

**Subsurface Transformers and Network Protectors
SC Meeting Oct 30, 2019
Columbus OH**

Chairman: _____ **George Payerle** _____

Vice-Chair: _____ **Tony Reiss** _____

Meeting Date: 10/30/2019 **Location:** Columbus, OH **Time:** 11:00 – 12:15

Meeting Administration:

- Sign In
- Chairman's Comments
 - A reference to the Patent requirement and Copyrights was made
 - Some Spring WG Minutes were not posted on the website
 - a recommendation was made by Brian K to have the WG and TF Chairmen send minutes to STNP Chair/Vice-Chair to get posted
- Quorum Determination
 - 26 of 37 members in attendance with 28 guests. 1 guest (Ken Hampton) requested membership at the conclusion of the meeting
- Approval of the Spring 2019 minutes (Al Trout motion to approve, 2nd – Mike Thibault) – unanimous

Members present:

Israel	Barrientos	Prolec GE
David	Blew	PSE&G
Douglas	Craig	Richards Manufacturing Co.
Thomas	Dauzat	General Electric
Larry	Dix	Quality Switch, Inc.
Mark	Faulkner	EATON Corporation
Fredric	Friend	American Electric Power
Benjamin	Garcia	Southern California Edison
Carlos	Gaytan	Prolec GE
Said	Hachichi	Hydro-Quebec
Kenneth	Hampton	Baltimore Gas & Electric
Michael	Hardin	H-J Enterprises, Inc. Advanced Power
Gary	Hoffman	Technologies
Brian	Klaponski	Carte International Inc.
Charles	Morgan	Eversource Energy
George	Payerle	Carte International Inc.
James	Ratty	Electronic Technology Inc.
Clemens	Reiss IV	Custom Materials, Inc.
Dan	Schwartz	Quality Switch, Inc.
Jeremy	Sewell	Quality Switch, Inc.
Adam	Sewell	Quality Switch, Inc.
Igor	Simonov	Toronto Hydro
Robert	Stinson	General Electric
Alan	Traut	Howard Industries

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John	Vartanian	National Grid
Joshua	Verdell	ERMCO

Guests present:

Glenn	Andersen	Fayetteville PWC
Kevin	Biggie	Weidmann Electrical Technology Specialty Transformer
Piotr	Blaszczyk	Components
Rhett	Chrysler	ERMCO
Lucas	Coffey	Alabama Power
Craig	DeRouen	ERMCO
Hakim	Dulac	Qualitrol Company LLC
John	Eastman	ZTZ Services International
Pam	Edwards	Central Moloney, Inc.
William	Elliott	General Electric
Roger	Fenton	Fenton Solutions
Sanford	Fong	Georgia Power Co.
Zoran	Goncin	Partner Technologies Inc.
Philip	Hopkinson	HVOLT Inc.
Ramadan	Issack	American Electric Power
Joe	Kelly	TCI Sales, Inc.
Robert	Kinner	FirstPower Group LLC
Robert	Marx, Sr.	Marx Associates, Inc.
Justin	Minikel	EATON Corporation
Roger	Owens	Central Moloney, Inc.
Christopher	Rutledge	Dynamic Ratings, Inc.
Stefan	Schindler	Maschinenfabrik Reinhausen
Avijit	Shingari	Pepco Holdings
Kerwin	Stretch	Siemens AG
Shankar	Subramany	KEMA Laboratories, DNV GL
Liz	Sullivan	Dominion Energy
Peter	Zhao	Hydro One

Working Groups Report:

- **C57.12.23 Single-Phase Submersible Transformers** working group –
- **NOT MEETING AT THIS TIME**
Alan Traut, Chairman,
 - Revision due date:
 - PAR Approval Date:
 - PAR Expiration Date:

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Stage: On break

- **C57.12.24 Three-Phase Submersible Transforrs** working group –
Ben Garcia, Chairman, Tom Dauzat Vice-Chair, George Payerle, Secretary
 - Approved: **12/7/2016**
 - Revision Due Date: **12/7/2026**
 - PAR Approval Date:
 - PAR Expiration Date: **12/31/23**

Stage: Recently Approved

Members present,

Thomas	Dauzat	General Electric
George	Payerle	Carte International Inc.
Benjamin	Garcia	Southern California Edison
David	Blew	PSE&G
John	Chisholm	IFD Corporation
Douglas	Craig	Richards Manufacturing Co.
Craig	DeRouen	ERMCO
Larry	Dix	Quality Switch, Inc.
William	Elliott	General Electric
Carlos	Gaytan	Prolec GE
Said	Hachichi	Hydro-Quebec
Kenneth	Hampton	Baltimore Gas & Electric
Michael	Hardin	H-J Enterprises, Inc.
John	Harley	FirstPower Group LLC
Robert	Kinner	FirstPower Group LLC
		Consolidated Edison Co. of
Brad	Kittrell	NY
Brian	Klaponski	Carte International Inc.
Kent	Miller	T&R Electric Supply Co.
Michael	Morgan	Duke Energy
Daniel	Mulkey	Mulkey Engineering Inc.
Jarrood	Prince	ERMCO
Juan	Ramirez	CELECO
James	Ratty	Electronic Technology Inc.
Pedro	Salgado	Electronic Technology Inc.
Igor	Simonov	Toronto Hydro
James	Spaulding	Fort Collins Utilities
Robert	Stinson	General Electric
Liz	Sullivan	Dominion Energy
Michael	Thibault	Pacific Gas & Electric
Alan	Traut	Howard Industries
Jeremy	Van Horn	IFD Corporation
John	Vartanian	National Grid

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Guests present,

Scott	Abbott	PPG Industries
Nitin	Adishesadrirao	Power Partners, Inc.
Jerry	Allen	Metglas, Inc.
Glenn	Andersen	Fayetteville PWC
Poorva	Bedge	Fort Collins Utilities Weidmann Electrical Technology
Kevin	Biggie	Technology
John	Eastman	ZTZ Services International
Pam	Edwards	Central Moloney, Inc.
Matthew	Enders	Oncor Electric Delivery
Sanford	Fong	Georgia Power Co.
Fredric	Friend	American Electric Power
Zoran	Goncin	Partner Technologies Inc.
Jeffery	Henry	Mapes & Sprowl
Ramadan	Issack	American Electric Power
Charles	Johnson	ABB Inc. Northeast Transformer Services
Gilbert	Kozer	Services
Maria	Lamorey	PPG Industries
Jinesh	Malde	M&I Materials, Inc.
Terence	Martin	MarVen
Bene	Martinez	Metglas, Inc.
Daniel	Martinez	Lamination Specialties
Robert	Marx, Sr.	Marx Associates, Inc.
Brian	McBride	Cargill, Inc.
Justin	Minikel	EATON Corporation
Roger	Owens	Central Moloney, Inc. Weidmann Electrical Technology
Barbara	Patoine	Technology
Chris	Pitts	Howard Industries
Robert	Reepe	Georgia Power Co.
Clemens	Reiss IV	Custom Materials, Inc.
Christopher	Rutledge	Dynamic Ratings, Inc.
Stefan	Schindler	Maschinenfabrik Reinhausen
Dan	Schwartz	Quality Switch, Inc.
Jeremy	Sewell	Quality Switch, Inc.
Avijit	Shingari	Pepco Holdings
Stefan	Siebert Siebert-	BROCKHAUS MESSTECHNIK
Audrey	Timmer	IFD Corporation
Adrian	Silgardo	IFD Corporation

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Edward	Smith	H-J Family of Companies
Christopher	Sullivan	Westmark Partners
Richard	Tellez	Siemens S.A.
Eric	Theisen	Metglas, Inc.
Joshua	Verdell	ERMCO
Shelby	Walters	Howard Industries
Chris	Wilford	Cam Tran Co.
Alan	Wilks	Consultant
Peter	Zhao	Hydro One

The meeting was called to order at 9:30 am in the Knox Room of the Hyatt Regency Columbus OH Tuesday October 29, 2019. As of this meeting, Ben Garcia is the new chair, Tom Dauzat is vice-chair and George Payerle remains as secretary. There were 30 members and 45 guests in attendance. There was a quorum. Seven guests requested membership. Membership changes from the Anaheim meeting and the Columbus meeting will be announced at the Charlotte meeting. Kent Miller moved to approve the agenda and Said Hachichi seconded. The motion passed unanimously.

Brian Klaponski moved to accept the minutes of the Anaheim meeting and Jeremy Sewell seconded. The minutes were approved unanimously. Introductions were made. The chair showed the patent slides. There were no disclosures. The chair showed the copyright slides.

The Chair noted that work on the PAR was begun at the S19 Anaheim meeting. It will expire December 31, 2023. We have 5 working meetings including the current Columbus meeting to finalize the draft and get it to review and resolve comments.

Old business: - work will continue on table 6 Minimum Material Thicknesses from the standard.

Tom Dauzat presented his findings from salt spray testing samples for 1000 hours. Details of his presentation will be posted on the website. He will bring samples to the Charlotte meeting. Among his findings was the fact that some samples actually gained weight. The thinking was that the salt actually worked its way into the steel or that possibly the residual salt on the samples attracted moisture from the air after the test. Results of the testing may prompt a reevaluation of the numbers in Table 6.

The chair asked for utility volunteers to look over sections of the spec. He received 7 volunteers who will each look over one section. Volunteers were Jim Spaulding, Ken Hampton, Dan Mulkey, Brian (who will have his staff look over the entire document) Chris Rutledge, Ben Garcia, and Dave Blew. Otherwise each person will review one section. There are 7 sections.

Bud Stinson made a motion to complete the current testing then do an additional test lasting 3000 hours. Brian Klaponski seconded. That test will be done on 304SS, 409SS and copper bearing steel. The motion passed unanimously.

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

Respectfully Submitted by: Ben Garcia, Chairman C57.12.24 Working Group

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- **C57.12.40 Secondary Network Transformer** working Group –
Dave Blew, Chairman, Dan Schwartz, Secretary
 - Published 2017
 - Revision due date: **12/31/2027**
 - PAR Approval Date:
 - PAR Expiration Date: **12/31/2023**

Stage: Submitted to Revcom on RevCom Agenda 04-May-2017

Members Present

Dave Blew (Chairman)
Dan Schwartz (Secretary)
Jason Attard
Piotr Blaszczyk
Douglas Craig
William Elliott
Mark Faulkner
Brad Kittrell
Brian Klaponski
Charles Morgan
Daniel Mulkey
George Payerle
James Ratty
Pedro Salgado
Stephen Schroeder
Adam Sewell
Jeremy Sewell
Igor Simonov
Robert Stinson
Liz Sullivan
John Vartanian

Company

PSE&G
Quality Switch
Consolidated Edison Co. of NY
The Specialty Switch Co LLC
Richards Manufacturing Co.
GE
Eaton Corporation
Consolidated Edison Co. of NY
Carte International Inc
Eversource Energy
Mulkey Engineering Inc.
Carte International Inc
Richards Manufacturing Co.
Electronic Technology Inc.
ABB, Inc
Quality Switch
Quality Switch
Toronto Hydro
GE
Dominion Energy
National Grid

Guests Present

Scott Abbott
Jerry Allen
Jeff Barnes
Israel Barrientos
Kevin Biggie
Paul Boman
Anthony Coker
Lucas Coffey
*Tom Dauzat
*Matthew Enders
Roger Fenton
Sanford Fong

Company

PPG
Metglas, Inc.
Norplex Micarta
Prolec GE
Weidmann Electrical Technology
HSBI&I Co.
M&I Materials
Alabama Power
GE
Oncor Electric Delivery
Fenton Solutions
Georgia Electric Power

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Leonardo Galhardo	DuPont
Zoran Goncin	PTI Transformers
Attila Gyore	Midel
Ken Hampton	BG&E
Jack Harley	First Power Group LLC
Robert Kinner	First Power Group LLC
Gilbert Kozer	Northeast Transformer
Maria Lamorey	PPG
Bob Marx	M&I Materials
Brian McBride	Cargill, Inc
Kent Miller	T&R Electric Supply
Justin Minikel	Eaton Corporation
Kevin Rapp	Cargill, Inc
Chris Rutledge	Dynamic Ratings
Salahuddin Shaikh	ABB, Inc
Avilit Shingari	Pepco
*Travis Spooone	Eaton Corporation
Eric Theisen	Metglas, Inc
*Requested Membership	

- 1) The group met on Tuesday, October 29, 2019 at 11:00 am with 21 members and 25 guests. Three (3) guests requested membership. Quorum was achieved with 21/34 (62%) of members present.
- 2) A call for patents was made; none were mentioned.
- 3) Copyright requirements were reviewed by the Chair.
- 4) An agenda was presented and approved, and introductions were made.
- 5) The minutes of the March 26, 2018, meeting in Anaheim, CA were reviewed. The minutes were approved unanimously.
- 6) The Chair announced that the PAR was approved and became active May 21, 2019 and expires December 31, 2023.
- 7) Old Business - The Chair opened up the meeting for discussion on topics to be addressed in the next revision of C57.12.40 and the following suggestions were made and discussed:
 - a. It was discussed that the formation of a Task Force on Corrosion and Cathodic Protection was set up with the first official TF meeting occurring on October 29, 2019 at 3pm in Knox (2) here at Columbus, OH.
 - b. More discussion was had about addressing corrosion within this standard among points made were:
 - i. Mixing material in tank construction (example – base and structure SS and walls different)

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- ii. Hardware material selection to correspond with tank materials (hardware including glands, valves, bolts, etc.)
 - iii. Specifying materials and including welding wire in that specification
 - c. It was decided that we should review the C57.12.40 standard to determine what, if any, sections should be updated with corrosion and cathodic protection requirements. Jeremy Sewell agreed to conduct this review.
 - d. Discussion was held about where to house the corrosion and cathodic protection materials as they stretch across multiple standards; should this information be an annex, spread into the standard, or should a new standard or guide be created.
 - e. Taking up a discussion on the standardization of throat and tank sizing to include potential figures in the standard. The discussion focused on limited options in the standard for throat sizing.
 - f. Further improvement on Bushing Connection standardization and documentation within the standard. A discussion was held on the requirement to weld bushings versus bolting bushings in. It was discussed that any opportunity to weld versus bolt creates less opportunity for leaking.
 - g. It was also discussed that we should visit the addition of the primary switch location in the next revision of the standard. Among items applicable to this topic are allowing user choices of locating the switch in the tank, separate from the tank, and locating the switch in its own tank; the standard should provide guidance for all three. A concern was raised that the WG should focus on maintaining the safety aspect of the previous revisions when considering how to address these potential additions as work practice vs. equipment safety. Igor Simonov has agreed to present on automated primary switching (including SCADA) that is currently in use during our next meeting in Charlotte, NC.
- 8) New Business – The Chair opened up the discussion on any new items the group felt needed to be addressed in the next revision.
 - a. There are multiple instances where C57.12.40 and C57.12.24 do not reference the same and should be corrected:
 - i. Tank construction thicknesses
 - ii. Percent I_2 difference in significant digits
 - b. John Vartanian brought up Table 8 and would like for it to be reviewed to determine if the table needs to be updated.
 - c. Igor Simonov also pointed out that Table 7 should cover up to 600V (it does not currently) to cover the title of the standard.
 - d. Igor Simonov also discussed additional testing that might be included in the standard:
 - i. Submersion testing
 - ii. Arc withstand of the transformer tank – this topic would include addressing intellectual property held by various manufacturers to then understand how we would integrate this into the standard as a type test.
- 9) The group discussed developing methods as a group and then assigning smaller groups to address and add to the standard.

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- 10) The Chair discussed that we have a few meetings to hash out the proposed modifications to the current revision, but that we must be diligent about doing so in order to finish the next revision in a timely manner.
- 11) The meeting was adjourned at 12:05 PM with the next meeting set for Charlotte, NC on March, 24, 2020.

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

Document #: C57.12.44

Document Title:

STANDARD REQUIREMENTS FOR SECONDARY NETWORK PROTECTORS

Chair: Mark Faulkner Vice-Chair: Alex Macias

Secretary: n/a

Current Draft Being Worked On: DRAFT 10 Dated: October 28, 2019

Meeting Date: October 28, 2019 Time: 4:45PM

Meeting Attendance

Activity Name: C57.12.44 WG Secondary Network Protectors
Activity ID: 703
Number of Members in Activity = 21
Number of Members Present = 15
Quorum Present = 71.4%
Number of attendees = 34

Meeting Minutes / Significant Issues / Comments:

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

1. Call to order and any Chair's remarks
 - a. **4:50 PM**
 - b. **Focus on review obtain input on 600V rated protectors**
 - c. **Draft for preparation and discussion for Ballot and MEC**
2. Quorum Verification
 - a. **Quorum was confirmed by show of hands**

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3. Confirmation of the essential patent statement and responses
 - a. **No conflicts presented to group**
4. Approval of minutes of the previous meeting
 - a. **Motion made by Doug Craig, 2nd Dave Blew**
 - b. **Minutes approved**
5. Approval of agenda for this meeting.
 - a. **Motion made to accept agenda, any opposed**
 - b. **No opposed; Agenda approved**
6. Technical
 1. **A clarification from last meeting was discussed to keep impedances per C57.12.40 for 600V protectors to compliance**
 2. **A motion was placed to approved**
 - a. **No opposition, motion passed**
 3. **Take to ballot subject to reviewing the draft prior**
 - a. **Motion to approve Brian Klaponski, 2nd Cory Morgan**
 4. **Ballot Resolution Committee formed:**
 - a. **Members:**
 - i. **Dan Mulkey**
 - ii. **Mark Faulkner**
 - iii. **Doug Craig**
 - iv. **Igor Simonov**
 - ii. **Meeting adjourned at 5:12 pm**
7. Fall meeting--date and location
 - a. **Charlotte, NC**
 - b. **Date: March 8, 2020**

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

Submitted by: Mark Faulkner

Date: 03/26/2019

- **C57.12.57 Ventilated Dry-Type Network Transformers** working group – *Inactive – withdrawn in 2001*

Task Force -- Corrosion Effects on Subsurface Transformers

Document #: n/a

Document Title:

Corrosion Effects on Subsurface Transformers

Chair: Will Elliot Vice-Chair: Justin Minikel

Secretary: Audrey Siebert-Timmer Per Cent Complete: 0

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Current Draft Being Worked On: n/a Dated: n/a

MONDAY,

Meeting Date: October 29, 2019 Time: 3:15 PM

Attendance:	Members	<u> 22 </u>	
	Guests	<u> 46 </u>	
	Total*	<u> 68 </u>	

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

Meeting Minutes / Significant Issues / Comments:

1. Will Elliot called the meeting to order at 3:15 PM.
2. As this is the first meeting a blank roster was circulated followed by the introduction of attendees stating their name and company affiliation.
3. Will Elliot reviewed IEEE Essential Patent Claims and SA Copyright Policy. No issues were raised.
4. Quorum verification. Not a working group; quorum not required.
5. George Payerle made a motion, seconded by Tom Duzat, for approval of the agenda. Motion was unanimously approved.
6. New Business:
 - a. Presentation by Tom Duzat on progress on corrosion testing per C57.12.32 titled "GE & AkzonNobel Coating Salt Spray Interim Testing to ASTM B117"
 - i. Question on why both 3x4 vs 3x6 samples were tested. These dimensions were pulled from past and current enclosure integrity standards. A comment was made that these two sizes may be an artifact from an old standard where they were used to help identify uncoated vs painted samples during testing.
 - ii. Question on how rust was removed from the samples. Presented results used DI water. Comment was made that this is not the most repeatable method and there are other methods that are proven to be more reliable.
 - iii. Comment was made that the C57.12.32 standard has a very limited cleaning procedure.
 - b. Presentation by Will Elliott on "Procedures and Equipment for Field Corrosion Testing"
 - i. Shared data from Liz Sullivan on temperature and potential measurements from a Dominion vault (Norfolk, Virginia location).
 - ii. Tom Duzat asked from five or more utilities and take measurements in a minimum of five vaults ideally every 20 days.
 1. Volunteers: Igor Simonov from Toronto Hydro, Ben Garcia from SCE, Matt Enders from Oncor, Liz Sullivan from Dominion, Brad Kittrel from Con Edison, Ramadan Issack from AEP.
 2. Tom Duzat to compile procedure including recommending measurement equipment and send to above volunteers.
 - iii. Discussion on what the utility data will be used for:

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1. Ideally it would be use to generate a map. This map can be used to develop a guideline that, based on the vault environment / corrosion potential, could recommend tank materials / protection systems.
 2. Concern that the map data is constantly changing and would become obsolete quickly. Discussion that this data would simply be a starting point.
 3. Concern that practical inventory management will hinder implementation of guide. It likely will be cost prohibitive and difficult to allocate to special material tanks to specific vaults locations.
- c. Presentation by Bill Byrd from Columbia Corrosion Control on an "Introduction and Experience with Corrosion in Underground Vaults (via conference phone)
- i. Reviewed causes of corrosion and corrosion prevention methods. Refer to presentation for details.
 - ii. For potential measurements Bill Byrd recommends to use a Miller LC4.
 - iii. Question on effectiveness of coatings. Coatings can be very effective in eliminating dissimilar metal contact (eg. copper vs steel).
 - iv. Question on magnesium anodes in a vault, utility experience found that a magnesium anode coated the transformer so much that utility could not operate the mechanical switches or tap changer. Discussion that Magnesium anodes are the most powerful anode you can buy. It is important to never hook up Magnesium to Aluminum as it forms an acidic product which eats away at the Aluminum. Aluminum anodes tends to pacify and will stop working, generally Zinc anodes are preferable.
 - v. You can also use a suppressed current rather than an anode to mitigate corrosion.
 - vi. Changing water level in vaults is a challenge. Cathode protection only works when it is below water. Water compositions vary significantly.
 - vii. Due to limited time the question period was cut short. Bill Byrd encouraged members to reach out if they have specific questions. His contact information is included in the slides.
7. Next meeting: March 22-26; Charlotte, North Carolina, USA
- a. Will Elliot will forward presentations to George Payerle to upload to the website.
8. The meeting was adjourned at 3:05 PM.

Submitted by: Audrey Siebert-Timmer

Date: 29/10/2019

Old Business:

- None to review

New Business:

A request was made by Garry Hoffman to add an agenda item to discuss the core gas issues being addressed by Transformer Subcommittee TF that was created.

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A motion was made by Gary Hoffman to add the agenda item and a second by Al Trout was received.

There was no objection to the change and because of a schedule overlap Gary Hoffman, Phil Hopkinson and Bill Griesaker reviewed the recommendations of the Task Force at the beginning of the meeting.

It was determined by the TF that the best way to ensure the issue was corrected going forward was that it needed to be referenced in the standard C57.12.00 and C57.12.90 so STNP subcommittee had to approve

At the conclusion of the presentation there was a motion by Gary Hoffman to add the information to C57.12.00 and C57.12.90. A second was made by Al Trout.

Discussion: Ben Garcia asked if the tank size would be enlarged causing an issue with vault sizes. It was confirmed there would not be an increase in size by Phil Hopkinson.

Discussion concluded and there was unanimous support to approve

There was a lengthy discussion started by Brian K and joined by others about the challenges the patent and copyright statements are making. Because attendees acknowledge the Patent statement at the time of registration this appears to be redundant. Several members agreed that if in the course of doing work a patent disclosure was needed it should be raised at that time and a recent example was given.

On the subject of the copyright statement several comments were made about the confusion of the requirement. For example: IEEE documents were originally ok to review without upfront approval but others were told they couldn't.

It was expressed that these requirements are taking away from the time that is needed to do accurate and timely standards review and there was a general sense that this is an unnecessary burden up until a standard is ready to be balloted

Motion 1 – Brian Klaponski, 2nd by Mike, Thibault seconded

The patent disclosure requirement at signup for the meetings should be sufficient for the groups to do business. Approval was Unanimous.

Motion 2 – Brian K, 2nd by Tom Dautat

Main committee (leaders) to develop ETF to determine what is appropriate in regards to copyright materials. Our suggestion is that Copyrighted material should have permission before going into a balloted standard. But material that may be copyrighted can be used in discussion within a meeting. Approval was unanimous.

Motion to Adjourn by Tom Dautat, 2nd by Adam Sewell

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Everyone got up – unanimous

Meeting adjourned @ 12:18

Next meeting:

- March 25, 2020 in Charlotte, NC