IEEE/PES TRANSFORMERS COMMITTEE

www.transformerscommittee.org
Spring 2014 Meeting; March 23-27
Hosted by Efacec Power Transformers
Savannah Marriott Riverfront; Savannah, Georgia USA

NOTES: See Page 4 for a key to abbreviations.

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Friday, March 21					
8:00 am - 5:00 pm >	IEEE/IEC WG Wind Transf. P60076-16	PCS	D. Buckmaster	20 US	Academy
Saturday, March 22					
	No Meeting Registration				
> 8:00 am - 12:00 pm >	IEEE/IEC WG Wind Transf. P60076-16	PCS	D. Buckmaster	20 US	Academy
7:00 pm until ???	Early Bird Event: Dinner, music and fun at "Savannah Smiles Dueling Pianos Saloon". -- Indicate your desire to attend when registering on-line for the Committee Meeting. -- Meet in hotel lobby at 6:45 pm. Savannah Smiles is ~8 minute walk from the hotel. See flyer for details.				
Sunday, March 23					
9:00 am - 1:30 pm	Technical Tour: Efacec Transformer Facility -- Space is limited; initially only Committee Members and Active Participants. -- Buses depart Marriott Hotel at 9:00 am. Return by 1:30 pm. -- Catered lunch at the factory. Each breakfast before departing in the morning. -- For more details, contact Erin Carpenter at +1.912.754.5435 or <erin.carpenter@efacec.com>.				
1:00 pm - 5:30 pm	Meeting Registration				Ballroom Foyer
2:00 pm - 5:30 pm	Administrative SC -- Closed meeting, by invitation only	Admin.	D. Platts	28 US (w/snack buffet)	Oglethorpe AB
3:00 pm - 5:30 pm	NEMA Transformers -- Closed meeting, by invitation only	++	C. Drexler	24 US (w/beverages)	Plaza
6:00 pm - 8:00 pm	Welcome Reception			450 Reception	Atrium & Riverwalk
Monday, March 24 -- Monday Breaks Sponsored by JSHP Transformer **					
7:00 am - 4:00 pm	Meeting Registration				Ballroom Foyer
7:00 am - 6:00 pm	Internet Cafe'			12 BD	Mercer
7:00 am - 7:50 am	Newcomers Orientation -- Breakfast Meeting; arrive early! -- Newcomers & Guests are encouraged to attend!		S. Antosz	60 CL (with buffet)	Savannah E
7:00 am - 7:50 am	Distribution SC Leaders Coordination -- Closed breakfast meeting, by invitation only		S. Shull	18 CONF (with buffet)	Academy
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			300 RT (9/tbl)	Savannah A
8:00 am - 9:30 am	Breakfast - Spouses/Companions (no meeting attendees please)			96 RT (8/tbl)	Atrium & Riverwalk
9:15 am - 3:30 pm	Spouses/Companions Tour: Historic District Tour and Bonaventure Cemetery, and lunch at Pirates House -- Advance registration required. Buses depart the Marriott Hotel at 9:15 am, and return approx 3:30 pm.				
8:00 am - 9:15 am >	Opening Session -- All attendees are encouraged to attend -- See separate document for meeting agenda -- Attendance recorded as eligibility for Committee membership		D. Platts	250 CL S1 250 TH	Savannah BC
9:15 am - 9:30 am	*Break (beverages only)*			Ballroom Foyer	

** Contact Joe Watson (joe_watson@ieee.org) if you are interested in sponsoring a coffee-break at a future meeting.

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Monday, March 24 (continued)					
9:30 am - 10:45 am	WG 3-ph UG Dist. Transf. C57.12.24	UTNP	G. Termini	60 MX	Plaza
9:30 am - 10:45 am	TF Winding Temp. Indicators	IL	P. McClure	80 MX	Oglethorpe AB (2nd floor)
9:30 am - 10:45 am	WG External Dielectric Clearances	DiTests	E. Davis	100 MX S2	Savannah D
9:30 am - 10:45 am	TF Consolidation of Oil Guides	IF	T. Prevost	100 MX S2 (add 40 TH)	Savannah E
9:30 am - 10:45 am	WG Tertiary/Stabiliz. Windings PC57.158	PCS	E. Betancourt	200 MX S3	Savannah B
9:30 am - 10:45 am	WG Failure Analysis & Report. C57.125	Power	W. Binder	200 MX S3	Savannah C
10:45 am - 11:00 am	*Break (beverages only)*			Ballroom Foyer	
11:00 am - 12:15 pm	TBD			60 MX	Plaza
11:00 am - 12:15 pm	WG Moisture in Insulation PC57.162	IL	T. Prevost	80 MX	Oglethorpe AB
11:00 am - 12:15 pm	WG Overhead Distr. Transf. C57.12.20	Dist	A. Traut	100 MX S2	Savannah D
11:00 am - 12:15 pm	WG PD Acoustic Detection C57.127	DiTests	D. Gross	100 MX S2	Savannah E
11:00 am - 12:15 pm	WG PCS Rev. to Test Code C57.12.90	PCS	M. Perkins	200 MX S3	Savannah B
11:00 am - 12:15 pm	WG Installation of Power Transf. C57.93	Power	M. Lau	200 MX S3	Savannah C
12:15 pm - 1:30 pm	Lunch Meeting: Standards Development Review		B. Bartley	280 RT (8/tbl)	Savannah A
	-- Special Presentation: "Review of Association Management System (AMS)", by G. Anderson -- Everyone is welcome to attend. All SC/WG/TF leaders are highly encouraged to attend. -- Doors actually open ~12:00 pm. Come early, get a good seat, and start eating. -- Complimentary meal with advance registration. No paper tickets. Admission verified at the door.				
	~~WG Standard Require for Secondary - Network Protectors C57.12.44~~	~~UTNP~~	Document sent to RevCom.		
1:45 pm - 3:00 pm	TBD			60 MX	Plaza
1:45 pm - 3:00 pm	WG Dry-Type Gen. Require. C57.12.01	Dry	T. Holdway	80 MX	Oglethorpe AB
1:45 pm - 3:00 pm	WG 1-ph Padmount Dist. Transformers C57.12.38 (12.21 & 12.25)	Dist	A. Ghafourian	100 MX S2	Savannah D
1:45 pm - 3:00 pm	WG Less-Flammable Hydrocarbon Insulating Liquid Guide C57.121	IF	D. Sundin	100 MX S2	Savannah E
1:45 pm - 3:00 pm	TF Audible Sound Revision to Test Code	PCS	R. Girgis	200 MX S3	Savannah B
1:45 pm - 3:00 pm	WG Tank Rupture & Mitigation PC57.156	Power	P. Zhao	200 MX S3	Savannah C
3:00 pm - 3:15 am	*Break (beverages only and treats)*			Ballroom Foyer	
3:15 pm - 4:30 pm	**SC HVDC Converter Transformers and Smoothing Reactors**	HVDC	M. Sharp	60 MX	Plaza
3:15 pm - 4:30 pm	WG Milli-amp Current Transf. C57.13.7	IT	H. Alton	80 MX	Oglethorpe AB
3:15 pm - 4:30 pm	WG 3-ph Padmount Distribution Transformers C57.12.34	Dist	R. Stahara	100 MX S2	Savannah D
3:15 pm - 4:30 pm	WG Natural Ester-Based Fluids C57.147	IF	P. McShane	100 MX S2	Savannah E
3:15 pm - 4:30 pm	WG Dielectric Freq. Response PC57.161	DiTest	A. Naderian	200 MX S3	Savannah B
3:15 pm - 4:30 pm	TBD			200 MX S3	Savannah C
4:30 pm - 4:45 pm	*Break (beverages)*			Ballroom Foyer	
4:45 pm - 6:00 pm	WG Dry-Type O&M Guide C57.94	Dry	D. Stankes	60 MX	Plaza
4:45 pm - 6:00 pm	WG PD in Bushings & PT/CTs PC57.160	DiTests	T. Hochanh	80 MX	Oglethorpe AB
4:45 pm - 6:00 pm	WG Step-Voltage Regulators C57.15	Dist	C. Colopy	100 MX S2	Savannah D
4:45 pm - 6:00 pm	WG Oil Accept & Maint. Guide C57.106	IF	B. Rasor	100 MX S2	Savannah E
4:45 pm - 6:00 pm	WG PCS Revisions to C57.12.00	PCS	S. Snyder	200 MX S3	Savannah B
4:45 pm - 6:00 pm	TBD			200 MX S3	Savannah C
6:00 pm- 10:00 pm	No Technical Tour. No other evening events planned.				

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Tuesday, March 25 -- Tuesday Breaks Sponsored by Baron USA, Inc. **					
7:00 am - 12:00 pm	Meeting Registration				Ballroom Foyer
7:00 am - 6:00 pm	Internet Cafe'			12 BD	Mercer
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			300 RT (9/tbl)	Savannah A
8:00 am - 9:30 am	Breakfast - Spouses/Companions (no meeting attendees please)			96 RT (8/tbl)	Atrium & Riverwalk
7:00 am - 7:50 am	EL&P Delegation (end-users only please) -- Breakfast Meeting; arrive early		J. Murphy	60 CL (with buffet)	Savannah E
9:15 am - 3:30 pm	Spouses/Companions Tour: Paula Deen Tour & Tybee Island, and lunch at Uncle Bubba's Oyster House -- Advance registration required. Buses depart the Marriott Hotel at 9:15 am, and return approx 3:30 pm.				
8:00 am - 9:15 am	WG Req. for Instrument Transf. C57.13	IT	R. McTaggart	60 MX	Plaza
8:00 am - 9:15 am	WG Oil Reclamation Guide PC57.637	IF	J. Thompson	80 MX	Oglethorpe AB
8:00 am - 9:15 am	WG Enclosure Integrity C57.12.28, C57.12.29, C57.12.31, C57.12.32	Dist	R. Olen	100 MX S2	Savannah D
8:00 am - 9:15 am	TBD			100 MX S2	Savannah E
8:00 am - 9:15 am	TF Geomagnetic Disturbances **(NEW)**	Admin	J. Verner	200 MX S3	Savannah B
8:00 am - 9:15 am	WG Functional Life Tests, De-energized Tap Changers (DETC) PC57.157	Power	P. Hopkinson	200 MX S3	Savannah C
9:15 am - 9:30 am	*Break (beverages only)*			Ballroom Foyer	
	~~WG Dist. Transf. Bar Coding C57.12.35~~	~~Dist~~	Document is complete and published.		
	~~TF Committee History~~	~~Mtgs~~	Will meet at the Fall Meeting.		
9:30 am - 10:45 am	WG 1-Ph Submersible Transformers C57.12.23 **(NEW)**	UTNP	A. Traut	60 MX	Plaza
9:30 am - 10:45 am	WG Station Service Voltage Transformers	IT	D. Wallace	80 MX	Oglethorpe AB
9:30 am - 10:45 am	TBD			100 MX S2	Savannah D
9:30 am - 10:45 am	WG Std Require for Bushings C57.19.01	Bush	S. Zhang	100 MX S2	Savannah E
9:30 am - 10:45 am	WG DGA Natural Ester Fluids PC57.155	IF	P. Boman	200 MX S3	Savannah B
> 9:30 am - 10:45 am	IEEE/IEC WG Wind Transf. P60076-16 -- Will also meet Fri-Sat 21-22 March	PCS	D. Buckmaster	200 MX S3	Savannah C
10:45 am - 11:00 am	*Break (beverages only)*			Ballroom Foyer	
11:00 am - 12:15 pm	WG Liquid-immersed Secondary Network Transformers C57.12.40	UTNP	B. Klaponski	60 MX	Plaza
11:00 am - 12:15 pm	WG Phase Shifting Transformers IEEE/IEC 60076-57-1202	Power	R. Ahuja	80 MX	Oglethorpe AB
11:00 am - 12:15 pm	WG Impulse Tests C57.138 (Distribution)	DiTests	J. Crotty	100 MX S2	Savannah D
11:00 am - 12:15 pm	WG GSU Bushings PC57.19.04	Bush	C. Arpino	100 MX S2	Savannah E
11:00 am - 12:15 pm	WG Guide for DGA in LTCs C57.139	IF	D. Wallach	200 MX S3	Savannah B
11:00 am - 12:15 pm	WG Loss Evaluation Guide C57.120	PCS	A. Traut	200 MX S3	Savannah C
12:15 pm - 1:30 pm	Awards Luncheon -- Doors open ~12:00 pm. Come early, get a good seat, and start eating. -- Advance registration is necessary. Paper tickets are not provided. Admission verified at the door.		B. Chiu	320 RT (8/tbl)	Savannah A
	~~TF Transf. Efficiency & Loss Evaluation~~	~~Dist~~	Work is complete. DOE has issued its final rule.		
1:45 pm - 3:00 pm	TBD			60 MX	Plaza
1:45 pm - 3:00 pm	TF Fluid Terms Normalization	Stds	P. McShane	80 MX	Oglethorpe AB
1:45 pm - 3:00 pm	WG Distr. Substation Transf. C57.12.36	Dist	J. Murphy	100 MX S2	Savannah D
1:45 pm - 3:00 pm	WG Revision to Low Frequency Tests	DiTests	B. Poulin	100 MX S2	Savannah E
1:45 pm - 3:00 pm	WG DGA Factory Temperature Rise Tests PC57.130	IF	J. Thompson	200 MX S3	Savannah B
1:45 pm - 3:00 pm	WG DPV Grid Transformers PC57.159	PCS	H. Shertukde	200 MX S3	Savannah C
3:00 pm - 3:15 pm	*Break (beverages and Pretzels!)*			Ballroom Foyer	

** Contact Joe Watson (joe_watson@ieee.org) if you are interested in sponsoring a coffee-break at a future meeting.

KEY

Note: A PC projector will be furnished in each meeting room. Arrive early to ensure that equipment operates/syncs correctly.
Overhead projectors are available from the hotel with advance notice.
> -- activity continued into another session / from another session
++ -- not a Transformers Committee activity TBD = "To Be Determined"
FC = flip chart; S1 = sound (special set-up)
S2 = stand mic in front only; S3 = one stand mic in front & stand mic(s) at mid-room

BD -- boardroom
US -- U-shape table
RT -- multiple roundtables
CL -- classroom seating (w/head table for 2)
TH -- theater seating (w/head table for 2)
MX -- mix classroom & theater (w/head table)

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Tuesday, March 25 (continued)					
3:15 pm - 4:30 pm	WG Dry-Type Test Code C57.12.91	Dry	D. Foster	60 MX	Plaza
3:15 pm - 4:30 pm	TF Switching Transients Induced by Transf/Breaker Interaction C57.142	PCS	J. McBride	80 MX	Oglethorpe AB
3:15 pm - 4:30 pm	WG Test Data Reporting C57.12.37	Dist	J. Crotty	100 MX S2	Savannah D
3:15 pm - 4:30 pm	WG Application of High-Temp Insulation Materials, IEEE P-1276	IL	M. Franchek	100 MX S2	Savannah E
3:15 pm - 4:30 pm	WG Revision to Gas Guide C57.104	IF	R. Ladroga	200 MX S3	Savannah B
3:15 pm - 4:30 pm	TBD			200 MX S3	Savannah C
4:30 pm - 4:45 pm	*Break (beverages only)*			Ballroom Foyer	
	~~TF Moisture in Oil~~	~~IF~~	Scope of TF moved to Moisture in Insulation WG.		
4:45 pm - 6:00 pm	TBD			60 MX	Plaza
4:45 pm - 6:00 pm	WG Neutral Grounding Devices PC57.32	PCS	S. Kennedy	80 MX	Oglethorpe AB
4:45 pm - 6:00 pm	WG Tank Pressure Coordinat. C57.12.39	Dist	C. Gaytan	100 MX S2	Savannah D
4:45 pm - 6:00 pm	TBD			100 MX S2	Savannah E
4:45 pm - 6:00 pm	WG Transf. Paralleling Guide PC57.153	Power	T. Jauch	200 MX S3	Savannah B
4:45 pm - 6:00 pm	WG Revisions to Impulse Test Sections of C57.12.00 and C57.12.90	DiTests	P. Riffon	200 MX S3	Savannah C
6:30 pm- 10:00 pm	No Technical Tour. No other evening events planned.				
Wednesday, March 26 -- Wednesday Breaks Sponsored by Weidmann Diagnostic Services ***					
	No Meeting Registration, No Technical Tours, No Spouse/Companion Tour				
7:00 am - 6:00 pm	Internet Cafe'			12 BD	Mercer
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			300 RT (9/tbl)	Savannah A
8:00 am - 9:30 am	Breakfast - Spouses/Companions (no meeting attendees please)			88 RT (8/tbl)	Atrium & Riverwalk
7:00 am - 7:50 am	**SC Meetings Planning**	Mtgs	G. Anderson	60 CL (with buffet)	Savannah D
7:00 am - 8:30 am	IEC TC-14 Technical Advisory Group -- Breakfast Meeting; arrive early -- All interested individuals welcome	++	P. Hopkinson	60 CL (with buffet)	Savannah E
8:00 am - 9:15 am	**SC Instrument Transformers**	IT	R. McTaggart	100 MX S2 (add 40 TH)	Savannah D
8:00 am - 9:15 am	**SC Insulation Life**	IL	B. Forsyth	350 MX S3	Savannah BC
9:15 am - 9:30 am	*Break (beverages only)*			Ballroom Foyer	
9:30 am - 10:45 am	**SC Bushings**	Bush	P. Zhao	100 MX S2	Savannah D
9:30 am - 10:45 am	**SC Distribution Transformers**	Dist	S. Shull	350 MX S3	Savannah BC
10:45 am - 11:00 am	*Break (beverages only)*			Ballroom Foyer	

*** Contact Joe Watson (joe_watson@ieee.org) if you are interested in sponsoring a coffee-break at a future meeting.

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Wednesday, March 26 (continued)					
11:00 am - 12:15 pm	**SC UG Transf. & Network Protectors**	UTNP	C. Niemann	100 MX S2	Savannah D
11:00 am - 12:15 pm	**SC Dielectric Tests**	DiTests	M. Franchek	350 MX S3	Savannah BC
12:15 pm - 1:30 pm	Lunch (on your own)				
1:30 pm - 2:45 pm	**SC Dry Type**	Dry	C. Johnson	100 MX S2	Savannah D
1:30 pm - 2:45 pm	**SC Power Transformers**	Power	J. Watson	350 MX S3	Savannah BC
2:45 pm - 3:00 pm	*Break (beverages and treats)*			Ballroom Foyer	
3:00 pm - 4:15 pm	**SC Insulating Fluids**	IF	D. Wallach	100 MX S2	Savannah D
3:00 pm - 4:15 pm	**SC Performance Characteristics**	PCS	E. teNyenhuis	350 MX S3	Savannah BC
4:15 pm - 4:30 pm	*Break (beverages only)*			Ballroom Foyer	
4:30 pm - 5:30 pm	**SC Standards**	Stds	B. Bartley	350 MX S3	Savannah BC
6:00 pm - 9:00 pm	Dinner Social: Dinner Cruise aboard the "Savannah River Queen". -- The boat is docked directly behind the hotel. Advance registration is necessary. -- Boarding and cocktails 6:00 to 7:00 pm. Embark at 7:00 pm. Return approx 9:00 pm. -- Paper tickets will NOT be provided. Admission will be verified with a registration list as you board the boat. -- It will be cool temperature in the evening, so dress appropriately.				
Thursday, March 27					
	No Meeting Registration, No Spouses/Companions Tours, No Internet Cafe'				
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			315 RT (9/tbl)	Savannah A
8:00 am - 9:30 am	Breakfast - Spouses/Companions (no meeting attendees please)			80 RT (8/tbl)	Atrium & Riverwalk
8:00 am - 9:15 am	Technical Presentation #1: "Switching Transients", by B. Degeneff, A. Rocha, and others. Sponsored by Perform. Characteristics SC. See flyer on website.			250 CL S1 200 TH	Savannah BC
9:15 am - 9:30 am	*Break (beverages only)*			Ballroom Foyer	
9:30 am - 10:45 am	Technical Presentation #2: "Review of C57.143 Guide for Monitoring Power Transformers", by C. Beauchemin, J. Benach, D. Chu, T. Pink, and B. Sparling. Sponsored by Power Transformers SC. See flyer on website			250 CL S1 200 TH	Savannah BC
10:45 am - 11:00 am	*Break (beverages only)*			Ballroom Foyer	
> 11:00 am - 12:00 pm	Closing Session -- All attendees are encouraged to attend -- See separate document for meeting agenda		D. Platts	250 CL S1 200 TH	Savannah BC
	Lunch (on your own)				
> 1:00 pm - 5:00 pm	WG Phase Shifting Transformers IEEE/IEC 60076-57-1202 -- Continued from 11:00 am Tuesday	Power	R. Ahuja	20 US	Savannah E
1:30 pm - 4:00 pm	Technical Tour: Gulfstream Aerospace Corporation -- Space is limited; so register early! -- Due to security restrictions, a passport is necessary (passport from US or other country). -- Buses depart Marriott at 1:30 am. Return to hotel at approx 4:00 pm. -- Small fee for cost of bus transportation. -- For more details, contact Erin Carpenter at +1.912.754.5435 or <erin.carpenter@efacec.com>.				
	No EPRI Task Force Meeting (will meet at each Fall Meeting)				
Friday, March 28					
	No Transformer Committee Meetings, No Internet Cafe', No Social Events or Tours.				

*** Contact Tom Prevost (tprevost@ieee.org) if you are interested in making a technical presentation at a future meeting.

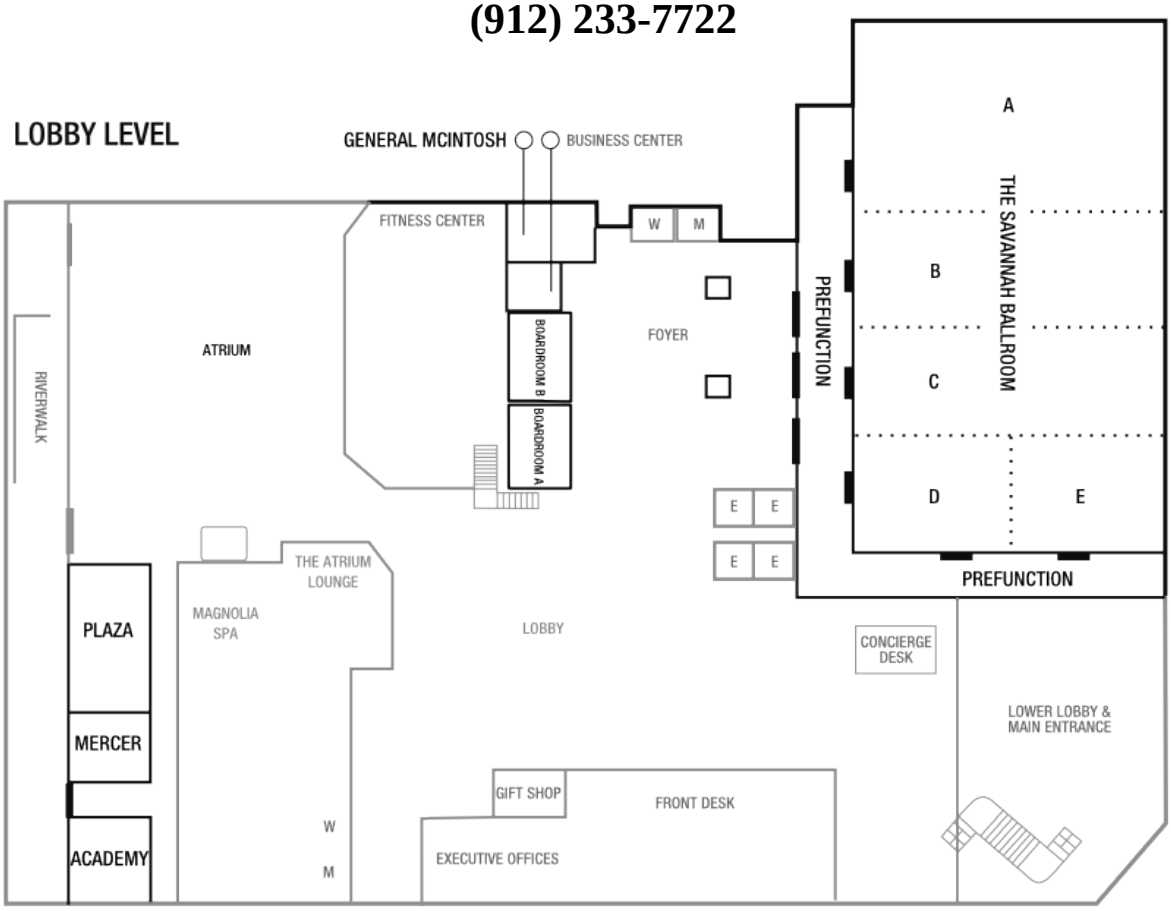
FUTURE COMMITTEE MEETINGS

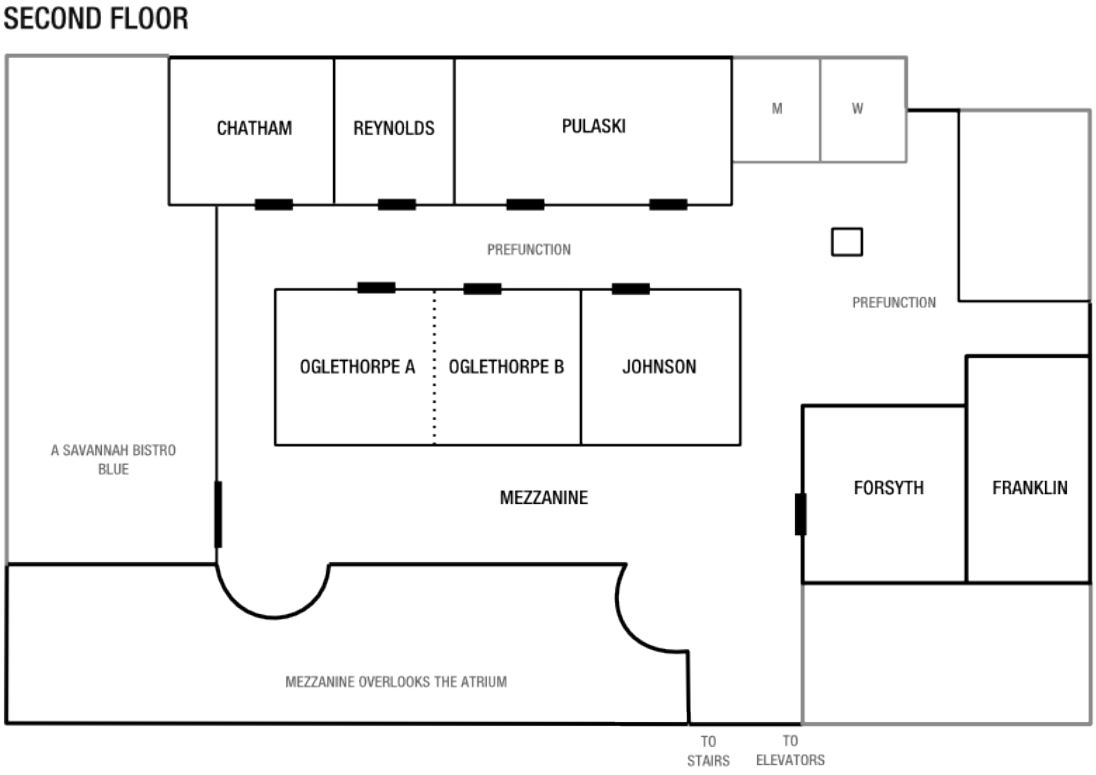
Fall 2014 - October 19-23; Washington DC Metro Area, USA. Hosted by Pepco
Spring 2015 - Dates to be determined; USA location to be determined

Savannah Marriott Riverfront

100 General McIntosh Boulevard; Savannah, Georgia 31401

(912) 233-7722





Annex A Bushings Subcommittee

March 26, 2014
Savannah, Georgia

Chair: Peter Zhao
Secretary: Eric Weatherbee

A.1 Opening of the Meeting

A.1.1 Introductions

The Chair explained that a new policy has been put in place that allows for the usual attendee introductions to be bypassed in favor of time constraints to allow more standards business to be addressed.

A.1.2 Attendance

Membership count was taken with the following results: 26 of 40 members were present and 75 guests for a total of 101 attendees. There were 33 new guests and 9 membership requests. A quorum was reached.

A.1.3 Chairman's remarks

The Chair reviewed and made comments to the group on the Working Group manual and procedures.

The Chair noted that there have been many bounced communications using the AMS system and asked that people try to keep their information up to date.

The Chair reviewed the WG and TF schedule with the group, see Appendix A of this report.

A.1.4 Working Group and Taskforce reports

A.1.4.1 C57.19.00-2004 – Keith Ellis, Chair

No Meeting was held. Mr. Ellis reviewed the standard and did not find anything in need of updating but asked the group to review and send him anything they deemed necessary to be brought up for discussion as a possible revision. Mr. Sharma informed the SC that IEC has two different standards for dealing with porcelain and composite insulator testing which IEEE should consider during the next revision to this standard. The Chair asked Mr. Ellis to also make note that overload should be addressed within the standard by at least adding some comments in its regard.

A.1.4.2 WG PC57.19.01-2000 – Dr. Shibao Zhang, Chair; David Wallach, Secretary

See complete minutes in Appendix B of this report.

A.1.4.3 C57.19.100-2012 – Tommy Spitzer, Chair, not present

The guide was published February 2013, as such no meeting was held.

A.1.4.4 WG PC57.19.04 – Chair, Open; JD Brafa, Vice Chair; Secretary, Open

Following Mr. Brafa's meeting summary the Chair asked if there were any volunteers to fill the vacant Chair position. He stressed that active participation is key for this standard to reach completion and the difficulties that may arise while trying to work out the dimension/characteristics between all the manufacturers while giving the end users the interchangeability they desire. See complete minutes in Appendix C of this report.

A.1.4.5 IEC / IEEE 65700.19.03 – Les Recksiedler (IEEE) and John Graham (IEC), Co-Chairs

See complete minutes in Appendix D of this report.

A.1.5 External Liaison reports

A.1.5.1 IEC Bushing Standards Activity – John Graham, IEEE Liaison

Mr. Graham informed the group that IEC will be defining a new term. It will likely be RIS for the new resin impregnated synthetic bushings. Following Mr. Grahams briefing Mr. Sharma noted that IEC seems to have discontinuity in cantilever values listed in their bushing standard and the bushing cantilever values listed in the IEC circuit breaker standard. See complete minutes in Appendix D of this report.

A.1.5.2 IEEE 693 – Eric Weatherbee, IEEE Liaison

Mr. Weatherbee informed the group there has not been any progress since the last SC meeting as IEEE 693 spring meeting had not taken place yet. He informed the group that the next S14 IEEE 693 meeting would be held in San Diego, April 15th through the 16th.

A.1.5.3 WG PC57.160 – Thang Hochanh, Chair; Thomas Sizemore, Secretary

See complete minutes in Appendix E of this report.

A.2 Unfinished Business

A.2.1 Solid Dielectric Bushings – Keith Ellis

Mr. Ellis informed the group that he would like RIP and ERIP defined separately. Several members did not think that RIP and ERIP should be considered solid dielectrics as SDB is defined as having no condensers. Mr. Elliot commented that going that far into the individual chemistries between the two designs is beyond the scope of the standard, unless a reason can be determined to do so.

A.2.2 Oil to SF6 Bushings – John Graham

Mr. Graham asked if the group wants to have this defined in the standard. Mr. Elliot stated the current scope of C57.19.00 and 01 excludes these types of bushings and therefore are the beyond the scope, as such it would require significant revision to include.

A.2.3 Study Report on Distribution Transformer Bushings – Josh Verdell

This report was giving at the end of the SC meeting so that the distribution transformer group that runs in parallel could join the discussion. Following Mr. Verdell's report of his findings the Chair suggested that Mr. Shaw, Mr. Verdell and himself meet or have a conference call to discuss how best to proceed as significant participation will be required from the distribution side to complete this task and it has been tried several times over the years and has yet to maintain active participation required to succeed.

A.3 New Business

A.3.1 Investigation Report – IEEE C57 Standards for Composite Bushings – Devki Sharma

Mr. Sharma noted that upon his review of the standards he was unable to find any exclusion to composite bushings. He proposed that during the next revision of the standards composites should be included. Mr. Graham commented that IEC's definition of composite is different than the way it is being used by Mr. Sharma and therefore we need to keep the differences in mind.

A.3.2 PD Test for Shunt Reactors – Egon Kirchenmayer

Mr. Kirchnmayer showed a presentation to the group and also the comments of the other task group members that joined the task group after the St. Louis meeting. In summary, two agreed there is a need for a new special test and two disagreed. Presentation to be available on website for those interested.

A.4 Adjournment – 10:46am

Appendix A

IEEE/PES TRANSFORMERS COMMITTEE
Status Report of Transformers Standards

March 12, 2014

STANDARD / PROJECT	TITLE	Working Group Chair / Phone / Email	Pub Year / Rev Due Dat	PAR Issue Dat / PAR Expiration	Standard Status / Remark
SubCommittee **BUSHING** Chair **Zhao P.**		(417) 345-5926 peter.zhao@HydroOne.com			
PC57.19.04	Standard Performance Characteristics and Dimensions for High Current Power Transformer Bushings	Arpino C. 847 439-4122 carlo@astareg.com		6/16/2011 **12/31/2015**	New Project
C57.19.00	Standard General Requirements and Test Procedure for Power Apparatus Bushings	Ellis K. P. (615) 847-2157 keithcota@aol.com	2004 **12/8/2020**		Approved Formally Std. IEEE 21 Previous revision 1991. Errata issued March 2010 Reaffirmation approved 12/8/2010
C57.19.01 PC57.19.01	IEEE Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings	Zhang S. 585 768 1273 shibao.zhang@ieee.org	2000 **12/31/2018**	12/8/2010 **12/31/2014**	Approved +PAR for Revision Formally Std. IEEE 24 Reaffirmed in 2005. PAR for Rev first approved Dec 2007 Mar '10: NesCom extended PAR, unitl December 2013 PAR Extension is on March 2014 NesCom agenda
C57.19.03-19 P65700-19-03	Standard Requirements, Terminology, and Test Code for Bushing for DC Applications - Corrigendum 1	Recksiedler 204 474 3192	**12/31/2018**	3/25/2010 **12/31/2014**	Approved + PAR for Revision Published 6/6/2006 See Corrigenda -1, Published in 2006 New PAR for revision submitted 10/2007 Std merging with IEC std NesCom extended PAR, unitl December 2013 IEEE Work complete; still waiting for IEC. PAR Extension Request granted until Dec 2014
C57.19.100	IEEE Guide for Application of Power Apparatus Bushings	Spitzer T. (817) 215-6457 tommy.spitzer@oncorgroup.com	1995 **12/31/2022**		Approved New PAR requested and approved to 12/31/2010. NESCOM approved Extension till Dec 2012 Revision approved Dec 2012

Appendix B

WG Revision C57.19.01 Standard Requirements for Bushings.

MINUTES OF WORKING GROUP MEETING – S14 Savannah, GA

The working group met on Tuesday March 25, 2014, at 9:30 am with a total of 69 participants. Of those, 43 members and 26 guests. Working Group membership is currently 61 members therefore a quorum was achieved.

The following eight guests requested membership and four were granted member status:

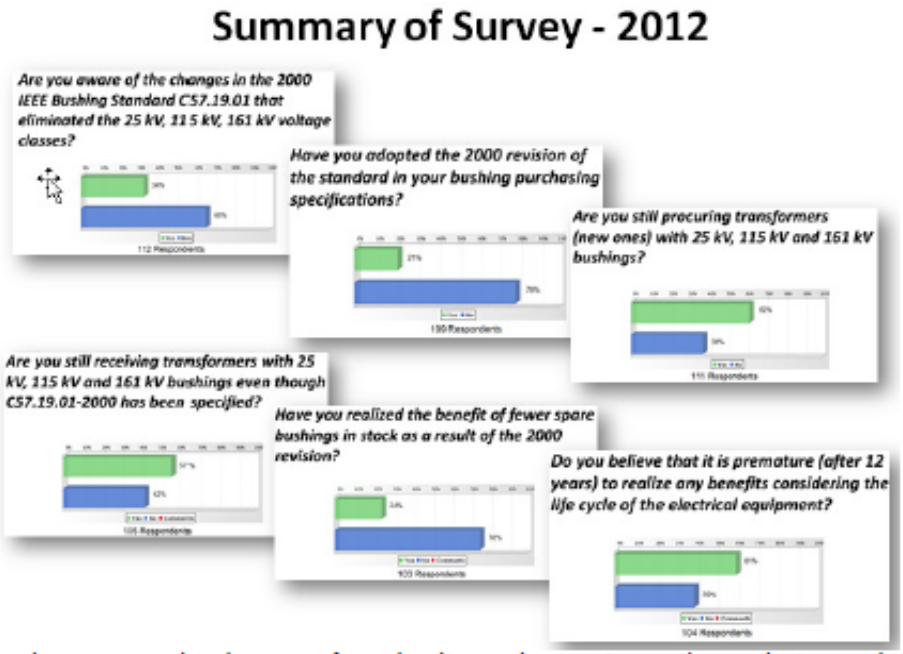
Name	Number of recent meetings (3 recent for membership)	Member Status Change
Barry Beaster	2	1 more meeting needed
Bernard Banh	1	2 more meetings needed
Neeraj Bhatia	2	1 more meeting needed
James Fairris	4/5	Granted
Wayne Johnson	4/5	Granted
Marek Kornowski	5/5	Granted
Kerry Livingston	4/5	Granted
Jim Oribiana	1	2 more meetings needed

1. Introductions and Distribution of Attendance Rosters
   a. The committee officers were introduced.
2. Establishment of Quorum
   a. A slide of WG membership was displayed. A count was performed and a quorum was established.
3. Minutes Approval
   a. F13 St Louis minutes were displayed on screen for a couple of minutes.
   b. F13 St Louis meeting were approved as posted on the website and on the screen.
4. PAR Extension Request in Review
   a. PAR extension request was submitted to extend until completion to 2017. IEEE will be considering this PAR this week.
   b. A new proposed timeline was presented and discussed assuming the extension request is granted:

- Spring 2014
  - Identify the issues to be addressed
- Fall 2014
  - Discuss the proposed solutions
- Spring 2015
  - Discuss the proposed solutions
- Fall 2015
  - Discuss the 1st draft of ballot
  - Start 1st ballot after the meeting
- Spring 2016
  - Discuss the 1st ballot results
  - Start 2nd ballot after the meeting
- Fall 2016
  - Discuss the 2nd ballot results
  - Start 3rd ballot after the meeting, if necessary
- Spring 2017
  - Discuss the 3rd ballot results
  - Start final ballot after the meeting, if necessary
- Fall 2017

Appendix B (con't.)

5. Old Business
    a. Summary of the Survey Results
        i. Survey results from 2010 asserted the standard should be revised.
            1. Bushing Dimensions of 115 kV to 345 kV to 5000 A
            2. Voltage Class (preferred and supplementary)
            3. RIP power factor limit
            4. Transformer Breaker Interchangeability (TBI)
            5. Cantilever test requirement
    b. The present scope of the PAR was reviewed.
        i. This standard covers electrical, dimensional, and related requirements for outdoor power apparatus bushings that have basic impulse insulation levels (BILs) of ~~200~~ 110 kV and above. It provides specific values for dimensional and related requirements that are to be interpreted, measured, or tested in accordance with IEEE Std C57.19.00-~~1991~~. Bushings covered by this standard are 5,000 A or less rated continuous current and intended for use in free air as components of ~~oil-filled~~ liquid-filled transformers and reactors. For information on ratings not covered by this standard and for replacement bushings for oil circuit breakers, refer to IEEE Std C57.19.01-1991.
    c. Another survey had been performed and results also asserted the need to revise the standard:



    d. There is a proposal to have preferred voltage classes to continue what was done in 2000 but have also supplementary voltage classes to restore requirements for those classes.
    e. The need also surfaced to add dimensions through 5000 A rating for the preferred and supplementary voltage classes. It was discussed if there is a need for 345 kV and above at 5000 A and it was agreed the need is not needed above 3000 A for 345 kV and above bushings.
    f. Transformer-Breaker Interchangeable (TBI) – if we get rid of the reference to the 1991 standard, there is still a need to cover TBI as there are still bulk oil circuit breakers in service and users need maintenance replacements

Appendix B (con't.)

g. Power Factor Limit for Resin Impregnated Bushings: There was an online discussion in Central Desktop to propose lowering this limit. The debate was somewhat complete for discussion of terminology of RIP versus ERIP. It has not been concluded if the power factor limit should be changed.

6. New Business
   a. Line to Ground Ratings
      i. 88 kV versus 102 kV Maximum line-to-ground voltage for 138 kV bushing was not transferred to the new standard in 2000. The suggestion was made that this question to a new survey. The concern is the bushing is tested at a lower PD level than users had available prior. The suggestion was made to examine at the history of this decision path for the 2000 standard.

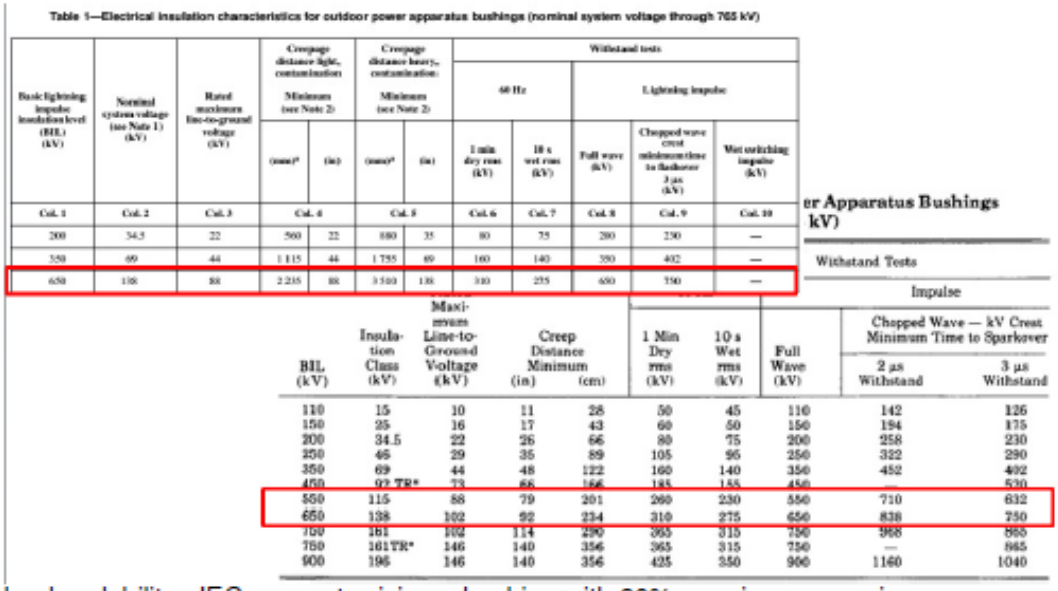


Table 1—Electrical insulation characteristics for outdoor power apparatus bushings (nominal system voltage through 765 kV)

Basic lightning impulse insulation level (BIL) (kV)	Nominal system voltage (see Note 1) (kV)	Rated maximum line-to-ground voltage (kV)	Creepage distance light, contamination Minimum (see Note 2)		Creepage distance heavy, contamination Minimum (see Note 2)		Withstand tests: 60 Hz		Withstand tests: Lightning impulse		
			(mm)*	(in)	(mm)*	(in)	1 min dry rms (kV)	10 s wet rms (kV)	Full wave (kV)	Chopped wave crest minimum time to flashover 3 μs (kV)	Wet switching impulse (kV)
Col. 1	Col. 2	Col. 3	Col. 4		Col. 5		Col. 6	Col. 7	Col. 8	Col. 9	Col. 10
200	34.5	22	560	22	880	35	80	75	280	230	—
350	69	44	1 115	44	1 755	69	160	140	350	402	—
650	138	88	2 235	88	3 510	138	310	255	650	750	—

er Apparatus Bushings
kV)

BIL (kV)	Insulation Class (kV)	Maximum Line-to-Ground Voltage (kV)	Creep Distance Minimum (in)	Creep Distance Minimum (cm)	1 Min Dry rms (kV)	10 s Wet rms (kV)	Withstand Tests: Impulse: Full Wave (kV)	Chopped Wave — kV Crest Minimum Time to Sparkover: 2 μs Withstand	Chopped Wave — kV Crest Minimum Time to Sparkover: 3 μs Withstand
110	15	10	11	28	50	45	110	142	126
150	25	16	17	43	60	50	150	194	175
200	34.5	22	26	66	80	75	200	258	230
250	46	29	35	89	105	95	250	322	290
350	69	44	48	122	160	140	350	452	402
450	92 TR*	73	66	166	185	155	450	—	530
550	115	88	79	201	260	230	550	710	632
650	138	102	92	234	310	275	650	838	750
750	161	102	114	290	365	315	750	968	865
750	161TR*	146	140	356	365	315	750	—	865
900	196	146	140	356	425	350	900	1160	1040

   b. Loadability: IEC suggests sizing a bushing with 20% margin over maximum continuous transformer current rating. The resulting discussion suggested C57.19.100 had covered the topic of overload then noted the section was removed because overload duration was not defined. At the moment bushing manufacturers would need to offer users guidance on loadability.
   c. Task Forces: The chair recommended development of task forces to address issues. Volunteers were requested. If volunteers are not received then the chair will appoint members to assist.
      i. Scope
      ii. Voltage Classes
      iii. 5000 A dimensions
      iv. Canteliver test
      v. Power Factor Test Limits
      vi. 88 kV vs 102 kV

7. Adjournment
   a. Meeting was adjourned at 10:30 am.

Minutes by: David Wallach, WG Secretary.
e-mail: david.wallach@ieee.org
Savannah, March 25, 2014.

Appendix C

Minutes: WG PC57.19.04 – LV Bushings Rated >5000A and Applied in Metal Enclosures
Date: March 25, 2014 @ 11:00am – Savannah, GA USA

1) Attendance:
   a) 25 Attendees:
      i) 11 of 28 Members were present (<50%). A quorum was not reached.
      ii) 14 Guests
         (1) 8 new, 6 repeat
2) Summary:
   1. This WG has had its second Chair step down and has been operating without a Secretary for the past 2 years. First priority moving forward is the nomination and approval of a new Chair and Secretary. Volunteers needed/wanted. Preference towards end users working in the field of generation.
   2. Par expires Dec. 31, 2015. The first action item for the new Chair was identified as the filing of an extension of the current PAR because it is not believed we will have the draft ready for ballot for before Oct. 20, 2015
   3. Review of open items from the F13 meeting in St. Louis:
      - Should OIP bushings with thermally upgraded insulating material have %PF criteria which differ from those with standard kraft paper insulation the consensus was there should be no difference in %PF.
   4. Other minor discussions:
      - Due to difficulty believed to be faced in dimensionally standardizing the idea was proposed to only address the performance characteristics of bushings applied in metal enclosed bus (typical of LV side of GSU), but due to the title and scope defining this standard as not only performance characteristics but also dimensions, this idea had to be dismissed.
      - Question came up whether this standard would also apply to dry bushings? This standard would be valid for any type of bushing insulating material whether that be oil impregnated porcelain insulated or dry resin impregnated core bushings (as examples).
      - Would the temperature rise for these bushings be related to the air temperature in the bus or would it be related to the ambient air of the environment? There were good points made to support both sides of this topic, but a consensus was not reached. Ongoing discussion.
      - The presentation from F11 meeting on differences between bushings applied in free air, and those in metal enclosed bus was presented again for those new guests to show why this standard is needed.

3) Action Items:
   1. JD Brafa & Van Nhi Nguyen work together to create and distribute to the members a copy of draft #1 of this standard for comment at the Fall 2014 meeting. Soft deadline is set for September 1, 2014.

4) Adjournment: Meeting was adjourned at 12:18p

Appendix D

IEC BUSHINGS STANDARDISATION

IEC Meetings
The IEC bushing committee SC36A met during the IEC General Session in New Delhi, India on October 19th 2013. The next committee meeting is planned for October 2015 in Minsk, Belarus.
Subcommittee Chair – John Graham, Siemens UK.
Secretary – Gian Franco Giorgi, CEDESPA, IT.

IEC60137 "Insulated Bushings for Alternating Voltages above 1000V"
A revision of the standard is being carried out by SC36A JMT5 with Convenor Lars Jonsson from ABB, Sweden. A kick-off meeting was held in Geneva in January 2014 with 17 members from 7 countries present. The main items for further discussion are;

- Extension of test values to cover UHV bushings.
- Possible extension of routine impulse testing following IEC60076-3
- Thermal classification including introduction of resin impregnated synthetics (RIS) insulation.
- Temperature rise test conditions.
- Altitude correction.

The next meeting is planned for April 2014.

IEC/IEEE6570.19.03 "Bushings for DC Application"
SC36A MT5 is working with the IEEE Bushing subcommittee with a joint working group to produce a dual logo document.
The document is at the final stages with an FDIS prepared by IEC and passed to IEEE for recirculation ballot. The ballot closes March 23rd. Any comment resulting from the ballot will be reviewed before the FDIS is formally circulated to IEC National Committees. Under IEC rules final publication should be around July 2014.
The IEEE PAR has been extended to cover the IEC delay.

IEC61463 "Seismic qualification of bushings"
SC36A MT6 has been formed and held its first meeting in Milan on October 9th 2013 with Paolo Cardano, Alstom P&V as convenor. The team will review other existing standards including IEEE693 to strengthen the document. An internal working group draft was circulated in September 2013 and the first CD is expected in April 2014.
Any comments from the IEEE committee would be welcome.

Other Work –
IEC61464 Dissolved gas analysis of oil impregnated paper bushings – IEC TC10 is working on a revision of the main DGA standard IEC60599. The latest CD includes an annex relating to interpretation of DGA in bushings but gives different limits to those in IEC61464 which could cause confusion. After discussions with SC36A, TC10 agreed to revert to the IEC61464 values.
IEC61639 Bushings for direct connection transformer/GIS – this is under review by the switchgear committee SC17C MT27 and has been re-numbered IEC62271-pt211. The CDV included an annex on very fast transient testing after comments from SC36A it was agreed to remove the annex at the FDIS stage. The FDIS has now been circulated with a closing date for comments March 24th.
IEEE Bushing subcommittee is discussing any need for a similar document covering transformer/gas bushings..

Cigré:
Cigré working group A2: 43 Bushing Reliability, chaired by Antun Mikulecky from Hungary, will meet in Madrid in April 2014..
The group has three task forces;

1. Questionnaire on bushing failure rates and data. _ the questionnaire is completed for circulation.
2. Drafting of technical brochure sections – definitions, failure modes, mechanisms.
3. Drafting of technical brochure sections - diagnostics and monitoring methods, including theory, measurement method and decision criteria.

It is aimed to publish the brochure during 2014.

John Graham
March 18th 2014

Appendix E

Date: 2014-03-24

Working Group for PD in bushings, PTs and CTs – PC57.160

The meeting was mainly focused on the revision of draft 4, following the discussion during the meeting in St-Louis.

1. Revision of the bushing tap representation for the 2 following cases
    a. Bushings tap has only a test tap
    b. Bushings tap has one test tap and a voltage tap
2. Partial discharges pattern or PRPD
    a. The chair recall to the WG, that the most valuable benefit of this guide on PD are the inclusion of a maximum number of patterns, describing the fault conditions encounter during PD measurements. For this reason, the contribution of every member to provide the patterns he has in his database is being the key point.
    b. The chair also mentioned that patterns are used by many laboratories to diagnose problems during PD testing.
    c. 4 patterns are presented and are related to test situations, where the PD are external to the test object. There were discussions relative to each of these cases that happen frequently during PD testing.
3. Verification of the calibrator injection level:
    a. There was discussion about old and recent method introduced in IEC for pico-Coulomb calibration. The "old" method, (where the verification/ calibration using an oscilloscope having a math function with integration) is easier to use.
    b. At the next meeting Detlev Gross promised to present the new calibration method from IEC.
4. Draft 5
    a. A copy of this draft will be circulating shortly to the participants and members of the WG.
    b. The chair asks the participants to review draft 5, send the comments for the preparation of draft 6.
5. TF on PTs and CTs
    a. Vladimir Khalin who led this TF will complete with his group, the revision of sections of draft 5 related to PTs and CTs.
6. Discussion on the use of UST (ungrounded specimen under test) and GST (grounded specimen under test).
    a. Discussion was made on the revision of these 2 terms that were used in other measurement than in PD testing. It was agreed that the WG will look at a revision of them.

WG Secretary:	Thomas Sizemore
WG Chair:	Thang Hochanh
Date:	2014-03-24

Annex C Distribution Subcommittee – Chair: Stephen Shull

March 26, 2014
Savannah, Georgia

Chair: Stephen Shull
Vice-Chair: Jerry Murphy

C.1 General Opening

Steve opened the meeting welcoming everyone to the meeting. Jerry circulated the rosters. To establish a quorum, a list of members were displayed and a count of was made. We did have a quorum with 29 of the 51 members in attendance.

The agenda was reviewed and motion made by Gael Kennedy, seconded by Kent Miller and approved by unanimous acclamation of the members in attendance.

The Fall 2013 meeting minutes were reviewed and motion made by Phil Hopkinson, seconded by Ed Brush and approved by unanimous acclamation of the members in attendance.

C.2 Working Group and Task Force Reports

C.2.1 C57.12.36 – Distribution Substation Transformers – Jerry Murphy

Jerry presented the following minutes from the working group meeting on March 25, 2014 at 1:45 PM in with 49 in attendance.

Jerry called the meeting to order. Introductions were made. The names of the members were projected on the screen. By a show of hands the quorum was reached by having 12 out of the 19 members present.

The minutes of the Fall 2013 meeting in St. Louis were presented. A motion was made by Gael Kennedy and seconded by Ron Stahara to approve the minutes as written. The minutes were approved unanimously.

Jerry informed that he had sent Draft 3 of the standard to all the WG membership encouraging them to review this draft so that any issues could be raised, discussed and resolved. All the changes that had been discussed in the past meetings were already incorporated.

This draft was projected on the screen to show the changes that had been incorporated. Craig Colopy requested the review of this document to the members of the WG C57.15 that were in attendance, considering their work with the joint IEEE/IEC standard process.

Bob Olen explained how the IEEE SA system worked, to ensure that the membership would be included in this system, so that they can receive any future invitation to ballot.

Jerry asked the group for a motion for a straw ballot to proceed to start a ballot process, considering that the document was ready to go through this process. A motion on this regard was made by Ron Stahara and seconded by Gael Kennedy. The motion was approved unanimously.

Jerry then informed that he would send the document to IEEE in April, so that the balloting process could be approved soon, and he once again requested the group to review the document and provide any comments.

There was no additional new business, and the meeting was adjourned at 2:05 PM.

Jerry made a motion before the subcommittee to move the standard to ballot, seconded by Gael Kennedy and the motion was approved by unanimous acclamation of the subcommittee members in attendance without further discussion.

C.2.2 C57.15/IEC 60076-21 – Step-Voltage Regulators – Craig Colopy

Craig presented the following minutes from the working group meeting on March 24, 2014 at 4:45 PM with 41 persons in attendance.

Craig opened the meeting by welcoming everyone. Craig asked the attendees to introduce themselves. Since this task force had just been formed and was working at this time without a PAR, Members are still being added. Those in attendance were asked to approve the agenda for this meeting. It was the general consensus that the agenda was correct. The St Louis unapproved Minutes were presented but because there was no task force at that time, it was determined that no approval was needed. Rosters of interested parties were passed out for additional individuals to sign up for Task Force Membership.

Craig updated the group on the status of PAR and DC (IEC Document for Comment.) Member nations are supposed to respond by May 9th, 2014 to this DC. Jodi Haasz commented that RevCom will meet Wednesday to consider the IEEE PAR request. It is anticipated that this will be approved.

Craig stated that he would like to do some preliminary work in some areas before next meeting which is scheduled in the Fall. The following areas were target and individuals assigned to work on these topics.

a) Sound Levels as per Brazil (NBR11809) – 2014 - Craig Colopy

b) C57.12.00 and C57.12.90 Revisions – review changes to see effects on this Standard. The volunteers were Giuseppe Termini and Wally Binder

c) Investigate the 55 and 65°C Average Winding rise and associated Hot Spot Rise. It was pointed out that IEEE's ambient is not the same as IEC. Therefore, Craig cautioned the volunteers to be careful in their review The volunteers were Jennifer Yu and Aleksandr Levin,

d) External Dielectric Clearances harmonization. The volunteers were Dan Sauer and Fred Friend

e) On-Load Tap Changer Section (IEC 60124-1 & NBR 11809) - The volunteers were Axel Kraemer, Lee Matthews, Chuck Simmons and Craig Colopy.

f) Develop a Tank Rupture Test and/or Cover retention based on the work being done in PCS57.12.39. The volunteers were Dan Mulkey, Jim Harlow, Justin Pezzin, and Said Hachichi.

g) Routine and Design Partial Discharge (150 BIL and higher) tests There were no volunteers.

h) Sound Level Requirements and Tests. The volunteers were Lee Matthews and Martin Rave.

i) Control/Apparatus Compatibility tests which could include status, control access, SCADA, etc. The volunteers were Craig Colopy, Dallas Jacobsen, Murty Yalla, Steve Shull, and Anil Dhawan.

j) Universal Interface between the apparatus and control with consideration of Safety, Liability, etc. The volunteers were Steve Shull, Anil Dhawan, Tas Taoussakis, and Craig Colopy.

k) A discussion concerning the topic of "Bypass off Neutral Position" which was to be targeted to an Annex. This annex would consider covering such topics as Safety, equipment failures, determination of neutral position, etc. The volunteers were Craig Colopy, Dan Mulkey, Chuck Simmons, and Mike Miller.

l) An Annex that would discuss overload, probability of different operations, and other no previous covered items. The volunteers were Dallas Jacobsen and Jim Harlow

m) Special considerations for Ester Based fluids. Alan Peterson volunteered to do this.

n) The Control Design and Testing: This currently discussed in section Section 9 of the current standard. Murty Yalla volunteered to do this.

The meeting ran out of time and there was a motion made by Lee Matthews to adjorn with a second by Mike Miller. The motion was carried by unanimous approval.

C.2.3 C57.12.20 – Overhead Distribution Transformers – Alan Traut

Alan presented the following minutes from the working group meeting on March 24, 2014 at 11:00 AM with 53 in attendance.

Al Traut asked for the Introduction of members and guests.

Al Traut provided the Chair's Report. The current PAR expires December 31, 2016. The 10-year cycle ends December 31, 2021. Al stressed that balloting needs to occur by 2015 or early 2016 to meet the December 31, 2016 PAR expiration date.

A quorum of the working group members was present (26 out of 33 members were present).

The minutes of the fall 2013 St. Louis meeting were discussed and approved.

Al Traut led the first discussion of old business on proposed transformer minimum impedance values. The typical values in his presentation came from the Department of Energy's recent work on distribution transformer efficiency values. The minimum impedance values were derived based on various panel breaker sizes. Discussion was held on including maximum impedance values, but the working group decided against this. Some felt that the proposed single-phase impedance values should be compared with those of 3-phase padmount transformers as a check. Al Traut will make the meeting slides available to everyone who attended the meeting as well as provide a summary of his approach in deriving the minimum impedance values. Adam Bromley and Chuck Simmons volunteered to assist Al Traut on the wording for the minimum impedance section.

The last item of old business discussed was regarding platforms for mounting overhead type transformers. Some larger transformers may require a platform for mounting due to increases in total weight as a result of the DOE efficiency requirements. The working group feels that the transformer base mounting capabilities need to be addressed in the standard. The group agreed that the standard should include a maximum weight beyond which transformers should be mounted on platforms. Concern on the weight limit of the different types of mounting brackets (adapter plates) was also discussed as some of these limits could be exceeded by future transformer designs. The group agreed that a weight limit needs to be defined for these mounting brackets (adapter plates). The group discussed this information being included in an informative annex. Dan Mulkey, Ali Ghafourian and Chuck Simmons agreed to work with Al Traut on putting together a summary of what some users are doing with platforms and send to the working group.

Under new business, Darren Brown questioned the grounding of the X2 bushing on the top four schematics of Figure 6. His concern was that by showing the X2 grounded, users may interpret this to mean that all X2 bushings should be grounded when it is only required that the X2 bushing be grounded on 120/240 Volt secondary designs. Following discussion, a motion was made (Allen Wilks / Darren Brown) to delete all X2 ground connections from Figure 6. The motion passed with 14 approving and 3 dis-approving.

The last discussion under new business involved which bushing should be grounded on single-phase overhead type transformers with four secondary bushings. Chuck Simmons will add language to the current draft and present to the working group at the next meeting.

Meeting was adjourned at 12:13 PM.

C.2.4 C57.12.34 – Three Phase Padmount Transformers – Ron Stahara

Ron presented the following minutes from the working group meeting on March 24, 2014 at 3:15 PM with 64 in attendance.

Ron Stahara called the meeting to order and introductions were made. The rosters were circulated. The complete detail of attendance is recorded in the AM system. To establish a quorum, a members list was displayed on the screen and those who saw their names were asked to hold up their hand. From this count of hands, it was determined that a quorum was established. A motion was made by Marty Rave and seconded by Ed Smith to accept the minutes of the Fall 2013 meeting as written as well as agenda for this meeting. The motion was pasted unanimously.

The discussion continued on the meaning of “permanently affixed”. The original clause in the document was as follows:

8.8 Instruction nameplate

8.8.1 Location

The instruction nameplate shall be located in the low-voltage compartment and shall be readable with the cables in place. When the nameplate is mounted on a removable part, the manufacturer’s name and transformer serial number shall be <u>permanently affixed</u> to a non-removable part.

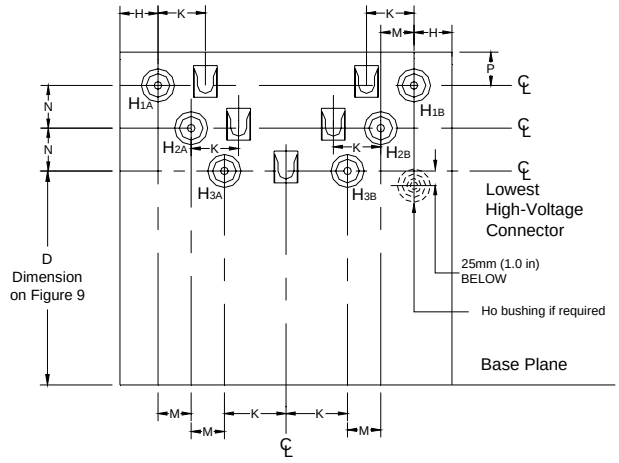
After some discussion it was reformed to the following:

8.8.1 Location

The instruction nameplate shall be located in the low-voltage compartment and shall be readable with the cables in place. If the nameplate is mounted on a removable part, the manufacturer's name and transformer serial number shall be attached to the tank in such a way to have equal or greater life expectancy than that of the transformer.

A motion was made by Jerry Murphy and seconded by Said Hachichi to accept this change. The motion pasted unanimously.

A discussion was continued from the fall meeting concerning the location of the H0 bushing. The group reviewed the drawings showing the H0 bushing as discussed in the last meeting. These were figures 2, 3, 6, 7, 10, 11,13A, 13B, 14A, 14B, and 14C. After some discussion, it was felt that the all of these were acceptable except the loop feed deadfront units. A concern was expressed that the position of the bushing in the example figure shown below may be in the way of cabling and connections at the higher voltage and current ratings.



Although this location had been shown to work for 200A, 15kV class installations, the higher voltage ratings and the 600A interfaces may be unable to be accommodated when the bushing was at this location. There was a lot of discussion concerning this and the conclusion was that the bushing will be moved to either above the H1A bushing well or the H1B bushing well. The preferred location was to be above the H1B bushing well. A motion was made to this effect by Michael Miller and seconded by Mike Faulkenberry. The motion pasted unanimously. Steve Shull was to make corrections to the affected drawings.

The document was discussed in general as a review of its content. There were a number of items discussed most of which were editorial in nature. Ron brought a comment to the group concerning the footnote b in Table 3. There were questions from the group as to if these footnotes in the Table would be a part of the standard. Steve was to verify that this was the case in that these footnotes provided valuable information to the standard. However, footnote b was a concern for the group. It appears that the technology has been developed to such a point as to allow for a 200 kV BIL separable connector and this statement may need to be corrected. Ron was not sure that the document was written to be used up to this level. After some discussion it was asked that Steve Shull do a minutes search to verify this was the case. As a side note, this was done and the following is an excerpt from the Fall 2006 Minutes:

A discussion ensued concerning the 34,500 Δ BIL level shown in the document as well as associated kVA ranges. It was decided by consensus

that the 34,500 GrdY/19,920 kVA levels would be used for this voltage. Some discussion was followed by a motion made by Iqbal Hussain and seconded by Myron Gruber to change the BIL level to 150kV to match the BIL of the 34,500 GrdY/19,920 kVA. It was further clarified by changing the Table 1 footnote d to the following; "The highest BIL level for separable insulated connectors is 150 kV BIL. If 200 kV BIL level is required, bushings must be used." The amendment to the motion and the motion both passed.

These notes indicate that this was the intent of the standard.

Steve would investigate this connector. Comments from the group will be solicited to determine the disposition of the information that he hopes to discover.

Alex Macias asked why this document didn't provide for accessories such as fuses and switches. It was pointed out in the discussion that some of the underground transformers have these items included in their standards. Steve Shull commented that these items have never been in the document since he had been part of the group and he was told by his predecessors that they should not be included. Ron pointed out that Gerry Paiva had work to get these items removed when he was a part of the group. Giuseppe Termini and Dan Mulky commented that switches and fuses should be considered since these were necessary when applying these units at the higher voltages or when loopfeed designs are required. Brian Klaponski stated that since we were concerned about the unsophisticated user in the document, it appeared to him that a reference to these items should be consider as some part of the document simply as a safety precaution. Ron said that we would get with Gerry and see if Gerry could remember the spirit and intent of why these types of accessories were removed from the standard.

Since the meeting was running low on time, Ron ended the discussion and shared that at the next meeting we would have to move this document to ballot. He said that Steve Shull would be getting the changes made to the document in the next month and would circulated it to the group for comment. He would like to have any changes or corrections finalized by the next meeting. With this a motion was made to adjourn by Paul Chisholm and seconded by Mike Faulkenberry. The motion pasted unanimously.

C.2.5 C57.12.28, C57.12.29, C57.12.30, C57.12.31, C57.12.32 – Enclosure Integrity – Bob Olen

Bob presented the following minutes from the working group meeting on March 25, 2014 at 8:00 AM in with 56 in attendance.

C57.12.28, Standard for Pad-Mounted Equipment – Enclosure Integrity

- **Published 9/30/2005, Revision Due date 12/31/2018**
- **PAR Approved 30-Sep-2010, Expires 12/31/2014**

C57.12.29, Standard for Pad Mounted Equipment - Enclosure Integrity for Coastal Environments

- **Published 10/11/2005, Revision Due date 12/31/2018**
- **PAR Approved 30-Sep-2010, Expires 12/31/2014**

C57.12.30, Standard for Pole-Mounted Equipment - Enclosures for Coastal Environment

- **Published 9/20/2010, Revision Due date 12/31/2020**
- **PAR Approved N/A, Expires N/A**

C57.12.31, Standard for Pole-Mounted Equipment - Enclosure Integrity

- **Published 9/20/2010, Revision Due date 12/31/2020**
- **PAR for Corrigenda** (SCAB Corrosion Test /4.5.6) **Approved 6-Mar-2013, Expires 12/31/2017**

C57.12.32, Standard for Submersible Equipment – Enclosure Integrity

- **Reaffirmed 3/7/2008, Revision Due date 12/31/2018**
- **PAR Approved N/A, Expires N/A**

Meeting Minutes / Significant Issues / Comments:

- Quorum was established

- Ron Stahara motioned, and Justin Pezzin seconded, to approve the minutes of the previous meeting on October 22, 2013 in St. Louis, Missouri. The motion was approved unanimously.

Discussion of C57.12.31 Standard for Pole-Mounted Equipment - Enclosure Integrity:

Bob Olen reported on the ballot for the corrigenda to correct Section 4.5.6, Simulated Corrosive Atmospheric Breakdown (SCAB), on page 8, which should require 10 SCAB cycles not the 15 that is stated in the 2010 Standard.

- The Ballot Results were:
  - 63Affirmative
  - 4 Negative
  - 94% Affirmative (passed > 75%)

- This corrigenda was submitted to REVCOM on February 21, 2014.

Discussion of C57.12.28 Ballot Standard for Pad-Mounted Equipment – Enclosure Integrity:

- The Re-Circulation Ballot Results were:
  - 97Affirmative
  - 5 Negative
  - 95% Affirmative (passed > 75%)
- This revision was submitted to REVCOM on February 21, 2014

Discussion of C57.12.29 Ballot Standard for Pad Mounted Equipment - Enclosure Integrity for Coastal Environments:

- The Re-circulation Ballot Results were:
  - 91 Affirmative
  - 6 Negative
  - 93% Affirmative (passed > 75%)
- This revision was submitted to REVCOM on February 21, 2014.

Discussion of C57.12.32 - Standard for Submersible Equipment – Enclosure Integrity:

The chair noted that the standard will expire in 4 years it is time to take out a PAR for revision. Al Traut motioned and Ron Stahara voted to go forward and submit a PAR for revision. There was much discussion around the Scope and the Purpose. Currently there is confusing language with “enclosure” being used for both the outer skin of the equipment and for the enclosure/vault/box in which the equipment is placed.

A group was formed to work on the scope and par between meetings. The volunteers were: Al Traut, Chuck Simmons, Adam Bromley, Giuseppe Termini, Anil Dhawan, Arvin Joshi, Bill Wimmer, Dan Mulkey, and Bob Olen

Dan Mulkey will attempt an initial layout of testing sequence for coatings that are on ferrous metal followed by testing for coatings that are on non-metallic or stainless substrates

Concluding Remarks

The next meeting will be in October 2014 in the Washington, D.C. area.

C.2.6 C57.12.37 – Test Data Reporting – John Crotty

John presented the following minutes from the working group meeting on March 25, 2014 at 3:15 PM.

John made a motion before the subcommittee to move the standard to ballot, seconded by Gael Kennedy and the motion was approved by unanimous acclamation of the subcommittee members in attendance without further discussion.

C.2.7 C57.12.38 – Single Phase Padmount Transformers – Mike Faulkenberry

Mike presented the following minutes from the working group meeting on March 24, 2014 at 1:45 PM in with 51 in attendance.

Ali Ghafourian opened the working group meeting at 1:45 p.m. Twenty-nine of thirty-four working group members were present and a quorum was established. The attendees are recorded in the AM System.

The minutes of the meeting had previously been posted on line and a copy was emailed to the working group members. A motion was made by Ron Stahara to approve the minutes from the fall 2013 meeting, it was seconded by Kent Miller, and the motion was passed unopposed by the working group members.

Ali presented the ballot results. The participation rate was 85% and the approval rate was 98%. There were 32 comments, one of which resulted in a negative ballot.

Mike Faulkenberry led a discussion of only those ballot comments that needed working group approval as follows:

Page 19; Figure 6; NEGATIVE BALLOT
Comment:
My comments are in regard to Figure 6 - Low Voltage Spacing for LV Ratings E, E/E1Y, and E/2E. The illustration for E/2E and the arrangement for the LV bushing terminals X1-X2-X3-X4 are used for either 120/240 V or 240/480 V rated windings. The illustrations in Table 7- Number of low-voltage terminals and arrangement for single-phase transformers in C57.12.20 specify that the LV bushing terminal arrangement X1-X2-X3-X4 are available for 167 kVA and above - up through 500 kVA in the case of C57.12.20. Is this implied in PC57.12.38 D1.4 as well?
Proposed Change:
I would add the following as part of Figure 6 in PC57.12.38:

Four low-voltage external terminals suitable for series, multiple, or three wire operation (120/240 or 240/480) - 167kVA and 250 kVA. Connect X2 to X3 externally for series operation. Connect X2 to X4 and X3 to X1 externally for multiple operation.
Resolution (Agreed to by Working Group Members):
A note will be placed at the bottom of Figure 5, rather than Figure 6 as suggested, that says, "The E/2E Low-Voltage rating with four external terminals, for example 120/240 V or 240/480 V, is suitable for series, multiple, or three-wire service. Connect X2 to X4 and X3 to X1 for multiple operation. Units shall be shipped connected for three-wire operation with X2 connected to X3 and to the tank." It was agreed that it would be applicable to all kVA sizes since the top cannot be removed from pad-mounted transformers for internal rewiring. So no statement as to kVA size for which it is applicable was necessary.

Page 20; Subclause 10.1; Line 4
Comment:
Reference to C57.91 should be changed to C57.12.00
Proposed Change:
IEEE C57.91 include overloads that could result in a transformer not remaining effectively sealed. IEEE C57.12.00 identifies Usual Service Conditions and I believe the expectation for the transformer remaining sealed is based on operating conditions spelled out in C57.12.00. I propose that the last sentence of Section10.1 be changed to read, "The transformer shall remain effectively sealed for a top-oil temperature of -5 degrees C to +105 degrees C continuous and under operating conditions as described in IEEE Std C57.12.00."
Resolution (Agreed to by Working Group Members): This change will be made.

Page 14; Subclause 7.6; Line 11
Comment:
I question the use of the term "lifting lugs" since this is typically accomplished with bolts screwed into female threaded bolt holes.
Proposed Change:
I propose that the last sentence of Section 7.6 be changed to read, "The safety factor is based on using all lifting provisions as instructed by the manufacturer." The company that I work for has encountered issues with bolts being used in the lifting provisions that were too long. Manufacturers should advise customers on the size, grade and length of bolts to be used to lift their specific transformers.
Resolution (Agreed to by Working Group Members): This change will be made.

Page 13; Figure 3
Comment:
Drawing title needs to include the term, "Type 1 arrangement".
Proposed Change:
I propose that the title for this drawing include "Type 1 arrangement" as that is included in the titles for Figures 1A, 1B, 2A and 2B. I propose the title for Figure 3 be changed to, "Figure 3 - Type 1 arrangement, live-front, high-voltage bushings, interchangeability dimensions".
Resolution (Agreed to by Working Group Members): This change will NOT be made as the working group felt that putting "Type 1 arrangement" in the title could lead to confusion.

Page 10; Figure 2A
Comment:
Drawing title needs to include the term, "small interface".

Proposed Change:
I propose that the title for Figure 2A be changed to, "Type 2 arrangement, small interface separable connectors, interchangeability dimensions". The title for Figure 2B includes the term "large interface", so I feel that Figure 2A should include the term "small interface".
Resolution (Agreed to by Working Group Members): After referring to IEEE Std 386, the term “small interface” was not found in the document. Therefore, this change will NOT be made, but it will be tabled until the next revision and researched further.

Page 7; Figure 1A
Comment:
Drawing title needs to include the term, "small interface".
Proposed Change:
I propose that the title for Figure 1A be changed to, "Type 1 arrangement, small interface separable connectors, interchangeability dimensions". The title for Figure 1B includes the term "large interface", so I feel that Figure 1A should include the term "small interface".
Resolution (Agreed to by Working Group Members): After referring to IEEE Std 386, the term “small interface” was not found in the document. Therefore, this change will NOT be made, but it will be tabled until the next revision and researched further.

Page 4; Subclause 4.2; Table 2
Comment:
In Table 2 (Electrical Characteristics and Minimum Electrical Clearances of High-voltage Bushings and Low-voltage Terminals for Live-front Transformers) on page 4, the values for "60 Hz dry 1 min withstand (kV)" associated with 18000 and 25000 Maximum nominal system voltages are different (the value for 18000 Volts is 42kV and the value for 25000 Volts is 60kV). Since the BIL values are the same, shouldn't the 60 Hz dry 1 min withstand (kV) values be the same?
Proposed Change:
I propose that these values be confirmed and changed if listed incorrectly.
Resolution (Agreed to by Working Group Members): Dan Mulkey stated that the 18000 volt entry in the table is not found in other standards and was probably added by someone at some point. Steve Shull made a motion that the 18000 volt line be removed from Table 2. The motion was seconded by Kent Miller, and the working group unanimously approved the motion. The 60 kV entry for the 25000 volt line was called in question, and it will be checked and verified as correct.

Page 3; Subclause 3.0; Definitions
Comment:
Is there a reason that "Ultimate Stress" isn't defined in Section 3 (Definitions)? Since "Working Stress" is defined, I think that "Ultimate Stress" should be defined in Section 3 at the top of page 3.
Proposed Change:
Define "Ultimate Stress" in Section 3 (Definitions).
Resolution (Agreed to by Working Group Members): Dan Mulkey suggested that the definition might already be in the IEEE Definitions. A check will be made before a definition is added to the standard.

Page 2; Subclause 2.0; Normative References
Comment:
I would like to see C57.12.25 referenced somewhere in the standard and its status identified as "unmaintained", or otherwise, and that it has been replaced by the C57.12.38 standard.

My concern is that some Users and possibly others will reference C57.12.25 without knowing that it is no longer maintained.

Proposed Change:

Include in Section 2 (Normative References) on page 2 and include identification of its status as "NOT MAINTAINED" or something equivalent.

Resolution (Agreed to by Working Group Members): This change will NOT be made for the following reasons:

1) Since Standard C57.12.25 is not mentioned in the text of the document, it cannot be included as a normative reference.
2) Standard C57.12.25 should have been withdrawn by IEEE when C57.12.38 was published.
3) The "Introduction" on Page iv now has this statement:
   In 2009, the first version of this standard was prepared. It replaced and combined ANSI C57.12.21-1992 and ANSI C57.12.25-1990 and was generally revised to comply with the then approved style for published standards.

Page 20; Clause 10.0; Oil preservation

Comment:

Scope indicates liquid filled transformers and in Clause 10, oil is mentioned.

Proposed Change:

Replace "oil" by "liquid."

Resolution (Agreed to by Working Group Members): We will consider changing this to "liquid" once the Task Force on the Terms Normalization White Paper has been submitted or until we have direction from the Sub-Committee. Once either of these occurs we will review this request.

Page 8

Comment:

I am concerned about the use of the term "Large Interface". I use this term in my company specs and it is generally known in the industry, but I cannot find a formal definition. This may be confusing to the "less experienced users". NOTE: The IEEE entry system prevents me from entering multiple page numbers, etc. but there are two figures that use "Large Interface".

Proposed Change:

Referring to fig 1C. "Small interface" = Std 386 Fig 7, and "large interface" = Std 386 Fig 8, 9. Maybe changing the Caption on 1B (for example) to "Figure 1B - Type 1 arrangement large interface (IEEE 386 figures 8 and 9) separable . . . " Using similar Captions for other figures.

Resolution (Agreed to by Working Group Members): As with the previous discussion on the "small interface" terminology, this topic will be addressed in the next revision of the standard when more research can be done to determine if the small and large interface terminology is still appropriate.

Page ii; Keywords

Comment:

The term "padmounted" isn't used in this standard that I can find, so I question why it is referenced in this section.

Proposed Change:

Consider deleting "padmounted" from this section.

Resolution (Agreed to by Working Group Members): Keywords are words that users might input when they are searching for a document. It does not necessarily have to be found in the document. So “padmounted” will remain as a keyword.

Figure 6
Comment:
The terms "ADD" and "SUB" should be identified.
Proposed Change:
Figure 5, Column Headers "ADD" and "SUB": I propose that "ADD" and "SUB" be defined as additive and subtractive polarities, respectively. Some may not realize what the terms "ADD" and "SUB" stand for as neither polarity or additive / subtractive is mentioned on this page.
Resolution (Agreed to by Working Group Members): This change will be made. The column headings will be changed from “ADD” to “ADDITIVE” and “SUB” will be changed to “SUBTRACTIVE.”

Page 5; Subclause 6.2 (2 Comments Received)
Comment on Line 9:
Since the applied-voltage test is required on the low voltage winding (as called out on line 13 and 14 in this section), the first sentence of this section should be revised. Otherwise, the first sentence could be interpreted to imply that no applied-voltage test is required for either the high or low-voltage windings.
Proposed Change for Line 9:
I propose that the first sentence of Section 6.2 (on line 9) be changed to read, "No applied-voltage test is required on the high-voltage winding." Otherwise, the first sentence could be interpreted to imply that no applied-voltage test is required for either the high or low-voltage windings
Comment on Line 13:
Change the sentence started with "An applied-voltage..." because there is no applied voltage in this case as defined on line 9 of the same subclause.
Proposed Change for Line 13:
Instead of "An applied-voltage...." include "The voltage in the induced-voltage test shall be applied on the low-voltage winding".
Resolution (Agreed to by Working Group Members): Both changes will be made.

Page 22; Annex A, Bibliography
Comment:
If the natural ester fluid guide is cited here (C57.12.147), then the mineral oil guide (C57.106) should also be cited.
Proposed Change:
Include in Bibliography as an informative reference:
C57.106 IEEE Guide for Acceptance and Maintenance of Insulating Oil in Equipment.
Resolution (Agreed to by Working Group Members): This change will be made.

Page iv; Introduction (2 Comments Received)
Comment 1:
It would be nice to have a few sentences added in the Introduction summarizing what was changed in this edition of the standard.
Comment 2:
While not part of the standard the introduction provides a great opportunity to provide a history of the standard for users, and future working groups revising the standard to

understand its development. Since a standard is now active for 10 years, all of those involved in a preliminary revision can be gone before the next revision is made and it is beneficial to have a starting point.
Resolution (Agreed to by Working Group Members): This change will be made.

Figure 4B
Comment:
Table on LV bushing stud sizes lists threads in English unit (inches) but the Note 1 indicates millimeters.
Proposed Change:
Indicate that Thread Size is in inches.
Resolution (Agreed to by Working Group Members): A line will be added to Note 2 of the Figure explaining that the stud thread sizes are in inches, only.

Ali asked if there was any new business, and none was brought forward.

Ali expressed disappointment that only about half of the working group members voted on the standard, even though an email had been sent reminding the members that the ballot pool was being formed and when the ballot was open. He suggested that the members make sure in IEEE SA that they have set their profile to be notified when there are transformer standards to be balloted.

The meeting was adjourned at 2:45 p.m.

C.2.8 C57.12.39 – Tank Pressure Coordination – Carlos Gaytan

Carlos presented the following minutes from the working group meeting on March 25, 2014 at 4:45 PM in with 44 in attendance.

The meeting was called to order at 4:45 PM. Introductions were made. The names of the members were projected on the screen. By a show of hands the quorum was reached by having 22 of the 32 members present.

The minutes of the fall 2013 meeting in St. Louis were presented. Ed Smith moved to approve them as written. Ron Stahara seconded. They were approved unanimously.

The comments received from Draft 2.2 were discussed. There were several comments on the proposed change from static to general transient pressure. Steve Shull moved to change general transient pressure to nominal pressure. Alan Wilks seconded. Under discussion, there were several comments about alternative names such as normal operating pressure, or usual service conditions", as well as using as a reference the standard dictionary for terms. The motion was then voted on and it passed with one negative vote.

Regarding the change from dynamic to rapid transient pressure, there were comments related with identifying a numerical reference for the rates of rise expected on this condition.

Steve Shull made comments regarding the use of single conversion values for the pressure levels covered in the document.

Regarding PRD definition, Josh Herz said that it was worth rewording how the definition of the pressure and flow conditions are written to address devices that have operating pressures other than 10 psig.

On the definition of slotted plug Chris Sullivan asked how would the ½" definition apply to the general case for all standards, since ¼" was utilized quite heavily in the industry, and that we need to modify the wording so it could be used everywhere and not specifically for a given type of equipment.

Another comments was made about the use of the term "negligible", that should not be used in the document, as it did not have a quantifiable definition.

On comments to Section 5, Steve Shull commented that it was designed for use with round tanks, and square tanks can see different conditions and should also be addressed as different test procedure to be called out inside this document. He suggested that we coordinated with the tank rupture group to get a copy of their recent paper that describes some test methods for rectangular tanks.

Under new business, Carlos mentioned that the next steps were to address these comments in a new draft 2.3, and adding other pending items such as the informative annex addressing coordination between tank strength and pressure relief, as well as vacuum and positive pressure conditions in transformers in operation. This new draft 2.3 is planned to be sent by June 2014 so that the group could have time to review in detail and provide additional comments to new draft before the Fall 2014 meeting

The Meeting was adjourned at 5:50 pm

C.3 Old Business

Steve presented to the subcommittee the need for involvement by the Distribution SC members with the Distribution Bushing TF for modification. Josh Verdell and Ed Smith will be representing the Distribution Transformer Sub-Committee on a Task Force in the Bushing Sub-Committee.

Steve continued by requesting subcommittee member involvement with C57.105 that will be forming a working group chaired by Adam Bromley.

Steve announced that Al Traut has stepped down as chair of the WG for C57.120 and Michael Miller would assume the role of chairman. Again Steve asked for Distribution Transformer Committee individuals to be involved in this group.

C.4 Chairman's Remarks and Announcements

The following is a recap of comments Steve made to the SC.

Membership is automatically granted to anyone requesting it at the first meeting of a new WG or TF.

Thereafter, membership is granted after a prospective member attends two consecutive meetings as a guest AND actively participates in the work of the TF/WG/SC. A former member may be reinstated if the same criterion is met.

Ongoing membership is maintained by consistent attendance at TF/WG/SC meetings, participation in internal TF/WG/SC surveys, or technical/editorial contribution to the TF/WG/SC's document or work.

Membership may be revoked if a member fails to attend two consecutive meetings or fails to respond to two consecutive surveys. The chair has discretion in not removing members who cannot attend but are still participating via survey responses and/or other written contributions.

Another key point not mentioned is that each TF/WG/SC Chair (or Secretary) must keep regular logs of attendance and participation and update the roster after each meeting. This is done in our Transformer Committee AM system. This will be used to determine the Quorum requirement for TF/WG/SC meeting business.

The main benefit of membership is the privilege of voting on TF/WG/SC issues.

C.5 New Business

C.5.1 Eric Davis, secretary of the WG on External Clearances reported on the recent activity to the subcommittee.

The WG and Survey results agreed to use the values contained in NEMA TR1-1980.

The NEMA TR1-1980 lists a single value for each voltage.

C57.12.00-2012, Table 4 lists multiple BILs for each voltage.

This proposed table attempts to merge the NEMA TR1-1980 values with the voltage and BIL.

The WG agreed to increase the Distribution Transformers phase-ground values for 110 and 125 kV BIL by about 10%.

The WG agreed to remove the "Minimum clearance between top shed of insulator of bushings of different phases" since:

* The early bushings had a stud connection and typically had an inch or more of porcelain between the metal stud and the edge of the bushing shed. This is no longer true with the condenser style bushings.

* It was also noted that the critical stress on the metal top cap of a bushing is always higher than the shed to shed stress and that no one had ever seen a flashover from porcelain to porcelain.

C.5.2 Sanjib Som asked how you may comment on a ballot when you cannot attend a WG meeting.

Steve thanked Sanjib for the question and reviewed the SA process to go into MyProject and select the areas of interest so you get notification of ballot pools being formed where you would be able to offer comments to the WG through the ballot mechanism.

C.5.3 Phil Hopkinson gave a heads up to the SC that a request would be made to the Performance Characteristics SC to work on a task force whose goal would be to address partial discharge that is occurring between the core and inner winding in certain winding

configuration. His hope was to add a paragraph to C57.12.00 to address the need for manufacturers to make design compensation to prevent this phenomenon from happening.

C.6 Adjournment

Ron Stahara made a motion and Kent Miller seconded to adjourn the meeting and the SC approve by unanimous acclamation.

Annex D Dry Type Subcommittee – Chair: Charles Johnson

March 26, 2014
Savannah, Georgia

Chair: Charles Johnson, Jr
Secretary: Robert C. Ballard

D.1 Introductions and Approval of Agenda and Minutes

The Subcommittee met on March 26, 2014 at 1:30 PM. There were 16 of 24 members present (therefore we had a quorum), 1 corresponding member, and 20 guests present, 6 guests requested membership. The attendance roster will be kept in the AMS.

The agenda was approved unanimously after a motion from Tim Holdway and a second from Roger Wicks.

The minutes of the St Louis, MO meeting were approved unanimously after a motion from Sanjib Som and a second from Jewan Puri.

D.2 Working Group and Task Force Reports

The next order of business was the presentation of the reports of the various working groups and task forces. See the following sections for the individual reports:

D.2.1 IEEE PC57.12.01 - Dry Type General Requirements Chair Tim Holdway

The working group met in the Oglethorpe Room of the Savannah Marriott Riverfront Hotel.

The meeting was called to order at 1:45 PM by Chairman Tim Holdway.

The meeting was convened with 19 members (out of 27 – therefore a quorum was reached with 70% attending) and 18 guests present with 5 requesting membership. The attendance was reported in the AMS.

The agenda was approved unanimously.
Motion: Rick Marek
Second: Kerwin Stretch

The minutes of the St. Louis October 21, 2013 meeting were approved unanimously.
Motion: John K. John
Second: Sanjib Som

Old business
- The comments to Draft 3, which was the draft that was balloted, were distributed to the Task Force and their recommendations were submitted to the chair

New business
- Draft 5 was completed by the chair and distributed to the Working Group on 3/10/2014

- The chair covered the following updates in Draft 5
    - Inclusion of the definition for ‘product standards’ in Section 3
    - Rewrite of section 5.10.3.2 Low-frequency tests to add clarity
    - Rewrite of section 5.10.3.5 Partial discharge tests to use the terms ‘solid cast’ and ‘resin encapsulated’
        - Don Kline commented that ‘resin encapsulated’ used to mean extra dips of resin in previous decades. He also noted that partial discharge is temperature dependent, but there was no further discussion on the relation of partial discharge and temperature. He then added that old AM radios could be used to locate partial discharge, but conceded that newer radios with noise filtering would not work.
        - Chuck Johnson added that partial discharge testing is required on ‘solid cast’ in IEC and there have not been recent issues with ‘resin encapsulated’ transformers failing due to partial discharge so it was not a required test
        - Phil Hopkinson proposed to change the definitions in 12.01 to be different from 12.80, but no formal motion was made
    - Acknowledgement that Table 15 Temperature limits of transformer under short-circuit conditions needed to be updated, but would not be undertaken inside of the current PAR
        - Rick Marek added that the equivalent table in IEC used 350°C for copper and 200°C for aluminum
    - Revision of Table 16 Dry-type transformer tests with special attention drawn to notes ‘a’ and ‘c’ relating to resistance and impedance and load losses, respectively.
- A revision to Table 5, “Dielectric insulation levels for dry-type transformers used on system with BIL ratings 350kV BIL and below”, to add 75kV BIL for 8.7kV system voltages was made by Carl Bush. He agreed that such a change should be made in the next revision.
    - As a response to Carl’s proposal, Chuck Johnson added that it should be considered to move the 15.0kV system voltage BIL minimum from 60kV BIL to 95kV BIL to match 12.00.
- A revision was requested to Section 5.10.3.2 Low-frequency tests to include instructions for single phase transformers by Chuck Johnson. He agreed to supply a proposal before the next revision to 12.01
- The chair reminded the membership what it meant to be a member of the working group and that included participation in balloting, surveys, and attendance at all meetings.
- Rick Marek and the chair reminded the working group that the next balloting cycle was a recirculation and only the sections changed to address the previous comments would be voted on.

Next meeting: Fall 2014, Washington DC, October 19-23, 2104.

With no further business, the meeting was adjourned at 2:51 PM.
Motion: Phil Hopkinson
Second: Dave Stankes

D.2.2 WG Dry Type O&M Guide C57.94 Chair Dave Stankes

The working group met in the Plaza Room of the Marriott Riverfront Hotel.

The meeting was called to order at 4:45 PM by Chairman David Stankes.

The meeting was convened with 12 out of 22 members (enough for a quorum) and 5 guests present with 1 requesting membership.

A motion to approve the agenda was proposed by Carl Bush and seconded Jerry Murphy. Motion was approved by voice vote with no opposing or abstaining.

The minutes of the St Louis (Fall 2013) and Teleconference (January 2014) meetings were approved by unanimous separate voice vote – both proposed by Rick Marek and seconded by Tim Holdway.

The chair discussed the timeline of the PAR leading to the end date of Dec 2015.

Document Review

1) Subhas Sarkar made the distinction that repaired units that have new windings need to be tested at full test levels otherwise reduced test levels to be used. Martin Navarro concurred. Since the standard covered the tests and not their levels, Subhas Sarkar's comment did not affect the standard.
2) Two new tests (Exciting Current and Power Factor Tip Up) were proposed to be added to Section 6 Testing by Jill Duplessis at the January meeting. There was discussion regarding lack of substantial industry use of such testing, after which Casey Ballard proposed to remove the tests from Draft 7. This was seconded by Carl Bush and carried by unanimous vote. The detailed descriptions of these tests were also deleted from Draft 7.
3) In section 6.1, the sentence "Trending tests have no value except as compared to pre-service (or previous) tests" was added to reinforce how these tests should be used.
4) In section 6.2.2 recommendation to remove 'distribution and power' as part of the Applied Voltage description and reorder test list (interchange (a) and (c)) were proposed by Roger Wicks and seconded by Jerry Murphy. This was approved by unanimous voice vote.
5) In section 6.3.2 resistance measurement was retained as first test, however other tests were arranged as per 6.2.2 and the last sentence at end was deleted. This was proposed by Roger Wicks and seconded By Carl Bush.
6) In section 6.2.1 the wording trending was used in place of comparison. This was proposed by Roger Wicks and seconded by Casey Ballard. This was passed by unanimous voice vote.
7) It was noted that several clauses do not have headers. Volunteers to review missing clause heading and recommend suitable ones included Rick Marek (Section 4.6, Albert Walls (Section 5) and Sanjib Som (Section 8.3.6)
8) Recommended changes to Section 4.10.2 from Rick Marek present in Draft 7 including references to C57.12.01 for temperature class references were approved as written. Motion to approve was proposed by Roger Wicks and seconded by Tim Holdway; this was carried by unanimous vote.
9) The header for 5.1.1.2 was amended to state ' ….ventilated and non-ventilated….."
10) In the body of 5.1.1.2, "dry transformer" was replaced by "dry-type transformer" and the phrase "ventilated" was replaced by "ventilated and non ventilated".
11) The header for 5.1.1.3 was amended to "Sealed"
12) In 5.1.1.3 the word dry transformer were replaced by dry type transformers.
13) In section 8…. Sanjib Som recommended adding references to the quality of air (clean and dry), but question of how to quantify this was raised. Sanjib will modify the language and this will sent out for email survey and comments. Further, in section 8 Sanjib suggested provide torque mark on hardware, this will also be sent for email survey and comments.

14) Section 3 Definitions was modified to reference C57.12.80. Definitions already referenced in C57.12.80 were removed from this section.

New business:

1) It was pointed out by Chair that the PAR would need to be amended to reflect change in Scope from original PAR. The new PAR will be submitted prior to May deadline in order to be reviewed at June Revcom meeting.
2) Once PAR is approved, it is the WG' intent that the document go to ballot prior to Fall 2014 meeting in Washington.

The motion to adjourn was proposed by Tim Holdway and was seconded by Casey Ballard. The meeting ended at 6:04pm.

D.2.3 TF Dry Type Test Standard C57.12.91 - Chair Derek Foster – Acting Chair Casey Ballard

The working group met in the Plaza Room of the Savannah Marriott Riverfront Hotel

The meeting was called to order at 3:15 PM by acting Chairman Casey Ballard

The meeting was convened with 14 people in attendance. As this was the first meeting of the task force, all attendees were able to request membership. 8 people requested membership, 2 requested to be guests, and the remaining attendees did not indicate a preference.

New business

- Discussion of topics for the new PAR
    - No load loss correction for temperature to support 12.01 note 7 on page 3
        - Casey Ballard will make a proposal
    - QC impulse test method to insert into 12.01 Table 16
        - Suggested alternate name was 'routine impulse'
        - Kerwin Stretch and Tim Holdway agreed to make a proposal
    - Moving the PD Test method from 12.01 into 12.91 Section 10
        - There was general agreement – but nobody took an action item
    - Dielectric testing at a different altitude than the installation altitude – related to 12.01 Table 1 and Annex A
        - Tim Holdway will work with Rick Marek to make a proposal
    - Sound level measurement in Section 13
        - Casey Ballard will contact Ramsis Girgis to determine the status of the sound testing procedure from 12.90 and 60076-10
    - Update all drawings using new CAD software
        - Casey Ballard agreed to support this
    - Inclusion of environmental testing from IEC 60076-11 for E0/E1/E2
        - Martin Navarro agreed to make a formal proposal
    - Inclusion of thermal shock testing from IEC 60076-11 for C0/C1/C2
        - Martin Navarro agreed to make a formal proposal
    - Inclusion of calibration requirements
        - Don Kline suggested that this should be added and will be voted on by the TF and SC

    - Heat run method with non-sinusoidal loads
        - Tim Holdway brought up a discussion from C57.110 and will be added to the list of items to be voted on
    - Impulse polarity – positive versus negative
        - Chuck Johnson asked if we should address the impulse polarity for solid cast versus resin encapsulated.
- The topics listed above will be sent out for a ballot to the TF and the Dry-Type SC for ranking. Formal instructions and due date will be send by the chair – Derek Foster and will be used to submit a PAR.

Next meeting: Fall 2014, Washington DC, October 19-23, 2104.

With no further business, the meeting was adjourned at 4:15 PM.

D.3 Old Business

There was no old business.

D.4 New Business

The chair noted that C57.96 and C57.134 revisions were approved.

He also noted that the PAR status for C57.12.01, C57.12.59, and C57.94 were expiring on 12/31/2015.

There was a ballot survey on C57.12.59 Through Fault Current Duration circulated with less than expected participation from the SC. The chair reminded those in attendance that membership means you have to participate. If you do not wish to participate then you can choose to be a guest.

Don Kline presented on an alternate way to measure three phase losses using voltage measurements and provided his presentation to the chair who will post it on the website on the recommendation of Rick Marek.

There are (4) documents that are going to expire before the end of 2019 and the chair asked for volunteers to act as the WG chairs. There were three volunteers.

- C57.12.51 501kVA and Larger — Sanjib Som
- C57.12.60 Thermal Aging — Roger Wicks
- C57.124 Partial Discharge Measurement — Casey Ballard
- C57.12.58 Transient Voltage Analysis — No Volunteer

D.5 Adjournment

Being no further business, the meeting adjourned at 2:35 PM upon the motion from Jewan Puri and a second from Tim Holdway.

Annex E HVDC Converter Transformers and Reactors Subcommittee Meeting Minutes

March 24, 2014, 3:15 pm.
Savannah Marriott Riverfront Hotel, Plaza meeting room
Savannah, Georgia

Chair: Michael Sharp
Vice Chair: Les Recksiedler,
Secretary: Ulf Radbrandt

E.1 Introductions and circulation of Attendance List

Introductions were made and the attendance list circulated.

There were 12 members and 27 guests present. Five of the guests requested membership

The total membership of the SC (not including corresponding members) is 16. We needed at least a total of 8 members (50% of 16) to be present in order to have a quorum. This was achieved.

The agenda for this meeting was approved.

E.2 Approval of the minutes of the October 21, 2013 meeting in St. Louis, Missouri

The minutes from the St. Louis meeting (Fall 2013) were approved.

E.3 Brief report on the meeting of the Administrative SC.

Many of the topics discussed at the administrative subcommittee meeting on Sunday were already presented at the opening session meeting on Monday.

There was one item from the administrative subcommittee meeting that is of particular importance to our subcommittee at this time. There is one new level for approval for proposals for dual logo standards. After approval by our SC, there must be an approval by the administrative subcommittee before a PAR is created and submitted for approval.

Our standard for converter transformers (C57.129) will expire in 2018, i.e. within 4 years.

Our standard for smoothing reactors (1277) will expire in 2020, i.e. within 6 years.

E.4 Presentation from the Joint IEC/IEEE meeting, regarding a possible dual logo standard for converter transformers, in London 6-7 February 2014. .

Ulf Radbrandt gave a presentation regarding the London meeting about:

- The participants
- The process of the work. The work started with the Excel file, with comparison between the IEEE and IEC standards, that was created by an IEEE group before the previous IEEE meeting in St Louis. The “Comparison” sheet of that Excel file was extended with two new columns, one for comments and one for a complexity level for each clause of the standards. The complexity levels

were 1 to 5 where 1 is “Easy” and 5 is “Very hard”. All clauses were not evaluated due to lack of time. The evaluation was focused on the clauses that were evaluated by IEEE to “Difficult” and “Quite Similar”, which are the clauses that would require most work.

- The findings. The items that were considered to require most work were the different methods for loss measurements and the different reference temperature for loss and impedance determination. The estimated number of clauses for each complexity level (complexity levels are within parenthesis) was 17 (1), 22 (2), 8 (3), 1 (4) and 3 (5).

- The proposed structure of the possible dual logo standard.

- The reference to different standards.
  The IEEE standard refers to a lot of other IEEE standards and the IEC standard refers to a lot of IEC standards. This could be handled in a dual logo in the same way as in other ongoing dual logo standards. The method is that the user must select if the standard is to be used as IEEEE or IEC. In the standard there are selections, in several locations, between e.g. IEEE references or IEC references.

- The conclusion from the meeting, which was that it should be possible to resolve the differences and agree on a dual logo standard.

The presentation will be distributed to all SC members.

E.5 Discussion and finally a decision whether or not we will start a joint WG together with IEC to go for a dual logo standard.

E.5.1 The different methods for IEC and IEEE for measurement of losses

Pierre Riffon pointed out that there had previously been an investigation regarding the different methods of loss measurement. He also said that the IEC method is only accurate for certain ratios between eddy losses and stray eddy losses. The IEEE method, which generally was developed by Alan Forrest at Teshmont, was considered most accurate. The method was developed for the use of a watt-meter but the use of spectrum analyzer is also possible. Peter Heinzig made a presentation regarding the comparison several years ago, but since he has changed employers since then, he doesn’t have access to that presentation. Pierre Riffon said that it should be possible to repeat that comparison based on new data from the different methods. Alan Forrest is probably available for consultation too.

It is possible to have 2 methods for loss measurement but that should, if possible, be avoided since it makes the standard more difficult to use. If we go for 2 methods, then a possibility is to have the method default selected by the selection between IEEE and IEC, which defines which references that should be used throughout the standard. It will probably be very difficult to get acceptance, within IEEE, for a dual logo standard if the IEEE method is removed.

E.5.2 Different reference temperature for losses

IEEE has 85°C and IEC has 75°C as reference temperature for determination of losses. One reason for the higher value for IEEE might be the very common usage of thermally upgraded paper.

At the London meeting there was a proposal to have four alternatives for reference temperature:

1. 85°C (for IEEE)

2. 75°C (for IEC)
3. Selected by the customer
4. Determined by the manufacturer, i.e. calculated for the rated loading of the actual transformer design.

Alternative number 4 could be the most precise method but it might be more difficult for the customers to evaluate different transformer designs (by different manufacturers) with this method. The IEC standard IEC 61803 for determination of HVDC converter station losses does now include this alternative.

E.5.3 Harmonics for determination of temperature rise and hot-spot temperature

The harmonics for determination of temperature rise and hot-spot temperature should be given for the worst case operating condition but it should be from an actual operation case. i.e. worst case harmonics should not be taken from different operation cases because the hot-spot factor would then be too conservative. This should be clearer in the standard.

E.5.4 Harmonics for determination of audible noise

The harmonics for determination of audible noise should be different from the harmonics for determination of temperature rise. The harmonics for determination of audible noise should not be from worst case but from nominal operation condition.

E.5.5 The clauses for audible noise

There has been a lot of work with IEC 60076-10 and IEC 60076-10-1, where Christoph Ploetner has been the convenor.

E.5.6 Participants from IEEE

There must be more people from IEEE that participate in the joint review work. Most IEEE participants have problem to travel to Europe. All IEEE SC members are encouraged to send in comments on the work. In the first hand comments can be given on the Excel file. Comments should be sent to all members of this SC.

E.5.7 Planned coming joint meetings.

The following meetings are planed together with IEC

2014-05-14--15 in Stockholm
2014-10-23--24 Washington DC (At the IEEE Transformers meeting).

We should have joint meetings at each coming IEEE meeting, with intermediate meetings elsewhere, until the dual logo draft is finished.

E.6 Forming of a working group within IEEE, which will work with the dual logo standard

A motion was put forward by Eric Davis and seconded by Klaus Pointner to go for a PAR, which would include the creation of a new dual logo standard for converter transformers and the formation of a WG

that will work together with the IEC MT to create it. The vote result from SC members was reported at the meeting as 11 for and 0 against. We should therefore start that process.

This PAR will not be approved until after the Stockholm meeting.

A motion was put forward by Eric Davis and seconded by Gene Blackburn to, until the PAR is approved, form a TF that will continue with the preparation work, write up the PAR and join the Stockholm meeting. When the PAR is approved, the TF will be changed to a WG. The vote result from SC members was reported at the meeting as 10 for and 0 against.

E.6.1 Request for members

At the meeting, volunteers to join the TF were Eric Davis and Ulf Radbrandt (who will be the chair of the TF). A request was made for all others interested in joining the task force and attending the Stockholm meeting to inform Ulf Radbrandt and Mike Sharp ASAP.

E.7 Brief review of the slightly modified annex for converter reactors provided by Klaus Pointner

Klaus Pointner gave a brief presentation of the work with the annex for converter reactors that will be included in IEEE 1277 Smoothing Reactors. The annex has been submitted to SC members prior to this meeting. There were no comments made at the meeting but all SC members were encouraged to review the document again and provide any comments they have before the next meeting.

E.8 Adjournment

The meeting was adjourned at 4.17 pm.

Annex G Insulating Fluids Subcommittee

March 26, 2014
Savannah, GA

Chair David Wallach
Vice-Chair Jerry Murphy
Secretary C. Patrick McShane

G.1 Introductions, Roll Call of Members for Quorum, Meeting Agenda Appoval, F13 Minutes Approval, and Chair's Comments

G.1.1 Chair's comments: The Chair advised the data base policy has progressed, only few issues remain. This mostly affects DGA Guides C57.104 & C57.155. Also, he gave a reminder WG and TF must log in attendance in the TC AMS systems. Because of this policy, having all attendees identify themselves is no longer required.

G.1.2 Roll Call of SC members. >25 Quorum was achieved.

There were 33 SC members and 23 guests in attendance at the meeting. A quorum was achieved. The following guests requested membership in the IFSC

Rainier Frotscher, Shawn Galbraith, Jerry Golarz, Jesse Inkpen, John John, Wayne Johnson, Zan Kiparizoski, Rodrigo Ronchi, Deanna Woods, Amitabh Sarkar Roger Verdolin.

G.1.3 Agenda Approval

- Motioned by: Don Cherry
- Seconded by: Kent Miller
- SC Vote Outcome: Passed unanimously

G.1.4 Corrections and Approval of minutes from Fall 2013, St. Louis, MO

- Motioned by: Sue McNelly
- Seconded by: Tom Prevost
- Outcome: Passed unanimously

G.1.5 WG & TF Reports Presented at the SC Meeting

G.1.5.1 C57.104 – IEEE Guide for the Interpretation of Gases Generated in Oil – Immersed Transformer WG Chair Rick Ladroga, Vice-Chair Claude Beauchemin

Tuesday, March 25, 2014
Savannah, Georgia
Minutes of WG Meeting

The meeting was called to order by Chair Rick Ladroga at 3:18pm. Vice Chair Claude Beauchemin and Secretary Susan McNelly (writer of Minutes) were also present.

There were 45 of 63 members present. There were 45 guests, and 8 guests requesting membership. A membership quorum was achieved. Guests attending the WG meeting for the first time who request membership or who have not attended 2 meetings in a row (including the present meeting, will be deferred until the next meeting attended.

The following guests requesting membership were (those identified with an asterisk (7 of the 8) will be added as WG members):

Larry Cristodoulou *	John John *
Don Dorris	Amitabh Sarkar *
Rowland James *	Alwyn Vanderwalt *
Thang Hochanh *	Leon White *

Agenda

1. Welcome & Introductions
2. Quorum Check
3. Approval of Minutes from Fall 2013 St. Louis Meeting
4. Chair's Remarks
5. Presentations
   a. Data - Claude Beauchemin – Full presentation was not completed
   b. Case Studies – Paul Boman – Time expired before this could be presented.
6. Adjourn

Introductions of the Chair, Vice Chair and Secretary were made. Attendees were not asked to introduce themselves but instructed that when speaking during the meeting to at that point introduce themselves and their affiliations.

Motion to approve the fall 2013 St. Louis meeting minutes was made by Tom Prevost and seconded by Don . The motion was unanimously approved.

Chair's Remarks:

The chair indicated that the group has been meeting both at the Transformer Committee Meetings and at least a couple of additional times per year. There is a lot of data involved that has tremendous commercial value. He thanked Luiz Cheim, Claude Beauchemin, and Norm Field for their work.

An update on the data security and confidentiality was given by Sue McNelly and Erin Spiewak. The plan is to store the data using the Central Desktop and using a separate Central Desktop provide access to the data to members approved to access it for WG purposes after completing a confidentiality form. The remaining activity before this can be implemented is to get approval of the forms by the Administrative SC and to specify a format for the data.

Rick restated the WG history, goals and objectives.

TFs

Framework: Jim Dukarm, Dave Hanson, Rick Ladroga
Data: Norm Field, Luiz Cheim, Claude Beachemin
Diagnostic Methods: Michel Duval, Dave Wallach
Case Studies: Paul Boman, Arturo Nunez
Arc Furnace TRs: Tom Lundquist
Bibliography: Jerry Murphy, Tom Prevost

Framework

A rough draft of the framework was completed in 2010. It was modified in 2012/2013 by Rick Ladroga. The Draft considers IEC 60599 - 2007

General Structure
- C57.104 Gas Guide Introduction & Overview
- Dissolved Gas Analysis Overview
- WG Data Research & Findings (Statistical Benchmarks)
- Proper Oil Sampling Methods
- Data Qualification
- DGA Diagnostic Methods & Analysis
- Fault Detection & Identification
- Case Studies

57.104 Dissolved Gas Analysis Guide
- Foreward (IEEE PES Narrative, Disclaimers, etc.)
- Introduction (C57.104 Historical Development)
- DGA Overview
- Scope
- Limitations of Guide
- References
- Definitions & Abbreviations
- Mechanisms of Gas Formation

DGA Concept, Purpose, & Application
- Concept of DGA
- Purpose of DGA
- Application of DGA
- Assessment of Individual Unit Health Status
- Risk Assessment & Classification
- Risk Management Strategies (Personnel & Equipment Safety, Owner, Operator, OEM, Transformer Expert, Insurance Company Considerations)
- Data Measurement Qualification & Quality Assurance
- Key DGA Sampling Categories

DGA Data Qualification
- Data Quality Review
- Errors & Omissions
- Missing or Duplicated Data
- Mislabeled or Swapped Samples
- Sample Mishandling
  - Air Exposure
  - Air Contamination
  - Cross Contamination
  - Inconsistent Data Values
  - Absence of Hydrogen
  - Inconsistent O2/N2 Ratio
- Interpretation of DGA Data
  - Initial Sample
  - Periodic Screening
  - Surveillance Sampling
  - Fault Monitoring
  - Quality Assurance & Verification

Fault Detection & Identification
- Data Variation & Norms for Fault Detection & Risk Classification
- Minimum Interpretation Limits for Gas Concentrations (Overview)
- Baseline for Increments
- Baseline for Rates of Change
- Limits for Combustible Gas Increments (Details)
- Limits for Combustible Gas Average Rates of Increase (Details)
- CO2/CO Ratio
- C2H2/H2 Ratio
- O2/N2 Ratio
- DGA Statistical Benchmark Values

Anexes & Tables

Annex A – Data Research Synopsis and Findings
Annex B – DGA Logic Flowchart
Annex C – Proper Method for Taking an Oil Sample
Annex D – Typical Faults
Annex E – DGA Diagnostic Methods
Annex F – Case Studies
Annex G – Bibliography

Tables – Determined by the Task Force

Data: Rate of Change (Trend) Continuing Discussion, presented by Claude Beauchemin

Claude indicated that after comments from several people, he thought he needed to represent some of the information. The full presentation will be included in the PDF version of the minutes and on the web site.

A question was asked if there is any information on the site conditions. Claude responded that there was no discrimination for any of the site conditions. Luiz Cheim indicated that the data was separated by size, voltage, etc, but not for the trending.

Claude indicated that the Table presented is only a possible Table. There are variations in lab data results which also need to be taken into account.

There was a extended discussion regarding the presentation. A considerable amount of effort has been made by Luiz, Claude and Norm in analyzing the data amid all of the issues related to the data confidentiality work that has not been finalized. Work will need to now focus on coming up with ranges for each of the conditions based on the data.

The core group working on the data analysis along with Tom Prevost and Rick Ladroga plan to meet in about a month to make some progress on coming up with these limit ranges. Sue McNelly will push for review and approval of the confidentiality forms from the Administrative SC so that they can be sent to the companies supplying the data for review and signature.

The meeting was adjourned at 4:35 pm. Don Cherry made a motion for adjournment and Tom Prevost seconded. The motion was unanimously approved.

Rick Ladroga
WG Chair

Claude Beauchemin
WG Vice-Chair

Susan McNelly
WG Secretary

G.1.5.2 C57.106 – IEEE Guide for Acceptance and Maintenance of Insulating Oil in Equipment

WG Chair Bob Rasor, Vice-Chair Jim Thompson, Secretary Claude Beauchemin

The WG Report at the Sub-Committee Meeting: Presented by Bob Rasor:

Quorum was achieved. Discussion at the WG meeting included ASTM D877 Dielectric Strength issue, a motion was made and passed for the WG to look at the overall structure of the Guide, and taking out the current wording regarding spills and complying with US

regulations. Instead, a more global statement wording was agreed upon to be sure to have compliance of applicable requirements and regulations.

The Minutes (unapproved) of C57.106 WG Meeting as Submitted:

The Minutes (unapproved) of WG Meeting as Submitted:

WG C57.106 IEEE Guide for Acceptance and Maintenance of Insulating Mineral Oil in Electrical Equipment

Monday, March 24th, 2014 4:45 PM

The meeting was called to order by Chair Bob Rasor at 4:50PM. To save time, introductions were skipped. There were 53 attendees. The four individuals that requested membership in St. Louis (Fall 2013) did not attend therefore will not become members until they attend two consecutive meetings. Quorum was reached as 19 of the 36 members were present.

Attendees requesting membership were:

1. Paul Boman
2. Don Dorris
3. Oleg Roizman
4. Eduardo Garcia
5. Arturo Nunez
6. Art Lemm
7. Mohamed Diaby
8. Omar Ahmed

Again, those above will become members when they attend the next conference meeting.

Agenda for the meeting was reviewed. Sections of the guide had been assigned in conference calls prior to the meeting. Several members have submitted their revision. The draft guide with track changes was displayed to show what has been changed so far.

Discussion took place on the schedule for completion of the guide. It was noted that the PAR expired Dec 2015. The schedule was explained by chair Bob that the draft document should be complete by May. Only a few sections remain to be revised by the assigned section leads. Once comments are received back it was thought a final draft and ballot could take place yet this year. Bob commented however that there are a few discussion areas yet for today's meeting that could take the completion date out a bit longer.

In prior conference calls, it was confirmed that LTC and circuit breaker oil qualities were not covered in other Transformer Committee guidance documents.

The question was raised as to whether circuit breakers belong elsewhere. Don Platts suggested that the circuit breaker information (section 8) be removed from this guide and handed over to the switchgear committee. Chair Bob will draft a letter and send to Tom Prevost to review before sending to David Wallach and the switchgear committee. This may simplify the work of the TF on Combination of Oil Guides as well.

There were no questions on previous minutes from St. Louis (Fall 2013).

Discussion on the draft guide followed:

- Table 1- Test Limits for shipments of new mineral insulating oil as received from the oil supplier

Dielectric ASTM D877 is currently being voted on in ASTM. They will have a meeting in May to determine if they will remove. If so, the WG will adjust Table 1 to follow ASTM as it is for new oil as received from the oil supplier.

Neutralization number will be 0.03 to follow ASTM and is because the reproducibility is plus or minus 0.015. It was also voted to keep Table 1 in-line with ASTM in Milwaukee. There was concern that it had been at 0.015 for years with no issue, so why was there need to change. It was stated again that the table is for new oil as received from the oil supplier, therefore the supplier follows ASTM.

• Tables 2 and 3-Test limits for new mineral insulating oil processed for new equipment prior to energization

Neutralization number will remain as 0.015 because this is IEEE stance and not a new oil specification.

• There are some additional changes to the document based on the straw ballot, but most have been made.

• Clair Claiborne still agreed to review Sections 2 and 3 – references and definitions.

• Section 6 minor revision to add sentence on tanker cleanliness and continuity ground on transfer hoses.

• Dave Hanson is working on a draft of Section 4.5 and will give to the chair in a few days. Discussion followed that the flow of the document could be improved. If a section on how oil is contaminated (what is behind oil contamination) is added, it could help bridge the gap between sections 4.4 and 4.5. So the thought was to add a section and modify 4.5.

• Chair Bob read the scope and it was asked if 106 should be evaluated and possibly expanded (section added and structure change) before it is used in the Combination of Oil Guides TF. Vice Chair Claude asked that if the flow needs corrected, someone could suggest an outline. Then if time permits, the WG will address it. The PAR was displayed. Tom Prevost said the PAR is written generic enough that it would not need to be changed.

• The question was clarified and Tom Prevost made a motion to 'improve the structure of the document to a more logical order, including additional background information where appropriate'. The motion was seconded by Don Cherry. A vote was taken and the motion was unanimously approved.

• Don Cherry made a motion to approve the minutes from St. Louis. The motion was seconded by Dave Hanson. A vote was taken and the motion was unanimously approved. It was mentioned that this vote may affect the completion timing of the document and that all would be done to expedite its completion.

• Section 7 minor revision was made to update terminology 'filter press' meaning mechanical filtering media. Question was raised as to if the guide should discuss processing, or if it should move to Reclamation Guide 637. Several agreed that processing must be mentioned because Class I, II and III are defined by how much processing is needed. Also that it is more useful in 106 as it is needed to know if reclamation is needed. The title of the guide 'maintenance' also suggests it has a place in 106. Tom Prevost stated that Table 5 conflicts with a table in 637. Bob Rasor said the voltage class divisions also conflict with those in 637.

• Section 10 was reviewed by Stephanie Denzer. Claude posed the question of what to do in case of a spill suggesting that reference to local codes could be an issue for several reasons

- US only, not international

- Regulations change
- Legal impact for IEEE?

It could be written very generic with something like 'applicable regulations'. Don Platts said IEEE PES Substation Committee has a document already with this information and that it could just be referenced. IEEE Explore has a search function to search for key words. Stephanie agreed to look into this.

• Tom Prevost made a motion to adjourn. The motion was seconded by Don Cherry. Meeting was adjourned at 6 PM.

G.1.5.3 WG C57.121 – IEEE Guide for Acceptance and Maintenance of Less-Flammable Hydrocarbon Fluid in Transformers

Chair: David Sundin

The WG Report at the Sub-Committee Meeting: Presented by David Sundin

Dave Sundin presented. He stated that it was decided that the WG will be disbanded. He made a motion to contact IEEE SA with the request to withdraw the PAR.

The Minutes (unapproved) of C57.121 WG Meeting as Submitted:

Unapproved Minutes: WG for Revision C57.121
March 24, 2014
Savannah, GA
Working Group:
Chair David Sundin
Secretary David Sundin
There were 4 Working Group members and 18 guests in attendance at the meeting. A quorum was achieved.
Approval of minutes from fall 20132, St. Louis

- Motioned by: Don Cherry
- Seconded by: Clair Claiborne
- WG Vote Outcome: Passed Unanimously

Old Business:

David Sundin reiterated the proceedings of the first WG meeting; that the WG had been formed in order to change the IFT value given in C57.121. David Sundin had been advised to present the need for the change in IFT value, and recommended new values, to ASTM D27. In the intervening 6 months since this initial meeting, the sole North American manufacturer of HMWH fluid has decided not to pursue a change in the ASTM or IEEE Specification value.

David Sundin asked for a motion to disband the WG and withdraw the PAR. Motion was made by Don Cherry and seconded by Larry Christodoulou. There was discussion with regard to the need for a super-majority to disband the WG. Bill Bartlett affirmed that 60% of WG attendees needed to vote to disband the WG for this to occur. The vote was unanimous and the motion carried.
New Business:
There was no new business for the WG.
Don Cherry motioned that the meeting be adjourned. Seconded by Clair Claiborne. Passed unanimously. Meeting adjourned.

Respectively Submitted, David Sundin, WG Secretary

G.1.5.4 WG C57.130 – IEEE Guide for Dissolved Gas Analysis During Factory Temperature Rise

Jim Thompson– Chair, Tom Prevost- Vice-Chair

The WG Report at the Sub-Committee Meeting: Presented by Tom Prevost.

Quorum achieved. Tom Prevost there only remains just a couple of item, with should be resolved by email ballots. After items are resolved by email ballot, then to SCIF for approval, all scheduled to occur before F14 DC meeting. He mentioned three motions made at the meeting:

1. Revise Table 1 to cover values for ppm per hour for condition levels 1, 2 and 3. The motion passed.

2. A motion against the first motion of having 3 levels of condition to a pass/fail criteria The motion did not pass.

3. Jin Sim made a motion to remove one gas from the table, hydrogen. The motion was approved

4. The values of the remaining gases in the table will remain the same.

The Minutes (unapproved) of C57.130 WG Meeting as Submitted:

The Unapproved Minutes S14 Savannah, Georgia

The Working Group met in the Savannah B room of the Marriot Riverfront Hotel in Savannah, GA on Tuesday March 25, 2014 at 1:45 PM. Present were seven (7) members and forty-three (43) guests. The acting Chair (Mr. Tom Prevost) removed three persons from membership due to lack of attendance at the last two meetings (Mr. Barry Beaster, Mr. William Darovny and Mr. Robert Tillman). The group now has 12 members, so a quorum was achieved.

The minutes from the previous meeting in St. Louis were approved as written.

The business order was to review the negative votes from the last straw ballot of draft 3, and confirm the resolution was acceptable:

1.- The paragraph requesting the limit of 2 000 ppm of oxygen was deleted from section 3.0 of draft 4. Resolution was accepted.

2.- There was discussion regarding changing the scope and including gas limits for overload heat runs, but no motion was done from any WG member in order to do so (change the scope of the guide), so it remains applicable for standard heat runs per C57.12.90.

3.- The resolution of limiting the application of this guide to transformers of 10 MVA and above, and 69 kV and higher was accepted, as included in section 7.3 of draft 4.

4.- There was a motion by Mr. Don Platts proposing to include in the document the detection limits as to be defined by the WG (references discussed were ASTM D3612 and IEC 61181), Mr Jin Sim seconded and there were no negatives, so the motion passed.

5.- Mr. Don Platts did another motion asking to remove condition III of table 1. No one seconded the motion.

6.- Mr. Jin Sim moved to remove C2H2 from table 1, and left the note below the table which limits the amount of acetylene to non-detectable. Mr. Mark McNally seconded the motion and there were no negatives, so the motion passed.

7.- There was a final motion to accept the numbers in table 1 as they are, except for the acetylene. The motion was done by Mr. Jin Sim, and seconded by Mr. Scott Digby, There was a ballot within WG members with 5 in favor and 1 disapprove. The motion passed.

Having no other new business, the meeting adjourned at 3:00 PM.

Respectfully submitted,

Juan Castellanos, Secretary

G.1.5.5 IEEE C57.139 IEEE Dissolved Gas Analysis in Load Tap Changers

Tuesday, March 25, 2014
Savannah, Georgia
Minutes of WG Meeting

Chair Dave Wallach called the WG meeting to order at 11:02 am. Vice-Chair Mark Cheatham and Secretary Susan McNelly (minutes written by) were also present. There were 38 of 63 members present (Quorum requirement was met). There were 60 guests present with 8 guests requesting membership. At this point, new members will not be considered unless they substantially contribute such as participating on the ballot resolution group. The membership roster and attendance will be recorded in the Committee AM System.

The following guests requested membership in the WG but as mentioned above only those that substantially contribute at this point will be added (*).

Marten Almkvist	Thang Hochanh
Javier Arteaga	Arthur Lemm
Bernard Banh	Kevin Sullivan
Emelio Morales-Cruz *	Alwyn VanderWalt

Agenda:

1. Introductions/Member Roll Call
2. Approval of minutes from the fall 2013 meeting
3. Milestones
4. Document Status/Discussion
5. Old Business
   - Revision of text in Clause 5.3.3
   - Comments from attendees on latest draft
   - Volunteers needed for ballot resolution committee
6. Old Business
7. New Business
8. Adjourn

Attendees

Introductions of the Chair, Vice Chair and Secretary were made. Attendees were not asked to introduce themselves but instructed that when speaking during the meeting to at that point introduce themselves and their affiliations.

Motion to approve the fall 2013 St. Louis, Missouri meeting minutes was made by Craig Colopy and seconded by Paul Boman. The motion was unanimously approved.

Milestones

Straw Ballot between meetings
Begin Ballot process – Mid 2014

- Mandatory Editorial Review
- Ballot
- Ballot Resolution

PAR Expiration December 31, 2015

- Submit Balloted document to REVCOM by October 2015

Document Status/Discussion

Dave Wallach indicated that Rainer Frotscher, Michel Duval, and others have been working on text for Section 5.3.3. A presentation was given by Rainer Frotscher on arcing patterns for (resistive) oil-switching LTC types. A Standard Pattern "A" mainly C_2H_2 accompanied by C_2H_4 and a new Pattern "B" with (much) more C_2H_4 than C_2H_2 were discussed. Pattern "B" appears to be based on aging of oil, not the type of breaker. Javier Arteaga asked what conditions in the oil were considered to be aged. Rainer commented that it appears to be based on carbonization of the oil especially when combined with humidity.

The first theory is due to carbonization of the oil (the lower the resistivity the higher the ethylene/acetylene ratio). The second theory is due to contact heating. A third theory is that carbon sludge deposits worsen the cooling of transition resistors.

Fredi Jakob asked if there was a difference between filtered or unfiltered oil. Rainer indicated that they had not filtered the oil.

Norm Field asked about the rate of change over time of gas ratio. Rainer indicated that this is very difficult to determine. The assumptions are based on spot measurements. There are very few cases where the device was monitored over years. The curve of resistivity was based on a single measurement not a trend.

- Document is ready for a straw ballot with this WG as well as IFSC
  - Should we consider also Insulating Fluids Subcommittee? Sue McNelly commented it would be best to have a bigger audience review the document as they would likely be balloting on it as well.
- Resolve straw ballot comments
- Mandatory Editorial Review
- Prepare ballot pool
- Ballot

Volunteers will be needed for ballot resolution. Tad Daniels and Mike Lau volunteered to serve on a ballot resolution group. After the meeting, Emelio Morales-Cruz also volunteered.

Dave went through recent changes to the guide that have been made.

There was wording added that there is still value to doing DGA on units, even if the LTC has been blocked from operation, unless the contacts are totally bypassed

One of the goals coming to this revision was could norms be developed. It was determined to be somewhat impossible without identifying manufacturer, along with loading practices and switching practices. A statement to this effect was added to Appendix B.

Old Business

No old business was discussed.

New Business

No new business was raised for discussion.

The meeting was adjourned at 11:35m.

Dave Wallach
Chair

Mark Cheatham
Vice-Chair

Susan McNelly
Secretary

G.1.5.6 IEEE C57.147 Guide for Acceptance and Maintenance of Natural Ester Fluids in Transformers

WG Chair: Patrick McShane, Vice-Chair: Clair Claiborne, Secretary: Jim Graham

The WG Report at the Sub-Committee Meeting: Presented by Patrick McShane:

A preliminary draft has been created based on the input from the TFs, but some TFs have yet to submit their assignments. Also some of the subjects (items of interest) for possible inclusion in the revised standard have not been fully addressed. At the meeting the items were prioritized as to their relative importance to be address. Several were removed from the list. The TF Chairs will be contacted to urge completion of the assignments so a draft can be developed for a straw vote. The PAR expires end of 2016, but due to the consolidation TF requires this Guide to be approved before they can issue a draft of a consolidated guide.

The Minutes (unapproved) of C57.147 WG Meeting as Submitted:

March 24, 2014
Savannah, GA

Chair: Patrick McShane, Vice-Chair: Clair Claiborne, Secretary: Jim Graham

- Call to Order was made at 3:15 PM.

- Introductions/Membership Attendance/Quorum Check

- Attendance

  - 22 of 36 members present, quorum was achieved
  - 56 guests
  - total attendance = 78
  - 5 guests requested membership

- There were no changes or objections to the Fall 2013 Minutes, so these were unanimously approved.

- There being no changes or objections to the proposed agenda, the agenda was unanimously approved.

- Chair's Remarks, Patrick McShane:

  - Welcome of new members
  - Discussion of a new task force established by the Insulating Fluids Subcommittee for the consolidation of the insulating liquids maintenance guides, including C57.147.
  - Review of the time line goals for completion of the guide revisions

1. All outstanding TF assignments will be dealt with asap

2. If TF assignments are not completed by May. 15, the WG officers will review assigned sections and edit as needed in current guide

3. Second draft to be reviewed at F14

4. To assist in insulating fluids guide consolidations project, the SA approval target is Q4, 2015; 5 quarters prior to PAR deadline

- Task Force Reports

  - No task force reports were presented at this meeting..
  - The Chair again emphasized task forces which have not completed their respective assignments need to do so by May 1, 2014.

- Old Business

  - The list of items of interest that have been compiled over the few years were reviewed and prioritized or eliminated from TF assignments.

- New Business

  - Draft 1 of the revised guide was presented, and proposed revisions were reviewed. Draft 1 will be posted on the website by July 15, 2014 for the working group to review.

- The meeting adjourned by acclamation at 4:35 pm.

Respectively submitted,

Jim Graham, Secretary

Task Force Items of Interest Assignments

TF 1: Section 4 – Insulating Liquid Tests & Significance for NE
New Chair: David Sundin
- Low Temperature Properties TF1 & TF2
- Particle Count limits - statement addressing lack of data by TF1
- Partial discharge inception TF1 & TF2
- Furan analysis TF1
- DGA (coordination with NE DGA WG) TF1

TF 2: Section 6 - Handling & Evaluation of NEF used in field filling
New Chair: Roland James

- Testing evaluating oxidation stability - TF2
- Dielectric performance. (Is ASTM D6871 sufficient?) TF2
- Large Gap and Creep Withstand TF2
- Highly non-uniform fields TF2

• Low Temperature Properties TF1 & TF2
• Different minimum values of dielectric breakdown for totes and drums as received vs. bulk shipments TF2
• Flash point limits for vapor phased and retro filled transformers TF2
• Partial discharge inception TF1 & TF2

TF 3: Compatibilities of NE Fluids with Components & Accessories
(includes Section 7 - Evaluation of NEF in New Equipment)
• No section on load tap changers (unlike C57.106) TF3

TF 4: Section 8 - Maintenance of NEF
• Additive level evaluation

TF 5: Annex B (Misc. Technical Issues)

TF 6: Field Application Guide & Equipment Evaluation
• Determining new loading limits for retro filled xfmrs - TF6.
• Online monitoring/diagnostics sensors (dissolved gas, moisture, temperature)
• NE Fluid Handling vs. Mineral Oil
• Transportation and Storage Requirements for NE Fluids vs. Mineral Oil
• Retro-Filling Existing Equipment
  a. NE Fluid Filling Procedures
  b. Post Fill Procedures – Recommended Tests *
  c. Start-Up Procedures
  d. Key Properties Change of NE fluid as it ages
• Filling New Equipment
  a. NE Fluid Filling Procedures
  b. Post Fill Procedures - Recommended Tests *
  c. Start-Up Procedures
  d. Key Properties Change of NE fluid as it ages
• Cold Start Operations
• Recommended Monitoring
• Proper NE Fluid Disposal Procedures
• Nameplate changes and/or informational labels
* May need to bring in relevant transformer subcommittees

TF 7: All other sections - Miscellaneous
• Consolidation SC IF Fluids Guides impact on revision process.- TF7
• Should guide include environmental values - TF7
• Joint participation with IEC TC10 / TC14 TF1 & TF2
• Research relevant published papers & update bibliography
Additional Fire, Health, Environmental and Sustainability Considerations

G.1.5.7 IEEE C57.155 DGA in Natural and Synthetic Based Ester Fluids

The WG Report at the Sub-Committee Meeting: Presented by Paul Boman:
A new draft based on the comments received during the last straw vote was discussed and the consensus is that is pretty good. It has been sent to the WG for another straw vote, which has a deadline to be established for early April. The PAR expires this year.

The Minutes (unapproved) of C57.155 WG Meeting as Submitted:

G.1.5.8 WG PC57.637 Guide for the Reclamation of Insulating Oil and Criteria for Its Use

WG Chair Jim Thompson

The WG Report at the Sub-Committee Meeting: Presented by Dave Sundin :

The PAR is expiring end of this year. There was a lot of discussion regarding the need for Table 1, Criteria for Acceptance. Since this is addressed by C57.106, the WG decided to remove the Table. A reference to US documents on reference to US laws and rules on handling, spills, or disposal of oil rules were replace by verbiage advising the user to research and adhere to all applicable regulations.

It was decided to remove Table 4, which lists limits after filling but before energization, as it was determine to be outside the Guide's scope. Also, it was approved at the meeting to change the reference of ASTM D1275-B to simply ASTM D1275 because ASTM has consolidated the (A) and (B) parts of that method.

The WG resolved all the issues brought up by the straw ballot by the "super majority" of the WG. Dave Sundin made a motion to the SCIF requesting that the current draft be approved for balloting. Don Cherry seconded the motion.

The discussion on the floor began with Tom Prevost advising on the need to be sure that the draft is ready to go to IEEE SA for editorial review and a ballot pool formed. Tom and Jodi state the time frame is very tight as it must go to ballot and be approved before end of this year. Tom mentioned that up to now, Jim Thompson has done most of word processing of the drafts. Tom Prevost and Dave Hanson volunteered to proof the draft. With no further comments the SCIF member attendees unanimous approved the motion. Jodi IEEE staff mentioned that the document with a favorable voting outcome must be submitted to Oct REVCOM by October 20. She stated that IEEE has approximately 30 days to edit the draft, and it typically requires 30 days to form the ballot pool, and they can be done concurrently.

The Minutes (unapproved) of Revision C57.637 WG Meeting as Submitted:

March 25, 2014
Savannah, GA

Working Group:

David Sundin acting WG Chair, standing in for Jim Thompson

There were 9 Working Group members and 17 guests in attendance at the meeting. A quorum was achieved.

Approval of agenda:

- Motioned by: Don Cherry
- Seconded by: Claude Beauchemin
- WG Vote Outcome: Passed Unanimously

Approval of minutes from fall 2013, St. Louis

- Motioned by: Don Cherry
- Seconded by: Claude Beauchemin
- WG Vote Outcome: Passed Unanimously

Old Business:

The WG reviewed the straw ballot that had been distributed. Jim Thompson had worked with individual WG members to resolve their negative votes.

Claude Beauchemin had several negative votes that had been resolved by changes that Jim Thompson made in the Guide.

Bob Rasor questioned the need for Table 1 because the same data is covered by C57.106, and that the two tables would be difficult to keep in sync whenever one of the Guides was updated. After a great deal of discussion within the WG, Claude Beauchemin made a motion to "Remove Table 1 and replace it with a reference to C57.106." Don Cherry seconded the motion. After more discussion, a vote of the WG members was taken. 9 members approved, there were no dissenting votes. The motion passed.

The ensuing discussion revolved around phrases advising the user to heed US laws regarding disposal and spills of transformer oils. The feeling of the WG was that mention of US law or regulations was not appropriate and should be replaced with more generic warnings that the user should obey all applicable laws regarding handling, spills or disposal of oil. Claude Beauchemin made a motion that "All references to US laws or regulations be replaced with a generic phrase that the user should obey applicable laws or regulations". Don Cherry seconded the motion. Vote was 9 for, 0 opposed. The motion passed.

The next discussion revolved around the need for Table 4, "Suggested Test Limits for Reclaimed Oil in Transformers and Reactors After Filling but Before Energizing". The WG discussed in depth the values shown in Table 4 and whether the inclusion of this table went beyond the scope of the Guide. Don Cherry made the motion that "we remove Table 4 and all references to it as it is not necessary due to C57.106 having all of this information and because Table 4 is beyond the scope of the Guide". The motion was seconded by Claude Beauchemin. After more discussion, a vote was taken, with 8 affirmative votes, and one negative (Bob Rasor). The motion carried.

Art Lemm made a motion that "References to method ASTM D1275(B) be changed to simply reference method ASTM D1275, as ASTM had recently removed the method B suffix". There was discussion regarding the need for reference to the date of any ASTM test methods, and was decided that IEEE preference was that no date reference be made, so that any referenced documents would automatically reference the most recent version. Claude Beauchemin seconded the motion. There were 9 affirmative votes, and no negatives. The motion carried.

After discussion of the procedural next step for this document, Ed teNyenhuis made a motion that "We incorporate all changes that we voted on by the working group and request approval for balloting by the Insulating Fluid Subcommittee." Jim Thompson seconded the motion. Vote was 9 affirmative, and 0 negative. The motion carried.

New Business:

There was no new business for the WG. Don Cherry motioned that the meeting be adjourned. Seconded by Jim Thompson. The motion passed unanimously. The meeting was adjourned.

Respectively Submitted, David Sundin, acting WG Secretary

G.1.5.9 TF on Consolidation of Insulating Fluid Guides

Chair: Tom Prevost

The TF Report given at the Sub-Committee Meeting by Tom Prevost:

Tom Prevost stated that the goal is to look at the process of combining the existing guides. Currently there are four insulating liquid guides, 2 of which are in revision process. The timing of the WG to issue its first draft will be dependent on C57.147 approval. The proposed scope will not include circuit breakers since they are covered in the C57.106 revision.

There was discussion regarding the mixing of insulating liquids. There appears to be, some confusion on definition of "mixing".. The idea is not the intention to purposely mix to make new hybrid insulating liquids with certain properties. The mixing issue is not related to planned retrofills, since there will be some mixing. Tom stated the TF needs to look on how mixing does occur including potential issues. For example silicone contamination in mineral oil that goes through degassing has caused problems.

Don Cherry reviewed the current insulating liquid guides regarding which ASTM test methods are used for acceptance values, and the listed values for each for new liquid as received, installed, and service aged. The differences were much less than anticipated, only about 3 of 50 and those primarily involved on one type of insulating liquid.

New Business, Tom asked about inclusion of other types of insulating liquids other than the current four with existing guides. This subject will be brought up next TF meeting

The Minutes (unapproved) of TF on Consolidation of IF Guides as Submitted:

Combination of Oil Guides Notes

Meeting time: Monday March 24th, 2014 @ 0930

TF Highlights:

• Second Meeting

• Discussions started with updates on the oil guides that ultimately will be combined. The goal is for the individual guides to complete their processes and then flow into the new combined document.

• C57.106 is hoping to vote by End of Year 2014

• C57.111 has a minor change

• C57.147 has the greatest movement and longest revision time with a Par Exp of 2016.

Subtask Force Highlights

• There was discussion on removal of the oil parameter table for circuit breakers with most members in agreement to remove it due to no scope. However, the Task Force will make a formal inquiry to the circuit breaker committee if they want the data to incorporate into their document which is currently under revision.

• A section on mixing of fluids was generally desirable to be included in the combined guide. However this discussion led to this section as a cautionary statement against mixing as a general recommend practice.

• Don Cherry presented tables comparing fluid types versus ASTM test methods. This prompted t a discussion that each fluid may have data table structures that would provide guidance at different stages – NEW Oil, Installed Oil, and Service Aged Oil. The Task Force will continue to evaluate this approach.

New Business

• Tom Prevost asked for discussion on the inclusion of new liquids such as Synthetic Esthers. There was discussion for and against new fluids with time expiring. Additional Discussion will be prompted in Washington.

Adjournment at 10:45 am

G.1.5.10 TF on Particle Count Limits in Mineral Oil

Chair: Mark Scarborough, Secretary: Paul Boman

A meeting of this TF was not held. Several weeks ago the TF Chair, Mark Scarborough, advised that it will be unlikely for him to attend future TC meetings. He write up a report for the SCIF on background and status of the TF's work to date. This has been a controversial issue regard a need for a guide on particle count. Tom Prevost stated that he has expressed his reservation in the past based on the difficulty of the methodology to determine particle values. He state that there is a discussion of particles in the insulating liquid in an Annex I of C57.152, including table I1, In-service transformer suggested particle count action points in particles per mL by μm.

David Wallach will contact Mark whether the TF would like to:

1. Generate a Task Force Report as it would be a shame to lose the information collected then bring forth a TF Report at the F14 SCIF meeting and the recommendation to disband. The final TF Report presented can be placed on the committee website for future reference.

2. TF can examine the collected information and TF resources and determine there is not interest in generating a TF Report and simply bring this TF decision to SCIF during the F14 SCIF meeting to disband without a TF Report.

David will contact Mark to discuss further.

G.2 New Business

As a Dual logo request received by IEEE from IEC TC 10 member for natural esters because IEEE has a standard and working on a revision and IEC is forming a WG to develop their first guide The consensus of the SCIF is that it is not interested in dual logo for C57.147. Jodi will advise the submitter of the decision

G.3 Adjournment

Don Cherry made the motion to adjourn, seconded by Claude Beauchemin, and unanimously approved.

Respectively Submitted, Patrick McShane, Secretary SCIF

Annex H Insulation Life Subcommittee - Unapproved Meeting Minutes

March 26, 2014 – Savannah, GA

Chair: Bruce Forsyth
Vice-Chair: Barry Beaster
Secretary: Eric Davis

The Insulation Life Subcommittee met in Savannah, GA on March 26, 2014 at 8:00 AM.

A hand count of the members at the beginning of the meeting revealed that 58 of 98 members and 0 of 3 corresponding members were present. A quorum was present.

K. Miller made a motion to approve the St. Louis Meeting minutes as written. D. Duckett seconded the motion. There was no discussion on the minutes. It was unanimously approved.

The agenda was reviewed. D. Platts made a motion to approve the agenda. T. Prevost seconded the motion. There was no discussion on the agenda. It was unanimously approved.

The attendance rosters show that the meeting was attended by 198 people, 65 of 98 members and 133 guests. 16 guests requested membership. 10 of these guests meet the membership requirements. The complete attendance is recorded in AMS.

H.1 Chair's Report

The Chair reminded everyone that this is a volunteer organization and thanked the members and activity leaders for their participation and efforts.

The Fall 2014 IEEE Transformers Committee Meeting will be held October 19, 2014 through October 23, 2014 in the Washington DC area.

Due to the size of the group, general introductions will not be made. Please state your name and affiliation when you address the subcommittee.

The Chair reviewed the purpose and scope of the Subcommittee and encouraged the Task Forces and Working Groups to review their purpose and scope at the beginning of every meeting.

The minutes for Activity Groups should record:

- The attendance including the number of members, the number of guests, and if a quorum was present
- Include a statement that the full attendance record is available in AMS.
- The Chair or Acting Chair
- The Secretary or Acting Secretary
- The name of the member who makes a motion, the name of the Member who seconds the motion, a restatement of the motion and if the motion carried or was defeated.

- A summary of the discussion and comments.

- Minutes should be submitted by April 9, 2014

The Chair reviewed the process to submit documents for Sponsor ballot. Working Groups must have a 2/3 majority to submit the document for Sponsor ballot. The Subcommittee must achieve a simple majority to submit a document for Sponsor ballot.

The Chair welcomed the following new members of the Insulation Life Subcommittee:

Jeffrey Britton	Jeffery Golarz	Peter Heinzig	John John
Zan Kiparizoski	Mario Locarno	Ali Naderian	Mark Perkins

H.2 Project Status Reports

H.2.1 C57.91 IEEE Guide for Loading Mineral-Oil-Immersed Transformers

C57.91 is valid until 2021.

H.2.2 C57.100 IEEE Standard Test Procedure for Thermal Evaluation of Liquid-Immersed Distribution Transformers

This standard is valid until 2021.

H.2.3 C57.119 IEEE Recommended Practice for Performing Temperature Rise Tests on Oil-Immersed Power Transformers at Loads Beyond Nameplate Ratings

C57.119 is valid until 2018.

H.2.4 C57.154 Design, Testing and Application of Liquid-Immersed Transformers with High-Temperature Insulation

C57.154 is valid until 2022.

H.2.5 C57.162 - Guide for the Interpretation of Moisture Related Parameters in Dry, Gas Insulated and Liquid Immersed Transformers and Reactors

The C57.162 PAR expires December 31, 2017. The standard is valid until 2018.

H.2.6 1276 Guide for the Application of High Temperature Insulation Materials in Liquid-Immersed Power Transformers

The 1276 PAR expires December 31, 2016. The standard is valid until 2018.

H.2.7 12.8.2.7 1538 IEEE Guide for Determination of Maximum Winding Temperature Rise in Liquid-Filled Transformers

1538 is valid until 2021.

H.3 Working Group and Task Force Reports

H.3.1 Task Force on Winding Temperature Indicators - Phil McClure

Chair: Phil McClure, Vice Chair: Bob Thompson
Monday, 03/24/14 Savannah, GA
The meeting was called to order at 9:30am.

Members and guests introduced themselves.

Members in attendance were identified and to document a quorum, a roster was circulated. There were 9 members and 22 guests in attendance. There are 11 members in the Task Force, and therefore a quorum was achieved. Three guests requested membership. The full attendance roster is available on the association management system (AMS) website.

Minutes of the Fall 2013 meeting in St Louis were presented and discussed. After discussion, a motion was put forward by Josh Herz to approve the minutes. The motion was seconded by Jean-Noel Berube and the minutes were then unanimously approved by vote of the members present.

Chairman McClure briefly reviewed progress and the current state of our efforts toward completion of the experiment report and technical paper. He had circulated revision 5 of the report and draft 12 of the paper to members for review prior to the meeting.

Discussion began with the report of the experiment. Noting the title had been changed as previously requested to include the words “Task Force Report”, Bruce Forsyth clarified that his advice at our previous meeting in regard to the necessity of those words was in regard to the fact that this was not a Task Force experiment, but the report on the experiment is a Task Force document. The clarification was acknowledged and discussion of the test report continued.

Dave Wallach indicated that the reference to Cooper Power in the material and equipment table should be revised to indicate the new owners of this company –Cargill

A misspelling was found and that concluded discussion on the experiment report.

A motion was put forward by Dave Wallach to approve the test report with corrections as described in the meeting. The motion was seconded by Jorge Gonzalez de la Vega and approved by unanimous vote of the members present.

The report will be corrected as approved and circulated to the members of the Task Force for ballot as revision 6 in the time between meetings.

At this point general discussion was continued by Chairman McClure in regard to transformers with OF, non-directed cooling and why when the pumps are activated it results in top oil temperatures that are significantly cooler than transformers with ON oil circulation. Jean-Noel Berube said that he had data that illustrates this phenomena and offered it to the Task Force. One of the group asked if the data could be made available by the Task Force, whereupon Bruce Forsyth indicated that such data would not be made public by the Task Force, but interested parties could contact Jean-Noel privately.

Chairman McClure continued the discussion with a review of the most recent changes in the paper, as presented in draft 12. He explained that draft 12 comprised major parts of revision 9, which were brought forward and heavily edited to condense them into the most pertinent content.

Discussion of the paper included:

- List of members
- Contents section (particularly section title revisions)
- A brief discussion of all newly added and/or edited sections

It was noted that section additional contributions for section 5.1 were submitted just after the cut-off for material for the meeting and what was there, was not quite ready for review. It will be added and circulated in between meetings.

Upon reading of the conclusions section, several attendees objected to some statements that were not supported by evidence in the document. While acknowledging that the statements may be true, it was decided to strike them rather than search out supporting documents, since that may be beyond the scope of the document.

It was stated that the changes noted during the meeting would be made, the new version of section 5.1 would be added to the technical paper and it would be circulated as draft 13 to the members in the time between meetings.

Jean-Noel raised a question as to whether an existing heated well can be used with a new probe which requires an unheated well, by simply disconnecting the heater. Phil said he had experience adjusting the probe depth to locate the hottest position and leaving the probe at that depth. Several other attendees nodded agreement and one commented that some installation instructions require a specific insertion depth.

Old Business: No old business

New business: No new business

Having no more business to cover, Dave Wallach moved to adjourn and Jean-Noel Berube seconded, followed by a unanimous vote of the members present to approve the motion. The meeting adjourned at 10:32 am.

Written and Respectfully Submitted by,

Bob Thompson, Vice Chair

H.3.2 Task Force on 1538 - IEEE Guide for Determination of Maximum Winding Temperature Rise in Liquid-Filled Transformers – Rick Marek

While the TF did not meet during the Transformers Committee meeting, the TF investigated the options according to the IEEE Standards Association Policies and Procedures which define the development process for four types of document development: New, Revision, Amendment, Corrigendum and Erratum. The TF agreed that Amendment was the correct process. A scope and purpose were determined with all in favor as determined by email vote. According to the charter of the TF, the chairman agreed to present the findings to the IL SC and request authorization to submit a PAR request.

Rick Marek moved that the Subcommittee approve the following scope and purpose for a PAR for the Amendment of IEEE 1538.

Scope: This amendment will expand the clause that addresses direct measurement by fiber optic detectors and will also add an annex detailing installation techniques for fiber optic probes. References will also be updated.

Purpose: The state of the art has improved over the years since the last reaffirmation of this guide. This amendment adds substantial detail and general recommendations for sensor location, based on the historical experiences of many fiber optic measurements, providing sufficient detail for everyday use on common designs. Information is also provided on proper sensor installation that was missing from the current guide.

Tom Prevost seconded the motion. After a brief discussion it was approved unanimously.

The Chair appointed Rick Marek as the Chair of the new Working Group.

H.3.3 Working Group on PC57.162 - Guide for the Interpretation of Moisture Related Parameters in Dry, Gas Insulated and Liquid Immersed Transformers and Reactors – Tom Prevost

Attendance	Members	34 out of 66
	Guest	72
	Guests Requesting Membership	10

Meeting Minutes

Tom Prevost, discussed at the first meeting that if you ask for membership you were granted membership, but from now on you will need to be at two consecutive meetings after requesting membership. Please if you do have comments or questions please introduce yourself and your affiliation to meet the rules.

Tom Prevost, chair, introduced himself, Valery Davydov, vice chair, and Deanna Woods, secretary, of the working group and to save time members and guests introduction was skipped.

A quorum of the working group members were present 34 out of 64.

The first meeting minutes approved with Don Cherry making a motion and Emilio Morales seconding the motion.

Tom Prevost then reviewed the scope and the purpose of the working group and then a slide of PAR was shown. Tom Prevost also called for any literature or papers for use while working in this group. (Bibliography for reference) In order to obtain the goal of this working group within four years, the group has been broken down into eight task forces. He then mentioned he sent the agenda to the members and guests. Tom Prevost talked about the break out of the group into task force and would like to see three to five volunteers on each task force so the work can get done.

H.3.3.1 Task Force 1 Terminology and Definitions
Task Force Leaders - Jeff Golarz jgolarz@lumasenseinc.com

This section will list and define the terminology for moisture related phenomena in solid, liquid and gaseous insulating materials used in transformers and reactors.

Tom Prevost ask Jeff Golarz to come forward and discuss his task force and go over the scope.

Volunteers – Please forward your information to Jeff

H.3.3.2 **Task Force 2 Measurement and evaluation of moisture-in-gas insulation parameters Rich was not present for the meeting, therefore Tom Prevost described the task force.**
Task Force Leaders - Rich Simonelli rich.simonelli@spx.com

This section describes existing measurement, evaluation and methods of moisture and other relevant parameters in a gaseous medium. It would great to someone from the transformer manufacturers

Volunteers – Please forward your information to Rich

H.3.3.3 **Task Force 3 Measurement and evaluation of moisture-in-liquid insulation parameters**
Task Force Leaders- Claude Beauchemin beauchemin@tjh2b.com

Claude came forward and described what the task force scope entailed.

This section describes the existing measurement and evaluation methods of moisture parameters and other relevant parameters in the liquid medium of a transformer or reactor for sequential or continuous on-line moisture assessments.

- -Karl Fisher Methodology
- -Consider effect of chemical solutions used for new aged and contaminated insulating liquids
- -Consider types of insulating liquid
- -Relative Saturation
- -Consider measurement method
- -Capacitive probe
- -Derived from Karl Fisher
- -Effect of aging (contamination) on water solubility

Volunteers – Please forward your information to Claude

Tom Prevost mentioned that with a group of this size that these meeting will detail updates on the task force progress and presentations of interest during the meetings. Also, the evolution of the guide will be given as part of the update at the meetings.

H.3.3.4 **Task Force 4 Measurement of moisture in solid insulation**
Task Force Leader - Paul Griffin pgriffen@doble.com

Paul was not present at the meeting therefore, Tom Prevost described the task force.

This section describes the methods of measurement of moisture in solid insulation using a balance, for un-oiled insulation and a Karl Fisher method using solvent extraction or vapor extraction for oiled insulation.

I don't know if anyone is using balances but we can find out at the meeting. I think many today are using ovens attached to a Karl Fischer titration instrument or solvent extraction. Once the group is together we can develop the scope but I would think there would be key areas that needed to be covered. For both non-oiled and oil-impregnated insulation things to explore are:

1. How to acquire samples and retain them for moisture measurements
2. Methods of measurement and specific details if outside of standard methods
3. Repeatability and accuracy of measurements

Volunteers – Please forward your information to Paul

H.3.3.5 **Task Force 5 Evaluation of moisture in solid insulation using dielectric response methods**
Task Force Leader - George Frimpong george.k.frimpong@us.abb.com

George came forward as described the task force, he did rewrite the scope to include (DFR< power frequency power factor). The topic to be stricken from the task force is to include DFR since there is a group already working on this topic and stick with the frequency domain. Struck out temperature distribution there is not temperature probes in the insulation so there is no way to do this prescribe method. Moisture distribution was also taken out due to the fact that these are all bulk moisture measurements. This section describes the methods of measurement of moisture in solid insulation using dielectric response methods.

Consideration will be given to methods that analyze dielectric response in the frequency domain (DFR< power frequency power factor)

Consideration of the following parameters needs to be included:

1. changes in temperature during the test
2. acid content of the paper (from oil acidity)
3. Geometry of insulation

Any comments- Valery Davydov is not sure if we only need to leave this in the frequency domain but I will leave this to the task force to decide. Valery main concern is the distribution of the moisture. George is relying on DFR working group. The group needs to discuss the effect of moisture and the effect of other contaminates on the DFR. The TF needs to have the discussion to include DFR.

Volunteers – Please forward your information to George

H.3.3.6 **Task Force 6 Inferring of moisture in solid insulation from measurements conducted in liquid or gaseous medium**
Task Force Leader - Valery Davydov valery.davydov@ieee.org

This section describes methods of inferring moisture in solid insulation from that measured in the liquid or gaseous medium for both sequential and continuous on-line measurements.

For equilibrium methods this section will discuss errors introduced due to moisture diffusion time constants and temperature measurement accuracy.

Valery Davydov gave presentation on is task force in detail.

Distribution of temperature and distribution of moisture must be considered. Valery stated his proposed suggestions of the direction of his task force but he also stated that these are not necessarily the final product of the guide.

Tom Prevost then gave a summation of Valery presentation and describes the scope of the task force. The goal of the task force is to combine what we are measuring and in each of these phases and infer what the moisture is solid insulation.

Don Platts then had a question about a procedural occurrence. He wanted to know the direction of the task force. Don Platts wants to make sure everyone has an input even at the task force level. Tom Provost hope and desire is that Valery has a starting point but it is far from concluding what the outcome that will be finalized with the task force.

Volunteers – Please forward your information to Valery

H.3.3.7 **Task Force 7 Evaluation of aging and end of life of solid insulation parameters**
Task Force Leader- Roger Wicks roger.c.wicks@usa.dupont.com

This section describes approaches for evaluation of parameters of end of life of solid insulation affected by moisture.

The consideration of the effects of moisture, oxygen and aging byproducts in transformer aging tests is the purpose of this task force.

Roger came forward to describe the scope of the task force he will be leading for the working group. Roger stated he can easily document from literature that is sent to Deanna but not sure of a good test one could use in dry applications.

Tom Prevost agreed with the point of gas or air insulated equipment could be difficult to get a good method that can be used for that and if not define the scope that will not be addressed.

Volunteers – Please forward your information to Roger Wicks

H.3.3.8 **Task Force 8 Factory/workshop application of knowledge on moisture; establishing baselines**
Task Force Leader - Poorvi Patel poorvi.patel@us.abb.com

This section describes a factory/workshop approach to the establishment of a baseline for each important moisture related parameter

Poorvi Patel came forward to describe the task force.

What is already used to establish a baseline in the industry will be convenient to use (i.e. dew point, DFR) and discussion on other oil test used already in a factory to determine dryness of the insulation.

Volunteers – Please forward your information to Poorvi

H.3.3.9 **Task Force 9 Field application of knowledge on moisture**
*** Note:** ***This section lists the risks associated with moisture***
Task Force Leader - Jim Thompson serve1@svtv.com

Jim was not in attendance at this meeting

Tom Prevost describes the scope of this task force. This is the document the risk and the effect of having high moisture in your transformers. Help with any ideas on how to mitigate the moisture and looking at absolute but also rate of change as well. Then the values will be used as risk assessment for those values.

Volunteers – Please forward your information to Jim.

H.3.4 Working Group for Application of High-Temperature Materials IEEE P-1276 – Mike Franchek

Tuesday, March 25, 2014
Savannah E, 3:15 pm – 4:30 pm
Marriott Riverfront Savannah GA, USA

H.3.4.1 Welcome & Chairman's Remarks — M. Franchek

The Chair opened the meeting at 3:16pm, with comments related to the work of this group.

H.3.4.2 Circulation of Attendance Rosters — R. Wicks

The Secretary circulated the attendance rosters. By the end of the meeting, there were 13 members and 42 guests in attendance with 4 repeat guests requesting membership. After addition to the membership list, this would increase our membership to 30 members. Full attendance has been included in the AM System.

H.3.4.3 Attendance for Quorum — R. Wicks

Three quorum calls were made. At the start of the meeting there were only 10 members in attendance. Midway through the meeting there were twelve, and finally at the end of the meeting there were the requisite 13 members in attendance.

H.3.4.4 Approval of Fall 2013 Meeting Minutes – St. Louis, MO — R. Wicks

At the end of the meeting, Dave Sundin made a motion to approve the minutes, Bruce Forsyth seconded and the minutes were approved unanimously.

H.3.4.5 Approval of Meeting Agenda — M. Franchek

At the end of the meeting, Raj Ahuja made a motion to approve the agenda, John Luksich seconded and the agenda was approved as used in the meeting.

H.3.4.6 Status of PAR Revision to change scope — M. Franchek

The chair reviewed the status of the PAR revision, noting that NESCOM will be meeting on 3/26/2014 (tomorrow) to approve the PAR revision. There were a number of questions asked prior to this meeting, which the chair responded to with no issues, so the approval is expected. Questions included concerns about timing, the omission of specific temperatures in the scope, etc., and these were addressed in the response.

The chair then finished this section of the meeting by reminding the members and guests the final scope and purpose that were submitted to NESCOM. The key differences between the revises scope and the 1997 version are the addition of distribution and regulating transformers as well as a reference

to temperatures outside the scope of C57.12.00. The revised purpose was simplified vs. the prior document.

H.3.4.7 **Review of IEEE 1276 - 1997 Table of Content / Changes** **All**

The chair provided an overview of the difference between a guide and a standard. The guide allows introduction of tutorial type information not appropriate for a standard such as ways to apply high temperature materials (design and usage) and to provide examples of these by application.

The chair noted that this document will include distribution transformers, which have different insulation systems and winding types than those used in the power transformer specific 1997 version, so examples and temperature classes will need to be provided. This document should not be a duplicate of C57.154. Since this is a guide, the document can provide informative information in the body of the document rather than only in an appendix – since a guide by nature is all "informative".

The chair provided an outline of a timeframe he would like to meet in order to complete this work prior to the PAR deadline of the end of 2016. To do this, he has proposed completing a table of contents by June of 2014 with a ballot of the document by the fall of 2015.

The chair noted that he has sent copies of the background paper, the 1997 version of 1276 and IEEE C57.154 to the working group members to help with the development of the standard. This has not gone out to the guests at this time. The chair noted that there is a similar document to C57.154 (IEC 60076-14), but he will not circulate this to the members.

John Luksich asked about a dual logo approach for this guide, however Rick Marek noted that there is a difference between the two standard documents due to the differences in the ambient temperatures between IEC and IEEE, which might make creating a dual logo version of the guide difficult.

The chair then reviewed the current table of contents from the 1997 version as a way to get the attendees thinking about the work needed for this revision. This lead to discussions on some of the sections which will be outlined below:

The past document contained at one and one-half long introduction which outlined some history and the rationale for the document. There was discussion from John L., Roger Wicks, Rick Marek, Raj Ahura and Radek Szewczyk along with the chair. At the end of the discussion, the consensus of those in attendance would be that there should be a short discussion in the revised introduction regarding the change from 1997 to the new version, and then the historical aspects of this introduction could become part of an expanded discussion on history (Editor's note - need to consider that we already have a background paper with some detail).

The chair then went over the reference/definitions (noting will need to be updated, especially considering the expanded scope).

The chair discussed merits of high temperature operations and this was agreed to be kept.

The chair discussed insulation systems (noting that there are differences between power and distribution that will need to be discussed). Roger Wicks noted that there are inconsistencies between this document and IEEE C57.100 that will have to be rectified (from a draft version of IEEE C57.100 that never made it into the 1999 version). Roger also noted that wire enamel insulation testing will need to be expanded, as this was not listed in detail in IEEE C57.100, though he has added some on

this in a similar IEC document (IEC 62332-2), and that this will be one area where volunteers will be needed.

The loading guide section will likely need to be renamed as loading guidelines for high temperature transformers. This will need to be expanded with the different types of insulation systems (distribution and power) as well as types of systems (hybrid, high temperature (solid and liquid), etc. The chair noted that the original document was mostly disk work power transformers (hybrid) so a lot of work and volunteers will be needed in these last two sections.

Rick Marek (Chair of the C57.154 document) reminded those in the audience that the merits of high temperature might be different for wider range of applications due to the expanded scope. The 1997 document noted future revisions would expand to cover new areas once applications were more broadly used beyond power and mineral oil, and this is now the case with current practices. Rick also mentioned that there is a new work proposal within Cigre (Hans Peter Gasser) to develop a thermal qualification method for fluids to determine thermal class of fluids (Radek mentioned this will be at the Cigre D1 materials session in August.

The chair continued with the old table of comments including a description of high temperature transformers, nameplate and heat run. He noted that a word version of the document has been promised by IEEE within a week to assist in this work. He finished the discussion of the old document by noting that there was an annex A related to gas analysis which likely will need to be expanded with new fluids, etc. and finally there was a bibliography which will need to be expanded.

Rick Marek noted that the nameplate information is in C57.154, and that the heat run might not need to be covered, however Radek noted that in from discussions in the DGA for factory heat run meeting that this might actually provide a lot of good information. John Luksich reminded that there is a difference in hottest spot vs. average winding with higher temperature transformers, as well as direct membership and the chair agreed, but thought it was already in the 1997 version for power units at least. Radek reminded that winding styles can be different (such as a semi-hybrid HV winding and full-hybrid LV winding) and this will need to be addressed in portions of the document (may affect loading, gassing, etc.).

The chair solicited volunteers for the TOC revision by June and the volunteers are Mike Franchek, Roger Wicks, John Luksich, Kurt Kaineder, and Mike Shannon. They will need to get this back to the chair by June by meeting with conference call, etc.

H.3.4.8 **Old Business**

There was no old business

H.3.4.9 **New Business**

The chair solicited volunteers for secretary, so that Roger could become Vice Chair (as the Adcom would like to see all three positions in working groups if possible).

H.3.4.10 **Adjournment**

A motion to adjourn the meeting was offered by Dave Sundin and seconded by John Luksich and passed unanimously, and the meeting was adjourned at 4:00 pm.

Secretary

Roger Wicks.

H.4 Old Business:

No old business.

H.5 12.8.5 New Business:

IEEE C57.119-2001 (Reaffirmed 2008) –The Chair stated that C57.119 expires in 2018. He suggested that we reaffirm or revise this document.

There was general discussion about this topic. The key points of the discussion are shown below.

- We can no longer reaffirm standards. We can submit a revision without any changes but is must be balloted.
- A new bushing document has been approved. Is C57.119 in sync with it?
- Some folks felt that this document was not used while others stated that it was used.
- It was suggested that we survey the Subcommittee for comments and have a working group resolve them. Several people felt this would take too long.
- The intention is to ballot the document as is and address any comments that are submitted. If significant comments are submitted a working group will have sufficient time to resolve them before the standard expires.

T. Prevost made the following motion:

Submit a PAR for the revision of C57.119 with the intention to ballot as it stands and deal with the resulting comments.

D. Platts seconded this motion. During discussion, B. Bartley suggested revising the motion to include "with minor editorial changes." D. Platts and T. Prevost both accepted this amendment. The Subcommittee voted on the following amended motion:

Submit a PAR for the revision C57.119 with the intention to ballot with minor editorial changes.

This motion received no negative votes and 3 abstentions. The motion was approved.

H.6 Adjournment

P. McClure made a motion to adjourn. K. Miller seconded this motion. The meeting adjourned at 8:45 AM.

Respectfully submitted,
Eric Davis
Secretary, Insulation Life Subcommittee

Annex L Standards Subcommittee – Unapproved Minutes

March 26, 2014
Savannah, Georgia

Chair: William Bartley
Vice Chair: Kipp Yule
Secretary: Jerry Murphy

The Chair, William Bartley opened the meeting calling a show of members to establish quorum which was met.

Bill then requested a review of the Agenda; Bob Thompson moved for approval and Jim Graham seconded then the agenda was approved by unanimous vote.

L.1 Meeting Attendance

The Standards Subcommittee met on Wednesday, March 26, 2014, at 4:30 PM. A role call showed 28 of 50 members in attendance achieving quorum at the meeting. Overall there were 87 attendees, 28 members, 59 guests, including 6 that requested membership upon tabulation of the circulated rosters with 4 meeting the established criteria.

L.2 Approval of previous meeting minutes

The Chair asked if there were any comments or corrections to the previous meeting minutes of the Fall 2013 meeting in St. Louis, Missouri. There were no comments to the meeting minutes; Bruce Forsyth moved for approval and Steve Snyder seconded then the minutes were approved by unanimous vote.

L.3 Chair's Remarks

Bill summarized the recent activities of the Transformer Standards activity for the six-month period October 1. 2013 to March 1, 2014. In the last five months, no new Standards, one Revision and one Corrigenda were approved by Standards Board. In this same period, Standards Board approved one PAR for a new standard, two PAR modifications and one PAR extension. The Transformer Committee is responsible for almost 100 standards, plus over 55 PARs, projects for new standards and revisions. The full Standards Report is available on the Transformers Committee website at the following link:

http://www.transformerscommittee.org/meetings/S2014-Savannah/Minutes/S14-StandardsReport.pdf

Bill shared the following reminders with the subcommittee from the Administrative Subcommittee.

a. Agendas must be approved and recorded in minutes as do the minutes.

b. Standards procedurally must be approved by the SC to proceed to SA ballot. This is not a technical review, but required to make advisement to all SC members.

c. Steve Antosz asked, "How do working groups of one get 2/3 approval?" Bill will take this to the AdCom and ask.

L.4 Working group reports

L.4.1 Continuous Revision of C57.12.00

The purpose of this WG is to compile all the work being done in various TF/WG/SC's for inclusion in the continuous revision of C57.12.00 in a consistent manner. This WG coordinates efforts with the companion Standard C57.12.90 so that they publish together. The goal is to issue new Standards every 2 to 3 years.

Standard C57.12.00 was published September 2010. A new PAR was requested in April 2011 and approved June 16, 2011 to cover the ongoing work for the continuous revisions. This PAR is good through December 31, 2015.

At this point several changes / additions to the standard have been approved by the respective subcommittees and have been placed into the document. The Dielectric Tests Subcommittee is finishing work on revisions to Tables 4 and 5, which I deem critical to have included in this next revision. There also is an issue concerning an equation error in section 7.4 that needs corrected. Two weeks following the conclusion of this meeting I will solicit input from all subcommittees for any additional changes that they may have ready for inclusion in the next ballot.

Subject to the successful outcome of the preceding statements, I expect in mid-2014 to form the ballot pool and launch the ballot.

Respectfully submitted, by Steven L. Snyder, WG Chair, on March 26, 2014

L.4.2 Continuous Revision of C57.12.90-2006

This is essentially a working group of one person. There was no meeting held. The purpose of the WG is to keep track of the work being done in various TF / WG / SC for inclusion in the continuous revision of C57.12.90 in a consistent manner.

Summary

The new PAR was approved on June 15, 2011. It is valid until Dec 31, 2015.

Future Revisions

Changes *already approved* for the next revision:

- New subclause 10.2.5 Connection of neutral terminal during switching impulse tests by Pierre Riffon's WG Revision to Impulse Test in Dielectric Test Subcommittee. Submitted on 4/27/09.

- Revisions to Clause 12 Short-circuit tests and new Annex on Connections diagrams for testing three-phase transformer using alternate single-phase source by Marcel Fortin's Task Force in the Performance Characteristics Subcommittee. Submitted in Fall 2009.

- Revision to subclause 10.3.2.4 Tap connections during lightning impulse test by Pierre Riffon's WG Revision to Impulse Test in Dielectric Test Subcommittee. Submitted on 10/28/10.

- Revisions to subclauses 10.2.1,10.3 and 10.3.3 which increases the number of full wave impulse waves applied from one to three. This is the same as IEC

- Revisions to Clauses 6 & 7 Polarity & Phase-relation and Ratio tests from Mark Perkins' PCS WG for Revision of C57.12.90. Final survey circulated in Sept 2011.

- Revisions to Temperature-rise tests by Paulette Payne Powell's WG in the Insulation Life Subcommittee

    - Subclause 11.1 which reversed the order of appearance of the two methods of simulated loading for temperature test. Submitted in January 2013.

    - Subclause 11.2.2 which revised items "a" through "f" of the hot resistance measurement procedure for temperature test. Submitted in January 2013.

    - Subclause 11.1.2.2 Loading back method. Added text and Revised Figures 28 & 29. Submitted in September 2013.

    - Revision to subclause 9.5 Zero Phase Sequence Impedance from Mark Perkins' PCS WG for Revision of C57.12.90. Final survey circulated in 2013; submitted in Feb 2014.

pending work

- Revision to Clause 13 Audible Sound by Ramsis Girgis' TF in the Performance Characteristics Subcommittee. TF and SC surveyed in March 2014.

- Other possible revisions to subclauses 10.2 to 10.4 from Pierre Riffon's WG for revision of impulse tests. Ongoing work continues…

- Other possible revisions to subclauses 10.5 to 10.10 from Bertrand Poulin's WG for revision of low frequency tests. Maybe some change due to Class II PD testing on 69 kV, xfmrs >15 MVA. Ongoing work continues…

Respectfully submitted by Stephen Antosz, WG Chair, on March 2014

L.4.3 WG on Revision of IEEE PC57.152 (old 62) – Jane Verner

The Working Group has completed its work and the standard has been published in 2013.

L.4.4 TASK FORCE on Recommendations to the IEEE Transformer Committee (TC) on Recommended Changes, Deletions, and Insertions Related to Normalizing the References of Insulating Liquids Throughout the IEEE TC Standard Series

P. McShane–TF Chair

Patrick McShane reported for the task force.

Annex of subject matter experts was removed.

L.4.5 TASK FORCE for Comparison of IEEE & IEC Standards for Cross Reference

The task force for IEEE-IEC cross reference was formed in October 2013 at the St Louis meeting.

The task force did not schedule a meeting at Savannah and will have the first meeting at Washington DC in October 2014.

Completed the comparison of the IEEE C57.12.00 with the IEC 60076-1 and the updated comparison is attached. The earlier comparison was done to the CDV document available at that time. This comparison will be updated in next few months.

Ajith Varghese is currently working on the comparison of transformer testing requirements in documents C57.12.00-2010 sections 8 & 9 and C57.12.90- 2010 with IEC 60076-1(2011) and IEC 60076-3.

Both of the above comparisons will be crosschecked by another member and will be available on SC Standards web page and presented to the members at the next meeting.

Respectfully submitted by Vinay Mehrotra on March 24, 2014

L.5 Old Business

None

L.6 New Business

None

L.7 Adjournment

The meeting was adjourned by Chair without objection; the meeting adjourned around 5:10pm.

Respectfully submitted by Jerry R. Murphy, Standards SC Secretary

Annex M Underground Transformers & Network Protectors SC – Chair: Carl Niemann

March 26, 2014
Savannah, Georgia

Chair: Carl Niemann
Vice-Chair: Dan Mulkey

M.1 Meeting Administration

Dan Mulkey chaired as Carl Niemann did not attend this meeting due to personal issues, and with George Payerle acting as secretary.

Introductions – The meeting was called to order. In the interest of time, introductions were not made.

Quorum – The members were listed on the screen and by a show of hands, it was determined that there was a quorum with 10 of the 13 members in attendance.

Approval of Minutes – The Fall 2013 minutes were amended to correct various spelling errors. They were motioned for approval by Alan Traut and seconded by Said Hachichi. The subcommittee approved these without opposition.

Members in Attendance:

Adam Bromley - Fort Collins Utilities
Said Hachichi - Hydro-Quebec
Brian Klaponski - Carte International Inc.
Daniel Mulkey - Pacific Gas & Electric
George Payerle - Carte International Inc.
Jeremy Sewell - Quality Switch, Inc.
Adam Sewell - Quality Switch, Inc.
Giuseppe Termini - PECO Energy
Alan Traut - Power Partners
William Wimmer - Dominion

Guests in Attendance:

Kevin Biggie - Weidmann Electrical Technology
Richard Cantrell - Doble Engineering Co.
Jermaine Clonts - Power Partners
Valery Davydov - Mr. Valery Davydov
Anil Dhawan – ComEd
* Larry Dix - Quality Switch, Inc.
Fredric Friend - American Electric Power
* Carlos Gaytan - Prolec GE
* Michael Hardin - H-J Enterprises, Inc.
Robert Kinner - FirstPower Group LLC
Lalin Kothalawala - Manitoba Hydro
* Alejandro Macias - CenterPoint Energy
* Charles Morgan - Northeast Utilities
Martin Navarro - Siemens Ltda
Robert Olen - Cooper Power Systems by Eaton
Barbara Patoine - Weidmann Electrical Technology
* Justin Pezzin - IFD Corporation
Russell Sewell - Quality Switch, Inc.
Stefan Siebert - BROCKHAUS MESSTECHNIK
Edward Smith - H-J Enterprises, Inc.
Richard Smith – Eaton
* Anastasios Taousakis - Pepco Holdings Inc.

* Requested and was granted membership in the Subcommittee

M.2 Each of the working groups that met reported as follows:

M.2.1 C57.12.23 Single-Phase Submersible Transformers – Alan Trout, Chairman, Adam Bromley, vice-chair.
Revision due date: 3/19/2019
PAR Expiration Date: NA

The meeting was called to order and everyone was asked to introduce themselves. Blank rosters were sent around as this is a new WG.

We did not need to establish a quorum as this is the first meeting and we will be establishing the group of members after this meeting. We had 40 attendees with 29 requesting membership.

Approval of minutes – There are no previous minutes as this is a newly formed working group.

Old business – none as this is a new WG

New Business - Title was modified to include 34500GrdY/19920 V instead of 25000 V. The low voltage rating did not change and was kept at 600 V. Ron Stahara asked if the 35 kV level was feasible and the consensus was that it is.

There was some discussion about changing the largest kVA size. Some customers' largest size is 250 or 500 kVA. There was a comment about the biggest unit used in a manhole might be 250 kVA. Giuseppe Termini and Dan Mulkey recommend that we go to 250 kVA; Said Hachichi wanted to know why we wouldn't go bigger (he buys 333 kVA and a few 500 kVA). There was another comment that a 333 kVA would be limit of the current standard stud size. Brian Klaponski recommended that we keep the maximum size at 250 kVA; there seemed to be consensus surrounding that suggestion.

Al Traut and Adam Bromley will ensure that the entire document is updated with new kVA, voltage ratings, etc.

Title and Scope - While reviewing the three phase submersible standard it was noted that the scopes are very similar except that 12.23 has the following paragraph: "This standard does not cover the electrical and mechanical requirements of any accessory devices that may be supplied with the transformer." It was decided to delete the sentence because we don't want to state what the scope isn't.

Ron Stahara made a motion to accept the changes to the Title and Scope; Rich Smith seconded that motion. The motion was unanimously approved and will be used for our PAR application.

Dates - Al asked if we wanted to keep dated references to other IEEE standards in this standard. Ron Stahara mentioned that we want to keep them generic. Brian Klaponski mentioned a concern that when something changes we might easily have an outdated reference. If we are referencing a specific section, it might make sense to use the date. It was decided that we want to use generic references as much as we can, and only use specific references when we have to. Al Traut and Adam Bromley will check all references and update references that need to be changed.

Consistency - There was a comment made regarding the need to keep consistent with submersible enclosure integrity and three phase submersible standards on definitions of submersible, submerged operation, etc.

Brian Klaponski asked if we wanted to keep the 55°C winding rise as a standard. Dan Mulkey stated that the insulation system is based on 65°C, but when we put in a submerged environment, the expectation is to have the 10°C cushion for when air circulation is non-existent.

Al Traut and Adam Bromley will update the document with the proposed changes. We will also submit a PAR application for this standard for approval at NESCOM prior to the October 2014 meeting.

Adjournment – The meeting was adjourned at 10:25 am. The next meeting will be in the Washington D.C. area in October 2014.

M.2.2 C57.12.24 Three-Phase Submersible Transformers working group – Giuseppe Termini, Chairman
Revision due date: 6/17/2019
PAR Expiration Date: 12/31/2015

Introductions – the meeting was called to order at 9:45 and introductions were made. George Payerle acted as recording secretary.

Quorum - The meeting was attended by 14 members and 33 guests. A quorum was achieved with 14 out of 17 members present. Six (6) guests requested membership. Under the new guidelines, guests must attend two (2) consecutive meetings before they can qualify for membership.

Approval of Minutes - The minutes from the St. Louis meeting were reviewed. Dan Mulkey made a motion to accept the minutes as submitted, Adam Bromley seconded the motion. The motion was approved unanimously.

Discussion - The chairman then moved to discuss the most recent draft revision of the standard which is D1. Sections 7.3.2 (Pressure Relief) and 7.3.3 (Loadbreak Switch) were reviewed.

After some discussion, the following sub-sections under pressure relief were changed:

1. A minimum ½ inch NPT or UNC fitting shall be located on the transformer cover and used for mounting a manual pressure relief plug or an automatic pressure relief valve.

2. The manual pressure relief plug shall allow slow release of pressure without completely removing the plug.

3. If an automatic pressure relief valve is specified, the fitting shall be sized for the flow rate of the valve and it shall be operable by using a standard hot-line tool.

Brian Klaponski moved to approve the new wording and Dan Mulkey seconded the motion. The motion was approved unanimously. There was additional discussion about adding information, perhaps in the appendix that would explain to the user the need for pressure relief. It was agreed to hold that discussion until after the next meeting. Carlos Gaytan volunteered to provide wording, based on his work in C57.12.39, to use in an appendix and report back at the next meeting.

Load break - The following sub-sections under load break switch were also discussed and revised:

1. A two-position loadbreak switch shall be provided to energize and de-energize the transformer's high voltage windings.

2. The switch shall be labeled as “OPEN” and “CLOSED” and shall be distinctly observable at a distance of 2.44 m (8 ft) from the transformer by the position of the handle.

3. The switch operating handle shall be located on the transformer cover and shall be operable by using a standard hot-line tool.

4. The switch rotation shall be clockwise to close, to energize the high-voltage windings, and counterclockwise to open, to de-energize the high voltage windings.

5. The minimum current-carrying capabilities of the switch shall be 200 A (continuous current rating) and 10 kA rms symmetrical for 0.17 s (short-time current rating).

6. All parts of the loadbreak switch external to the tank shall be of corrosion resistant material other than aluminum and plastic.

Dan Mulkey moved to approve the aforementioned changes and Adam Bromley seconded the motion. The motion was approved unanimously.

Discussion – Giuseppe Termini noted that progress needs to be made on 12.24 so that it can go to ballot at the next meeting. Dan Mulkey moved to approve the aforementioned changes and Adam Bromley seconded the motion. The motion was approved unanimously. Bill Wimmer and Dan Mulkey volunteered to work with the chairman to review Section 7.3.4 Overcurrent Protection and make any necessary changes prior to the next meeting.

The chairman stated that the remaining changes in the draft will be reviewed at the next WG meeting and encouraged the WG to provide additional input prior to the meeting so that the changes can be included in the next draft revision. The meeting was adjourned at 10:45 with the next meeting scheduled for October 20, 2014 in Washington D.C.

M.2.3 57.12.40 Secondary Network Transformer working Group – Brian Klaponski, Chairman
Revision due date: 12/31/2021
PAR Expiration Date: 12/31/2016

Introductions – The WG met on Tuesday March 25, 2014 at 11:00 a.m. with 10 members and 15 guests. An agenda was presented and introductions were made.

Minutes - The minutes of the October 22, 2013 meeting were reviewed and modified as follows: Added Bill Wimmer and Mark Faulkner to the attendance list. Corrected the meeting location to Renaissance Grand hotel in St. Louis MO. Corrected the name of a company from Center Point Energy to CenterPoint Energy. Corrected the name of one attendee from Marcias to Macias. George Payerle made a motion to approve the minutes as amended above. Jeremy Sewell seconded and the minutes were approved unanimously.

Document review - The meeting consisted of the review of the proposed changes made at the previous meeting. Additional changes to the following table and figures were suggested:

a) Table 9 – Change the dropout voltage values to the following:

Dropout voltage
15 to 75
33 to 166

The chairman will forward the changes to the table to Dan Mulkey and Mark Faulkner for review. Dan Mulkey will also solicit input from other end-users. .

c) Correction to title for figure 1(b) to add: "Configuration without switch and terminal chamber"

b) Change title to figure 1(c) as follows: "Configuration with or without internal switch"

Discussion - Jeremy Sewell and Tas Taousakis volunteered to work with the chairman to rewrite the clauses in the body of the standard to allow for the introduction of the new figures: 1 (b) and (c).

It was suggested that additional grounding (this is safety grounding that is normally provided through the primary network switch so it becomes an issue if there is not a primary network switch) would be required if suggested changes discussed in our meeting in regards to Figures 1(b) and (c) were adopted.

Tas Taousakis stated that 90% of network transformer failures occur in the termination chamber.

Adjournment - The meeting was adjourned at 12:15 pm with the next meeting set for Washington D.C. in October 2014

M.2.4 C57.12.44 Secondary Network Protectors working group – Bill Wimmer, Chairman, Mark Faulkner, Secretary
Revision due date: 12/31/2018
PAR Expiration Date: 12/31/2014

No meeting – Bill Wimmer reported that the document has been balloted and is probably before RevCom today so C57.12.44 did not meet.

M.3 Chairman's Comments: Based on the new Practices and Procedures, Membership in a WG is granted if you are either at the first meeting or you can request membership after you have attended 2 consecutive meetings. Membership retention is in jeopardy if you miss 2 consecutive meetings without a good reason.

We are supposed to vote on the agenda and vote on the minutes. There needs to be a 2/3 majority to go to ballot followed by a simple majority vote at the subcommittee level. WG chairs need to keep track of attendance in the AM system.

PARs have a life of 4 years and expire on December 31. Standards are good for 10 years from the date they are approved by RevCom.

M.4 Old Business: None

M.5 New Business -

M.5.1 AM System discussion - Brian Klaponski noted that the AM system software is not at all intuitive or user friendly, especially for those who only need to use it every 6 months. Brian moved to ask the committee to request modification of the AM system to make it easier to make changes. Alan Traut mentioned that if someone requests membership, we have to keep track of it ourselves. Our purpose is to discuss the technical aspects of

transformers and it is not a good use of our time to be dealing with difficult software. Adam Sewell seconded. The motion was approved unanimously.

M.5.2 **Membership -** Brian Klaponski noted that membership in the committee is small (13) compared to the number of the people who attend (32 at this meeting) and he encouraged more people to request membership. A number of people did.

M.6 The meeting was adjourned at 11:25. The next meeting will be in the Washington D.C. area in October 2014.