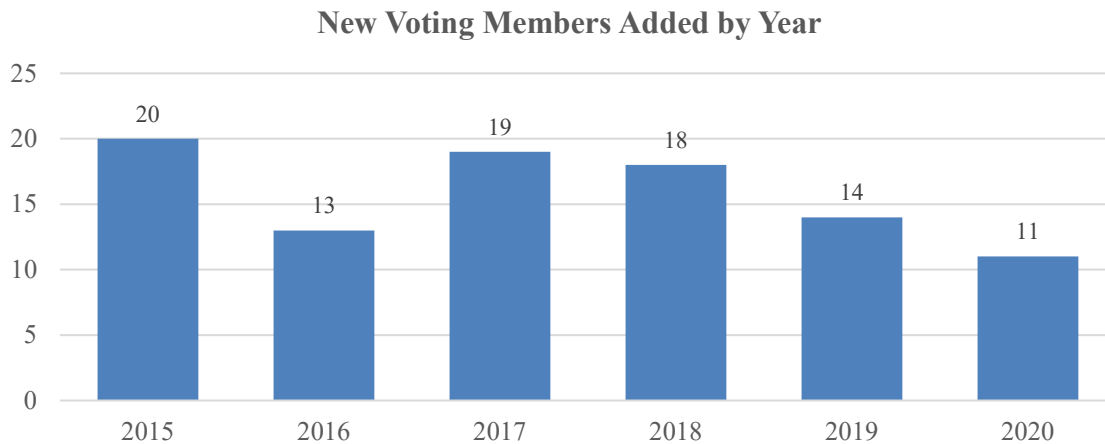


Figure 2: New Voting Members Added by Year

8.2. *Total Membership*

The addition of 11 new members brings the total Committee membership to 228 at the end of 2020. The Committee's total membership has remained fairly steady over the past few years. Efforts will be taken to encourage the many regularly attending non-voting participants to consider applying for voting membership.

Total Committee Members by Year

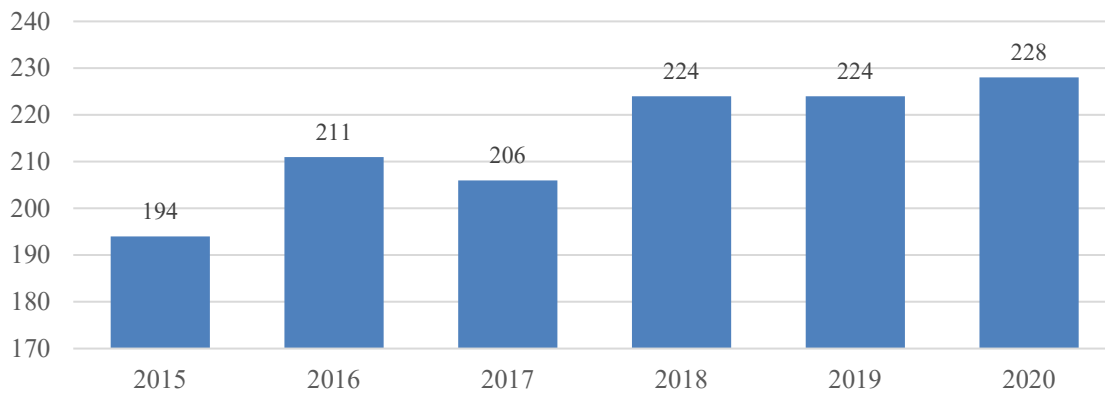


Figure 3: Total Committee Membership by Year (at year-end)

8.3. *Non-Voting Participation*

Non-voting participation had risen an average of 4% per year from 2015 to 2019, but in 2020 the participation dropped by about 3.5%. Despite the drop, the overall participation by non-voting participants is the second highest in the last 6 years. Voting membership has not risen at the same rate as non-voting membership. Efforts will be taken to encourage the many regularly attending non-voting participants to apply for voting membership.

Total Non-voting Participants by Year

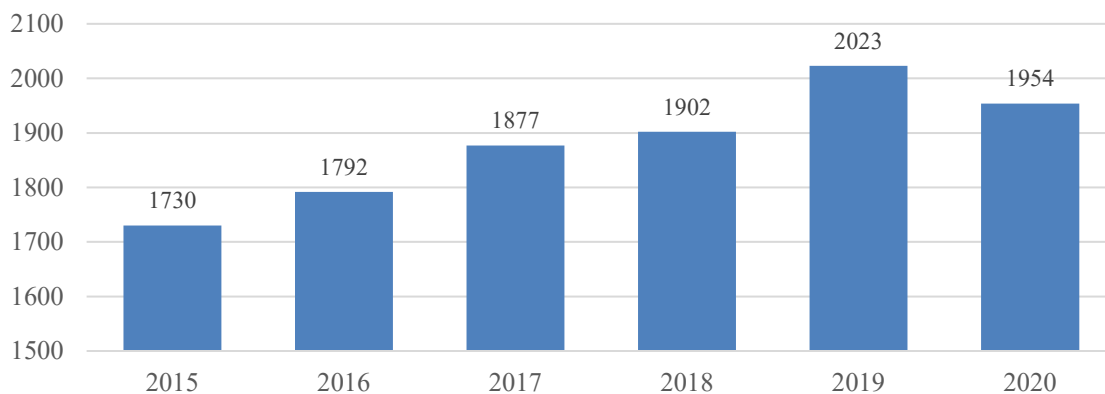


Figure 4: Total Non-voting Participants by Year (at year-end)

9. **Significant Plans for the Next Period:**

9.1. *Technical Tours*

The Transformers Committee typically coordinates technical tours of facilities that offer services and/or products related to the transformer industry and are reasonably close to the in-person meeting location. Because of the coronavirus the only Transformers Committee meeting held during 2020 was virtual and

no technical tours were provided. Technical tours have been extremely popular in the past and the Committee expects to continue offering tours when in-person meetings resume.

9.2. Future Virtual Meeting Plans

The Committee has several future meetings already planned with hotel contracts signed. The success of the Fall 2020 virtual meeting has raised interest in having more virtual meetings in the future. However, many participants have stated they value the personal interactions and networking opportunities presented during in-person meetings. The Committee will be studying its long-term meeting planning approach to find a good balance between cost, convenience, and over-all meeting value.

Submitted by: Bruce Forsyth

Date: January 30, 2021