Transformers Committee
Fall 2014 Meeting – Washington DC Metro Area, USA
October 19 - 23, 2014
Sheraton Premier at Tysons Corner

Chair: Don Platts **Vice Chair:** Stephen Antosz **Secretary:** Sue McNelly
Treasurer: Greg Anderson **Awards Chair/Past Chair:** Bill Chiu **Standards Coordinator:** Bill Bartley

IEEE/PES Transformers Committee

Fall 2014 Meeting Minutes

Washington DC Metro Area, USA October 19 - 23, 2014

Unapproved

(These minutes are on the agenda to be approved at the next meeting in Fall 2014)

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MONDAY OPENING SESSION

1.0 AGENDA

Opening Session

Monday, October 20; 8:00 am - 9:10 am

(rosters circulated and attendance recorded as eligibility for Committee membership)

1.	Welcome and Announcements	Don Platts
2.	Approval of Agenda	Don Platts
3.	Approval of Minutes from Spring 2014 Meeting	Don Platts
4.	Chair's Report	Don Platts
5.	Vice Chair's Report	Stephen Antosz
6.	Secretary's Report	Sue McNelly
7.	Treasurer's Report	Greg Anderson
8.	Report from Administrative Subcommittee Meeting	Don Platts
9.	Standards Report	Bill Bartley
10.	Editor's Report	Sanjib Som
11.	Hot Topics for the Upcoming Week	Subcommittee Chairs
12.	New Business & Wrap-up	Don Platts

Closing Session

Thursday, October 23; 11:00 am - 12:00 pm

1.	Chair's Remarks and Announcements		Don Platts
2.	Reports from Liaison Representatives (moved from Monday due to lack of time)		
	Annex A.	Stds Coord. Committee, SCC No. 4 (Electrical Insulation)	Paulette Payne Powell
	Annex B.	Standards Coord. Committee, SCC No. 18 (NFPA/NEC)	Ned Brush
	Annex C.	IEC TC-14 Technical Advisor to USNC	Phil Hopkinson
	Annex D.	CIGRE	Raj Ahuja
3.	Meetings Planning Subcommittee		Greg Anderson
4.	Reports from Technical Subcommittees (decisions made during the week)		
	Annex A.	Dielectric Tests	Mike Franchek
	Annex B.	Distribution Transformers	Steve Shull
	Annex C.	Dry Type Transformers	Chuck Johnson
	Annex D.	HVDC Converter Transformers & Reactors	Mike Sharp
	Annex E.	Instrument Transformers	Ross McTaggart
	Annex F.	Insulating Fluids	David Wallach
	Annex G.	Insulation Life	Bruce Forsyth
	Annex H.	Performance Characteristics	Ed teNyenhuis
	Annex I.	Power Transformers	Joe Watson
	Annex J.	Underground Transformers & Network Protectors	Dan Mulkey
	Annex K.	Bushings	Peter Z`hao
5.	Additional Report from Standards Subcommittee (issues from the week)		Bill Bartley
6.	New Business (continued from Monday) and Wrap-up		Don Platts

2.0 ATTENDANCE

2.1 COMMITTEE MEMBER ATTENDANCE

Legend:
CM Committee Member
CM-LM Committee Member-IEEE Life Member
CM-EM Committee Member-Emeritus

Committee Member Attendance (Red designates CM added at present meeting)				
Member Type	**Name**	**Company**	**Mon**	**Thu**
CM	Ahuja, Raj	Auriga Corporation	X	
CM	Amos, Richard	Unifin International	X	
CM	Anderson, Gregory	GW Anderson & Associates, Inc.	X	X
CM	Antosz, Stephen	Stephen Antosz & Associates, Inc	X	
CM	Arteaga, Javier	ABB Inc.	X	X
CM	Ayers, Donald	Ayers Transformer Consulting	X	X
CM	Ballard, Robert	DuPont	X	X
CM	Balma, Peter	Peter M Balma Engr Consulting	X	
CM	Bartley, William	Hartford Steam Boiler	X	X
CM	Beaster, Barry	H-J Enterprises, Inc.	X	
CM	Beauchemin, Claude	TJH2b Analytical Services	X	
CM	Betancourt, Enrique	Prolec GE	X	X
CM-LM	Binder, Wallace	WBBinder Consultant	X	
CM	Blackburn, Gene	Gene Blackburn Engineering	X	
CM	Blaydon, Daniel	Baltimore Gas & Electric	X	X
CM-LM	Boettger, William	Boettger Transformer Consulting LLC	X	X
CM	Boman, Paul	Hartford Steam Boiler	X	
CM	Brender, David	Copper Development Assn.		X
CM	Bromley, Adam	Fort Collins Utilities	X	X
CM	Brush, Edwin	BBF & Associates	X	
CM	Buckmaster, David	Transformer Forensics, LLC	X	
CM	Bush, Carl	Pemco Corporation	X	X
CM	Callsen, Thomas	Weldy-Lamont Associates	X	X
CM	Castellanos, Juan	Prolec GE	X	X
CM	Cherry, Donald	ABB Inc.	X	X
CM	Chiu, Bill	Southern California Edison	X	X
CM	Chu, Donald	Consolidated Edison Co. of NY	X	X
CM	Claiborne, C. Clair	ABB Inc.	X	X
CM	Colopy, Craig	Eaton's Cooper Power System	X	X
CM	Damico, Frank	TAMINI Transformers USA	X	
CM	Davis, Eric	Burns & McDonnell	X	X
CM-LM	Degeneff, Robert	Utility Systems Technologies, Inc.	X	
CM	Del Rio, J. Arturo	Trench Limited	X	X
CM	Dix, Larry	Quality Switch, Inc.	X	X
CM	Ellis, Keith	Elect Connection, Inc (RHM International)	X	X
CM	Fairris, James	Nashville Electric Service	X	
CM	Fallon, Donald	PSE&G	X	
CM	Faulkenberry, Michael	Georgia Power Co.	X	
CM	Foster, Derek	Magnetics Design, LLC	X	

Committee Member Attendance (Red designates CM added at present meeting)				
CM	Franchek, Michael	Weidmann Electrical Technology	X	X
CM	Garcia, Eduardo	Siemens	X	X
CM	Gardner, James	NRECA International	X	X
CM	Gaytan, Carlos	Prolec GE	X	
CM	Ghafourian, Ali	ERMCO	X	
CM-LM	Girgis, Ramsis	ABB Inc.	X	
CM	Graham, James	Mott MacDonald, Inc.	X	X
CM	Graham, John	Siemens TDL	X	X
CM	Griesacker, Bill	Doble Engineering Co.	X	
CM	Gromlovits, Mark	Federal Pacific		
CM	Hachichi, Said	Hydro-Quebec	X	X
CM	Hardin, Michael	H-J Enterprises, Inc.	X	
CM	Harley, John	FirstPower Group LLC	X	X
CM-LM	Harlow, James	Harlow Engineering Associates	X	
CM	Hayes, Roger	ALSTOM Grid	X	X
CM	Heinzig, Peter	Weidmann Electrical Technology	X	X
CM	Hochanh, Thang	ALSTOM Grid	X	X
CM	Hoffman, Gary	Advanced Power Technologies	X	
CM	Holdway, Timothy	Intermountain Electronics	X	X
CM	Holifield, Thomas	Howard Industries	X	X
CM-LM	Hopkinson, Philip	HVOLT Inc.	X	
CM	Johnson, Charles	ABB Inc.	X	
CM	Jordan, Stephen	TVA	X	X
CM	Kennedy, Gael	GR Kennedy & Associates LLC	X	X
CM	Kennedy, Sheldon	Niagara Transformer	X	X
CM	Khalin, Vladimir	KV Consulting	X	
CM	King, Gary	Howard Industries	X	
CM	Klaponski, Brian	Carte International Inc.	X	
CM	Kraemer, Axel	Maschinenfabrik Reinhausen	X	X
CM	Kraetge, Alexander	HIGHVOLT	X	X
CM	Lackey, John	PowerNex Associates Inc.	X	X
CM	Lau, Michael	Weidmann Diagnostic Solutions	X	
CM	Levin, Aleksandr	Weidmann Electrical Technology	X	X
CM	Lopez-Fernandez, Xose	Universidade de Vigo	X	
CM	Marek, Richard	DuPont	X	X
CM	Matthews, Lee	Howard Industries	X	
CM	McClure, Phillip	Weschler Instruments	X	
CM	McNelly, Susan	Xcel Energy	X	X
CM	McShane, Charles Patrick	Cargill, Inc.	X	
CM	McTaggart, Ross	Trench Limited	X	X
CM	Mehrotra, Vinay	SPX Transformer Solutions, Inc.	X	X
PCM-LM	Mehta, Shirish	Mehta Consultants		
CM	Melanson, Joseph	J. Melanson, Inc.	X	
CM	Melle, Thomas	HIGHVOLT		X
CM-LM	Miller, Kent	T&R Electric Supply Co.	X	X
CM	Miller, Michael	We Energies	X	X
CM	Millward, Paul	ITEC	X	X
CM	Molden, Arthur	AMEESCO	X	
CM	Moleski, Hali	S.D. Myers Inc.	X	
CM	Mukerji, Amitav	ABB Inc.	X	X

Committee Member Attendance (Red designates CM added at present meeting)				
CM	Mulkey, Daniel	Pacific Gas & Electric	X	X
CM	Murphy, Jerry	Reedy Creek Energy Services	X	X
CM	Nicholas, Ray	Schaffner MTC Transformers	X	
CM	Nicholas, Ron	ABB Inc.	X	
CM	Papp, Klaus	Trench Austria GmbH	X	X
CM	Patel, Poorvi	ABB Inc.	X	
CM	Penny, Brian	American Transmission Co.	X	
CM	Perkins, Mark	ABB Inc.	X	
CM	Pezzin, Justin	IFD Corporation	X	
CM	Platts, Donald	Omicron	X	X
CM	Pointner, Klaus	Trench Austria GmbH	X	X
CM	Poulin, Bertrand	ABB Inc.	X	X
CM	Prevost, Thomas	OMICRON electronics Corp USA	X	X
CM	Puri, Jeewan	Transformer Solutions, Inc.	X	
CM	Radbrandt, Ulf	ABB	X	X
CM	Rasor, Robert	S.D. Myers Inc.	X	
CM	Rave, Martin	ComEd	X	X
CM	Recksiedler, Leslie	Manitoba Hydro	X	
CM	Riffon, Pierre	Hydro-Quebec	X	X
CM	Roussell, Marnie	Entergy	X	X
CM	Sarkar, Subhas	Virginia Transformer Corp.	X	
CM	Schweiger, Ewald	Siemens AG	X	
CM	Sewell, Adam	Quality Switch, Inc.		X
CM	Sewell, Jeremy	Quality Switch, Inc.	X	X
CM-LM	Sharma, Devki	Entergy	X	
CM	Sharp, Michael	Trench Limited	X	X
CM	Shekelton, James	H-J Enterprises, Inc.	X	
CM	Shertukde, Hemchandra	University of Hartford	X	X
CM	Shull, Stephen	The Empire District Electric Co.	X	X
CM	Simmons, Charles	Duke Energy	X	X
CM	Sizemore, Thomas	ABB Inc.	X	X
CM	Skinger, Kenneth	CBI	X	
CM	Smith, Edward	H-J Enterprises, Inc.	X	X
CM	Snyder, Steven	ABB Inc.	X	X
CM	Som, Sanjib	Siemens Industry, Inc.	X	X
CM	Spitzer, Thomas	City Transformer Service Co.	X	
CM-LM	Stahara, Ronald	Stahara Consulting	X	X
CM	Stiegemeier, Craig	ABB Inc.	X	X
CM	Sweetser, Charles	OMICRON electronics Corp USA	X	X
CM	Swinderman, Craig	Mitsubishi Electric Power Products	X	
CM	Tanaka, Troy	Burns & McDonnell	X	
CM	Tarlapally, Susmitha	ABB Inc.	X	
CM	teNyenhuis, Ed	ABB Inc.	X	X
CM	Termini, Giuseppe	PECO Energy	X	X
CM	Thompson, Jim	T&R Service Company	X	
CM	Thompson, Robert	RST Consulting, P.C.	X	X
CM	Traut, Alan	Power Partners	X	X
CM	Trummer, Edgar	Transatlantic Transformer Consulting		
CM	Tuli, Subhash	Electrical T&D Apparatus Consultant Inc.		
CM	Verdolin, Rogerio	Verdolin Solutions Inc.	X	X
CM	Verner, Jane Ann	Pepco Holdings Inc.	X	X

Committee Member Attendance (Red designates CM added at present meeting)				
CM	Vir, Dharam	SPX Transformer Solutions, Inc.	X	X
CM	Wallace, David	ABB Inc.	X	X
CM	Wallach, David	Duke Energy	X	X
CM	Watson, Joe	ZTZ Services	X	X
CM	Wicks, Roger	DuPont	X	X
CM-LM	Wilks, Alan	Consultant	X	X
CM	Wimmer, William	Dominion	X	X
CM	Woodcock, David	WICOR Americas	X	
CM	Yang, Baitun	Pennsylvania Transformer	X	
CM	Yu, Jennifer	Pacific Gas & Electric	X	X
CM	Yule, Kipp	Bechtel Power Corp	X	X
CM	Zhao, Peter	Hydro One	X	X
CM	Ziomek, Waldemar	CG Power Systems Canada Inc	X	X
		Totals:	**146**	**91**
		% of Members Present:	**71%**	**44%**

In addition to the above totals,

Quorum achieved at Monday Opening Session
Quorum not achieved at Thursday Closing Session

2.2 GENERAL ATTENDANCE

Legend:

II	Interested Individual
II-LM	Interested Individual-IEEE Life Member
AP	Active Participant
AP-LM	Active Participant-IEEE Life Member
PCM-LM	Past Committee Member-IEEE Life Member

General Attendance				
Member Type	**Name**	**Company**	**Mon**	**Thu**
II	Ahmed, Omar	Transformer Protector Corp	X	X
AP	Allen, Jerry	Metglas Inc.		
II	Almkvist, Marten	ABB Components	X	X
II	Alonso, Mario	Efacec Power Transformers		
AP	Ansari, Tauhid Haque	ABB Inc.	X	
II	Anthony, Stephen	Pepco Holdings Inc.	X	
AP	Antweiler, James	Schneider Electric/Square D	X	
II	Armstrong, Chris	Petro-Canada Lubricants Inc.		
AP	Armstrong, James	Siemens Energy	X	
AP	Atef, Kahveh	San Diego Gas & Electric		X
II	Averitt, Ralph	Reinhausen Mfg.		
AP	Baranowski, Derek	Baron USA, Inc.		
AP	Barnes, Abbey	Baron USA, Inc.		
AP	Bartek, Allan	C-K Composites		
II	Batey, Sheila	Alstom Grid UK Ltd	X	X
AP	Behrens, Tammy	SPX Transformer Solutions, Inc.	X	
AP	Benach, Jeffrey	Weidmann Diagnostic Solutions	X	
II	Bercea, Emil	ABB AG	X	
II	Bergmann, Stefan	HIGHVOLT	X	
AP	Berler, Zalya	ZTZ Services International, Inc		
AP	Bernesjo, Mats	ABB Inc.	X	

General Attendance				
Member Type	**Name**	**Company**	**Mon**	**Thu**
AP-LM	Bertolini, Edward	Richards Manufacturing Co.		
II	Bittner, Carlos	Reinhausen Mfg.	X	
II	Blake, Dennis	Pennsylvania Transformer		
II	Blaszczyk, Piotr	The Specialty Switch Co LLC	X	
II	Boege, Alan	Orto de Mexico	X	
AP	Bolliger, Alain	HV Technologies	X	
II	Borden, Michael	Mitsubishi Electric Power Products	X	
II	Borowitz, James	Northeast Utilities	X	
II	Bozich, Bradford	Smiths Power		
AP	Brafa, John	ABB Inc.	X	X
II	Bray, Elizabeth	Southern Company Services	X	
AP	Bressan, Natalia	Siemens Energy		
AP	Britton, Jeffrey	Phenix Technologies, Inc.	X	
AP	Brodeur, Samuel	ABB Inc.	X	
II	Brown, Chris	Tempel	X	
II	Brown, Darren	Howard Industries	X	
II	Buchgeher, Erich	Siemens AG	X	
AP	Burde, Jagdish	PDI	X	
II	Burns, Curtis	Burns Power Consulting, LLC	X	X
AP	Cai, Jim	JSHP Transformer	X	
II	Caldeira, Julio	M&I Materials Ltd	X	
II	Cantrell, Richard	Doble Engineering Co.		
II	Carpenter, Erin	Delta Star Inc.		
AP	Caskey, John	NEMA		
II	Chakraborty, Arup	ALSTOM Grid	X	X
II	Cham, Ebrima	Efacec Power Transformers		
AP	Cheatham, Jonathan	General Electric	X	
AP	Cheim, Luiz	ABB Inc.	X	
II	Chen, Qi	JSHP Transformer	X	
AP	Chhajer, Dinesh	Megger	X	
II	Chiang, Solomon	The Gund Company	X	
II	Chiodo, Vincent	HICO America		
AP	Chisholm, John	IFD Corporation		
II	Chon, Jihoon	Korea Testing Laboratory	X	
II	Chow, Chih	Pepco Holdings Inc.	X	X
II	Christodoulou, Larry	Electric Power Systems		X
II	Chrysler, Rhett	ERMCO	X	X
II	Chuk, Shuk Yin	Pepco Holdings Inc.		
II	Clonts, Jermaine	Power Partners	X	
II	Collin, Jean-Francois	Nomos Systems		
II	Coreno, Sergio	Siemens	X	
AP	Costa, Florian	Corimpex USA, Inc.		
II	Cox, Paul	GE Digital Energy	X	
AP	Craven, Michael	Phoenix Engineering Services	X	X
AP	Cunningham, Kelcie	Delta Star Inc.	X	
AP	Daniels, Timothy	Weidmann Electrical Technology		
II	Dauzat, Thomas	General Electric		
II	Dave, Nikita	Efacec Power Transformers		
AP	Davydov, Valery	Mr. Valery Davydov	X	X

General Attendance				
Member Type	**Name**	**Company**	**Mon**	**Thu**
II	del Valle, Yamille	NEETRAC	X	X
II	Dennis, Scott	ABB Inc.	X	
II	Denzer, Stephanie	General Electric	X	
II	Dhawan, Anil	ComEd	X	X
AP	Diaby, Mohamed	Efacec Power Transformers		
AP	Digby, Scott	Duke Energy	X	X
II	Dilling, Wayne	Mortenson Construction	X	
AP	Dorpmanns, Luc	SMIT Transformatoren B.V.	X	
AP	Dorris, Don	Nashville Electric Service	X	X
AP	Drees, Terry	Cindus Corp.	X	
II	Drobnick, Jason	Jordan Transformer	X	
II	Dunn, James	Unifin International		
AP-LM	Duval, Michel	Hydro-Quebec IREQ		
II	Ebbert, Alexander	HICO America		
II	Elliott, Will	General Electric	X	
II	Evans, Aaron	HICO America		
AP	Fausch, Reto	Haefely-Hipotronics	X	
II	Fedor, Ken	SMIT USA	X	
AP	Field, Norman	Weidmann Diagnostic Solutions	X	X
II	Flores, Hugo	Efacec Power Transformers		
II	Foata, Marc	Reinhausen Canada		X
AP	Forrest, George	Delta-X Research USA, Inc.	X	
II	Friend, Fredric	American Electric Power	X	X
AP	Frimpong, George	ABB Inc.	X	
II	Frotscher, Rainer	Maschinenfabrik Reinhausen		
II	Gagnon, Jean-Francois	Siemens Transformers Canada		
AP	Galbraith, Shawn	Nuclear Service Organization	X	
II	Gara, Lorne	Orbis Engineering	X	
II	Garcia, Benjamin	Southern California Edison	X	
II	Geibel, David	ABB Inc.		X
II	Golarz, Jeffrey	LumaSense Technologies	X	
II	Golner, Thomas	SPX Transformer Solutions, Inc.	X	X
II	Golon, David	Dynamic Ratings, Inc.	X	
AP	Gomez, Rolando	Arteche		
AP	Gonzalez de la Vega, Jorge	Orto de Mexico	X	
AP	Gross, Detlev	Power Diagnostix	X	X
AP	Guerra, Jorge	Efacec Power Transformers		
AP	Guilbault, Frank	Cogent Power Inc.		
II	Guner, Ismail	Hydro-Quebec	X	X
AP	Hakim, Shamaun	CG Power Systems USA, Inc.	X	
II	Hamilton, Kendrick	Power Partners	X	
AP	Hammer, Mark	ALSTOM Grid		
AP	Hanson, David	TJH2b Analytical Services	X	X
AP	Harden, Kenneth	Schneider Electric	X	
II	Harder, Steven	Siemens Energy		
II	Harrison, Ken	N. American Substation Services		
II	Hartmann, Thomas	Delta Star Inc.	X	X
II	Hernandez, Ronald	Doble Engineering Co.	X	
AP	Herron, John	HIGHVOLT - Reinhausen	X	X

General Attendance				
Member Type	**Name**	**Company**	**Mon**	**Thu**
AP	Herz, Josh	Qualitrol	X	X
II	Hicks, Roger	Pepco Holdings Inc.		
II	Holleran, Joseph	Ameren	X	X
AP	Holmes, Jill	Bureau of Reclamation		
AP	Holsomback, Steve	Southern Company Services	X	
II	Humenick, Noelle	IEEE	X	
II	Hurlet, Patrice	EDF	X	X
AP	Inkpen, Jesse	Qualitrol Corp. - Serveron	X	
AP	Izquierdo, Jose	Siemens Servicios S.A de C.V	X	X
AP	Jacob, Nathan	Manitoba Hydro	X	
AP	Jakob, Fredi	Consultant		
AP	Jarman, Paul	National Grid	X	X
AP	Jaroszewski, Marion	Delta Star Inc.	X	X
AP-LM	Jauch, Erwin	Beckwith Electric Co.	X	
II	Jensen, Brad	Burns & McDonnell	X	X
AP	John, John	Virginia Transformer Corp.	X	X
AP	Johnson, Derek	Reinhausen Mfg.	X	
II	Johnson, Jean	NEMA		
II	Johnson, Sidney	Rimkus Consulting Group, Inc.	X	
AP	Johnson, Wayne	EPRI	X	X
II	Johnstone, Ted	Cogent Power Inc.	X	
II	Joshi, Arvin	GE	X	
II	Juchem, Kevin	ABB AG		X
II	Kaineder, Kurt	Siemens AG	X	
II	Kaiserseder, Gerald	Starkstrom-Geraetebau GmbH	X	X
II	Kang, Jinho	Hyundai Heavy Industries	X	
II	Kang, Sam	DuPont		
II	Kharel, Rudra	Burns & McDonnell	X	
AP	Kinner, Robert	FirstPower Group LLC	X	
II	Kiparizoski, Zan	Howard Industries	X	
II	Kirchenmayer, Egon	Siemens AG		
AP	Kirchner, Lawrence	Siemens Energy	X	
II	Kopf, Jon	Power Asset Recovery Corp.		
AP	Kornowski, Marek	Polycast International	X	X
AP	Kranich, Neil	Jordan Transformer	X	
II	Kremer, Daniel	Phenix Technologies, Inc.	X	
II	Kulasek, Krzysztof	ABB Inc.	X	
AP	Kurth, Bernhard	Reinhausen Mfg.	X	
AP	Kyle, Randall	Southern Company	X	
AP	Lachman, Mark	Doble Engineering Co.	X	X
II	Lamb, Michael	Dominion	X	X
II	Larochelle, David	NDB Technologies	X	X
II	Lawless, Andrew	Siemens Energy		
II	Layman, Tim	HV Technologies Inc.		X
II	Leal, Gustavo	Dominion	X	X
II	Lee, So-young	Hyundai Heavy Industries	X	X
II	Leishman, Gary	American Electric Power	X	X
II	Lemos, Gilbert	Southern California Edison	X	
AP	Livingston, Kerry	Great River Energy	X	

General Attendance				
Member Type	**Name**	**Company**	**Mon**	**Thu**
II	Lobo, Gregorio	Mitsubishi Electric Power Products, Inc.	X	
AP	Locarno, Mario	Doble Engineering Co.	X	
II	Lugge, Andrew	Mitsubishi Electric Power Products	X	
AP	Luksich, John	Cargill, Inc.	X	
II	Luo, Shawn	Seattle City Light	X	
II	Macalinden, Dan	BROCKHAUS MESSTECHNIK		
II	Macias, Alejandro	CenterPoint Energy	X	
II	Mango, Joseph	NextEra Energy Resources		
II	Mani, Kumar	Duke Energy		
II	Mao, Libin	Consolidated Edison Co. of NY		
II	Marchini, Gregory	IEEE	X	
II	Marquardt, Bryan	AK Steel		
AP	Martin, Terence	Doble Engineering Co.	X	
II	Martin, Zach	Delta Star Inc.	X	
II	Martinez, Apollonia	Public Service Co. of New Mexico	X	
AP	Mayer, Robert	San Diego Gas & Electric	X	
AP	McBride, James	JMX Services, Inc.	X	X
II	McCloskey, Scott	Amran Inc.		
II	McCullough, Douglas	Maxima / Hyundai	X	
II	McHugh, Kathleen	SABIC Innovative Plastics	X	
AP	McIver, James	Siemens Energy		
II	McNeish, Kenneth	TXTS	X	X
II	Mehmel, Ronald	CG Power Systems Canada Inc	X	
II	Meisner, David	American Electric Power	X	X
AP	Miller, Michael	Siemens Industry, Inc.	X	
II	Minhaz, Ronnie	Transformer Consulting Services Inc.	X	X
II	Mitra, Sunit	Pepco Holdings Inc.		
II	Montanha, Juliano	Siemens Ltda	X	X
II	Morales-Cruz, Emilio	Qualitrol	X	
AP	Morgan, Charles	Northeast Utilities	X	X
II	Mulla, Robert	Pepco Holdings Inc		
AP	Mullikin, Randolph	ABB Inc.		
AP	Murray, David	Tennessee Valley Authority	X	X
AP	Mushill, Paul	Ameren	X	
AP	Naderian, Ali	Kinectrics	X	
II	Nambi, Shankar	Bechtel Power Corp	X	
AP	Narawane, Aniruddha	ABB Inc.	X	
II	Natale, Anthony	HICO America	X	
AP	Navarro, Martin	Siemens Ltda	X	X
II	Nazarko, Jeffrey	Tempel	X	
II	Neild, Kristopher	Megger	X	
II	Nelson, Thomas	NIST		
II	Newman, Steven	Delta Star Inc.		
AP	Nims, Joe	Allen & Hoshall	X	
AP	Nordman, Hasse	ABB Oy, Transformers	X	X
II	Nunes, Jr, Jayme	Nynas AB		
II	Nunez, Arturo	Mistras Group, Inc.		
AP	Oakes, Stephen	CG Power Systems USA, Inc.	X	
AP	Ogajanov, Rudolf	ABB Inc.		

General Attendance				
Member Type	**Name**	**Company**	**Mon**	**Thu**
AP	Olafsson, Gylfi	SPX Transformer Solutions, Inc.	X	
II	Oliver, William	Hitachi HVB, Inc.	X	
II	Ortiz, Jow	NextEra Energy		
II	Osborn, Gary	TCI Sales		
AP	Ostrander, David	Ameren	X	X
AP	Panetta, Sergio	I Gard Corporation		
AP	Parkinson, Dwight	Cooper Power Systems by Eaton	X	X
AP	Patel, Dhiru	Hammond Power Solutions Inc.	X	
AP	Patel, Sanjay	Smit Transformer Sales, Inc.		
II	Patoine, Barbara	Weidmann Electrical Technology	X	X
AP	Payerle, George	Carte International Inc.	X	
II	Pellon, Verena	Florida Power & Light Company	X	
AP	Perjanik, Nicholas	Weidmann Diagnostic Solutions	X	
AP	Perlichek, Robert	Public Service Co. of New Mexico	X	
AP	Peterson, Alan	Utility Service Corporation		
II	Pinon, Oscar	WEG-Voltran	X	
II	Pitts, Chris	Howard Industries	X	
II	Plante, Nicolas	IREQ	X	X
II	Progar, John	Jordan Transformer	X	
II	Pruente, John	SPX Transformer Solutions, Inc.	X	
II	Ramnial, Madhvi	Powertech Labs Inc.		X
II	Rapp, Kevin	Cargill, Inc.		
II	Rasco, Jimmy	Ergon, Inc		
II	Rashid, Adnan	Measurement Canada/Industry Canada	X	X
AP	Ray, Jeffrey	JLR Consulting, Inc.	X	X
AP	Razuvayev, Sergiy	Delta Star Inc.	X	
II	Reagan, Ashley	ELTEK International Labs	X	
II	Reed, Scott	MVA Diagnostics, Inc.		
AP	Reeves, Jerry	Efacec Power Transformers	X	
II	Rezai, Hossein	The Transformer Consultant	X	
II	Rijnsoever, Frank	SMIT Transformatoren B.V.		
II	Rincon, Diego	Electroporcelana Gamma	X	X
AP	Rinks, Timothy	Reinhausen Mfg.	X	
II	Riopel, Sebastien	Electro Composites (2008) ULC		
II	Rivers, Mark	Doble Engineering Co.	X	
II	Roach, John	Hartford Steam Boiler	X	
AP	Roberts, Mark	N. American Substation Services		
II	Rock, Patrick	ATC	X	
II	Rodriguez, Leopoldo	Efacec Power Transformers		
II	Roizman, Oleg	IntellPower Pty Ltd	X	X
II	Roman, Zoltan	ALSTOM Grid		X
II	Ronchi, Rodrigo	WEG-Voltran	X	
II	Rottenbacher, Andre	Ritz Instrument Transformers	X	X
II	Russwurm, Dirk	DTM Instruments, LLC		
II	Saldivar, Juan	Prolec GE	X	
II	Sanders, Brian	ICMI, Inc.	X	X
AP	Sarkar, Amitabh	CG Power Systems USA, Inc.	X	
AP	Sauls, Roderick	Southern Company Services	X	
AP	Sauzay, Mathieu	JST Transformateurs		X

General Attendance				
Member Type	**Name**	**Company**	**Mon**	**Thu**
II	Scardazzi, Alaor	Siemens Ltda	X	X
II	Schiessl, Markus	Starkstrom-Geraetebau GmbH	X	X
AP	Schleismann, Eric	Southern Company	X	X
II	Schmitt, Philipp	Weidmann Electrical Technology	X	X
AP	Schrammel, Alfons	Siemens AG	X	X
II	Schubert, Juergen	Starkstrom Geraetebau GmbH	X	
II	Sewell, Russell	Quality Switch, Inc.	X	X
II	Sexton, Aron	Kinectrics		
II	Shannon, Michael	Rea Magnet Wire	X	
II	Sharpless, Samuel	Rimkus Consulting Group	X	X
II	Shea, Kelly	San Joaquin Refining Company		
II	Sheehan, David	HICO America	X	
II	Shem-Tov, Mark	Von Roll Transformers	X	X
II	Sheridan, Peter	SGB-USA	X	
II	Shertok, Yitzhak	Duke Energy	X	
II	Shi, Lin	TBEA USA		
II	Shirasaka, Yukiyasu	Hitachi Ltd.	X	X
II	Shor, Andre	Von Roll Transformers	X	X
AP	Siebert, Stefan	BROCKHAUS MESSTECHNIK		
II	Simon, Preston	Electrical Technologies	X	
II	Simonelli, Richard	SPX Transformer Solutions, Inc.		
II	Slattery, Christopher	FirstEnergy Corp.	X	X
II	Smith, Shane	Delta Star Inc.	X	X
II	Snyder, Brian	Doble Engineering Co.		
II	So, Eddy	National Research Council of Canada		
II	Sohn, Yong Tae	Hyosung	X	X
II	Song, Kwang Jae	Korea Testing Laboratory	X	
II	Sordo, Salvador	WEG Electric Corp.	X	
AP	Spiewak, Erin	IEEE	X	X
AP	Stank, Markus	Maschinenfabrik Reinhausen		
AP	Stankes, David	3M IPT	X	
AP	Steineman, Andrew	Delta Star Inc.	X	X
II	Steineman, Christopher	Meramec Electrical Products, Inc.	X	
AP	Stem, Gregory	Cardinal Pumps & Exchangers		
AP	Stranko, Jennifer	HPN Global		
II	Stretch, Kerwin	SGB USA, Inc.	X	X
AP	Sullivan, Christopher	Westmark Parnters		
II	Sullivan, Kevin	Duke Energy	X	X
II	Sullivan, Liz	ABB Inc.	X	
AP	Sundin, David	DSI Ventures, Inc.		
II	Susa, Dejan	Statnett SF	X	
II	Tafoya, Mauricio	Siemens Energy		
II	Taousakis, Anastasios	Pepco Holdings Inc.		
AP	Tellez, Richard	Siemens S.A.		X
AP-LM	Tendulkar, Vijay	ONYX Power, Inc.	X	X
II	Thompson, Ryan	Burns & McDonnell	X	
II	Tikvesa, Taib	KAEC		
II	Toro, Diana	Gamma Insulators Corp	X	X
II	Tostrud, Mark	Dynamic Ratings, Inc.	X	

General Attendance				
Member Type	**Name**	**Company**	**Mon**	**Thu**
II	Tozzi, Marco	Camlin Power	X	
II	Trautmann, Frank	Siemens AG	X	X
AP	Trivitt, Donnie	Oklahoma Gas & Electric	X	
II	Valentin, Reinaldo	Duke Energy	X	
II	Van Horn, Jeremy	IFD Corporation	X	
AP	Varghese, Ajith	SPX Transformer Solutions, Inc.	X	X
II	Varnell, Jason	SPX Transformer Solutions, Inc.	X	
AP	Vedante, Kiran	ABB Inc.	X	X
AP	Veens, Jos	SMIT Transformatoren B.V.	X	X
II	Verdell, Joshua	ERMCO	X	X
II	Vijayan, Krishnamurthy	CG Power Systems Canada Inc	X	X
AP	vonGemmingen, Richard	Dominion	X	X
AP	Walia, Sukhdev	Brookfield Renewable Power	X	
II	Wang, Evanne	DuPont	X	
II	Wang, Jian	TBEA USA		
AP	Weatherbee, Eric	PCORE Electric		
AP	Weathington, Larry	N. American Substation Services		
II	Weisensee, Matthew	PacifiCorp	X	X
AP	Werelius, Peter	Megger		X
II	White, Leon	Serveron		
AP	Williams, Michael	ABB Inc.	X	
AP	Williams, Randy	ABB Inc.		
II	Wood, David	Central Moloney, Inc.	X	
II	Woods, Deanna	Alliant Energy		
II	Wright, Jeffrey	Mitsubishi Electric Power Products	X	X
AP	Yalla, Murty	Beckwith Electric Co.		
II	Younes, Hassan	Kinectrics	X	
AP	Young, Samuel	Reinhausen Mfg.	X	
AP	Zhang, Jim	Arizona Public Service Co.		
AP	Zhang, Shibao	PCORE Electric		
AP	Zhu, Hanxin	BC Hydro		
II	Zito, Anthony	Siemens Energy		
II	Zouaghi, Abderrahmane	ABB Inc.		
		Total General Attendance:	**236**	**97**

	Mon	**Thu**
Total Committee Member Attendance:	**146**	**91**
Total Attendance:	**382**	**188**

In addition to the above totals, there were 174 of the total attendees that attended **both** the Monday and Thursday Sessions and 386 that attended **either** the Monday or the Thursday Session.

3.0 MEETING SCHEDULE

The meeting schedule is provided at the end of this report.

IEEE/PES TRANSFORMERS COMMITTEE

www.transformerscommittee.org
Fall 2014 Meeting; October 19-23
Hosted by Potomac Electric Power Co. (Pepco)
Sheraton Tysons Hotel; Washington DC Metro Area, USA

NOTES: See Page 4 for a key to abbreviations.

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Friday, October 17					
1:00 pm - 5:00 pm >	WG Wind Turbine Transf. P60076-16	PCS	D. Buckmaster	26 US	Great Falls
1:00 pm - 5:00 pm >	IEEE/IEC Joint Review WG Step-Voltage Regulators C57.15 / 60076-21	Dist	C. Colopy	22 US	Potomac
Saturday, October 18					
> 8:00 am - 5:00 pm >	WG Wind Turbine Transf. P60076-16	PCS	D. Buckmaster	26 US	Great Falls
> 8:00 am - 5:00 pm >	IEEE/IEC Joint Review WG Step-Voltage Regulators C57.15 / 60076-21	Dist	C. Colopy	22 US	Potomac
7:00 pm until ??	Early Bird Event: Dinner, music & fun at Iris Lounge. Advance registration necessary. See flyer for details. -- Meet there any time after 7:00 pm. Your name will be on a "will call list" there. Dinner served at 8:00 pm. -- The Iris Lounge is a 3-minute taxi or hotel shuttle ride from the hotel (or 20-minute walk).				
Sunday, October 19					
1:00 pm - 5:30 pm	Meeting Registration				Fairfax Foyer (Lobby Level)
2:00 pm - 5:30 pm	Administrative SC -- Closed meeting, by invitation only	Admin.	D. Platts	26 US	Great Falls
3:00 pm - 5:30 pm	NEMA Transformers -- Closed meeting, by invitation only	++	C. Drexler	22 US	Potomac
6:00 pm - 8:00 pm	Welcome Reception			450 Reception	Tysons Ballroom (Upper Lobby Level)
Monday, October 20 -- Monday Breaks Sponsored by BROCKHAUS MESSTECHNIK **					
7:00 am - 4:00 pm	Meeting Registration				Fairfax Foyer
7:00 am - 7:50 am	Newcomers Orientation -- Breakfast Meeting; arrive early! -- Newcomers & Guests are encouraged to attend!		S. Antosz	60 CL	Ash Grove BC
7:00 am - 7:50 am	Distribution SC Leaders Coordination -- Closed breakfast meeting, by invitation only		S. Shull	16 BD	Premiere Ballroom (Upper Lobby Level)
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			270 RT (9/tbl)	Tysons Ballroom
8:00 am - 9:30 am	Breakfast - Spouses/Companions (no meeting attendees please)			96 RT (8/tbl)	McLean / Vienna
8:45 am - 4:30 pm note early departure!	Spouses/Companions Tour: Mount Vernon, Old Town Alexandria, Arlington National Cemetery, and lunch at Mount Vernon Inn. Advance registration required. Limited attendance. -- Bus departs Sheraton Hotel at 8:45 am, and returns approx 4:30 pm.				
8:00 am - 9:10 am >	Opening Session -- All attendees are encouraged to attend -- See separate document for meeting agenda -- Attendance recorded as eligibility for Committee membership		D. Platts	300 CL S1 250 TH	Fairfax Ballroom (combined rooms)
9:10 am - 9:30 am	*Break (beverages only)*			Fairfax / Ash Grove 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, October 20 (continued)					
9:30 am - 10:45 am	WG 3-ph UG Dist. Transf. C57.12.24	UTNP	G. Termini	60 MX	Ash Grove A
9:30 am - 10:45 am	TF Winding Temp. Indicators	IL	P. McClure	80 MX	Great Falls
9:30 am - 10:45 am	WG External Dielectric Clearances	DiTests	E. Davis	100 CL	Presidential Theat.
9:30 am - 10:45 am	TF Consolidation of Oil Guides	IF	T. Prevost	120 MX S2 (add 60 TH)	Ash Grove BC
9:30 am - 10:45 am	WG Tertiary/Stabiliz. Windings PC57.158	PCS	E. Betancourt	275 MX S3	Fairfax Ballroom A
9:30 am - 10:45 am	WG Failure Analysis & Report. C57.125	Power	W. Binder	275 MX S3	Fairfax Ballroom B
10:45 am - 11:00 am	*Break (beverages only)*			Fairfax / Ash Grove Foyer	
11:00 am - 12:15 pm	WG Ventilated Dry Type C57.12.51 **New!**	Dry	S. Som	60 MX	Ash Grove A
11:00 am - 12:15 pm	WG Moisture in Insulation PC57.162	IL	T. Prevost	80 MX	Great Falls
11:00 am - 12:15 pm	WG Overhead Distr. Transf. C57.12.20	Dist	A. Traut	100 CL	Presidential Theat.
11:00 am - 12:15 pm	WG PD Acoustic Detection C57.127	DiTests	D. Gross	120 MX S2	Ash Grove BC
11:00 am - 12:15 pm	WG PCS Rev. to Test Code C57.12.90	PCS	M. Perkins	275 MX S3	Fairfax Ballroom A
11:00 am - 12:15 pm	WG Installation of Power Transf. C57.93	Power	M. Lau	275 MX S3	Fairfax Ballroom B
12:15 pm - 1:30 pm	Lunch Meeting: Standards Development Review -- 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. -- Registration necessary. No paper tickets. Admission verified at the door.		B. Bartley	240 RT (8/tbl)	Tysons Ballroom
1:45 pm - 3:00 pm	WG Secondary Network Protectors C57.12.44	UTNP	B. Wimmer	60 MX	Ash Grove A
1:45 pm - 3:00 pm	WG Dry-Type Gen. Require. C57.12.01	Dry	T. Holdway	80 MX	Great Falls
1:45 pm - 3:00 pm	WG 1-ph Padmount Dist. Transformers C57.12.38	Dist	A. Ghafourian	100 CL	Presidential Theat.
1:45 pm - 3:00 pm	WG Less-Flammable Hydrocarbon Insulating Liquid Guide C57.121	IF	D. Sundin	120 MX S2	Ash Grove BC
1:45 pm - 3:00 pm	TF Audible Sound Revision to Test Code	PCS	R. Girgis	275 MX S3	Fairfax Ballroom A
1:45 pm - 3:00 pm	WG Tank Rupture & Mitigation PC57.156	Power	P. Zhao	275 MX S3	Fairfax Ballroom B
3:00 pm - 3:15 pm	*Break (beverages and treats)*			Fairfax / Ash Grove Foyer	
3:15 pm - 4:30 pm	**SC HVDC Converter Transformers and Smoothing Reactors**	HVDC	M. Sharp	60 MX	Ash Grove A
3:15 pm - 4:30 pm	WG Milli-amp Current Transf. C57.13.7	IT	H. Alton	80 MX	Great Falls
3:15 pm - 4:30 pm	WG 3-ph Padmount Distribution Transformers C57.12.34	Dist	R. Stahara	100 CL	Presidential Theat.
3:15 pm - 4:30 pm	WG Natural Ester-Based Fluids C57.147	IF	P. McShane	120 MX S2	Ash Grove BC
3:15 pm - 4:30 pm	WG Dielectric Freq. Response PC57.161	DiTest	A. Naderian	275 MX S3	Fairfax Ballroom A
3:15 pm - 4:30 pm	WG Transformer Capability with Non-sinusoidal Loads PC57.110 **New!**	PCS	R. Marek	275 MX S3	Fairfax Ballroom B
4:30 pm - 4:45 pm	*Break (beverages only)*			Fairfax / Ash Grove Foyer	
4:45 pm - 6:00 pm	WG Dry-Type O&M Guide C57.94	Dry	D. Stankes	60 MX	Ash Grove A
4:45 pm - 6:00 pm	WG PD in Bushings & PT/CTs PC57.160	DiTests	T. Hochanh	80 MX	Great Falls
4:45 pm - 6:00 pm	WG Step-Voltage Regulators C57.15 / 60076-21	Dist	C. Colopy	100 CL	Presidential Theat.
4:45 pm - 6:00 pm	WG Oil Accept & Maint. Guide C57.106	IF	B. Rasor	120 MX S2	Ash Grove BC
4:45 pm - 6:00 pm	WG PCS Revisions to C57.12.00	PCS	T. Ansari	275 MX S3	Fairfax Ballroom A
4:45 pm - 6:00 pm	TBD			275 MX S3	Fairfax Ballroom B
7:00 pm - 10:00 pm	Social Event: "Monuments By Moonlight", with champagne and desserts. See flyer for details. -- Space is limited, so register soon! Indicate desire to attend when you register on-line for the meeting. -- Bus begins loading at the hotel at 6:45 pm, and departs at 7:00 pm. Returns to hotel at ~10:00 pm.				

DATE/TIME	ACTIVITY	SUB-COM	ACTIVITY CHAIR	ROOM CAP/ARR/AV	MEETING ROOM
Tuesday, October 21 -- Tuesday Breaks Sponsored by Doble Engineering Co. **					
7:00 am - 12:00 pm	Meeting Registration				Fairfax Foyer
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			270 RT (9/tbl)	Tysons Ballroom
8:00 am - 9:30 am	Breakfast - Spouses/Companions (no meeting attendees please)			96 RT (8/tbl)	McLean / Vienna
7:00 am - 7:50 am	EL&P Delegation (end-users only please) -- Breakfast Meeting; arrive early		J. Murphy	40 CL	Potomac
9:15 am - 4:00 pm	Spouses/Companions Tour: Smithsonian American History Museum and Georgetown Food Tour. Advance registration required. Limited attendance. -- Bus departs Sheraton Hotel at 9:15 am, and returns approx 4:00 pm.				
8:00 am - 9:15 am	WG Req. for Instrument Transf. C57.13	IT	R. McTaggart	60 MX	Ash Grove A
8:00 am - 9:15 am	WG Oil Reclamation Guide PC57.637	IF	J. Thompson	80 MX	Great Falls
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 CL	Presidential Theat.
8:00 am - 9:15 am	TBD			120 MX S2	Ash Grove BC
8:00 am - 9:15 am	WG Geomagnetic Disturbances PC57.163	Stds	J. Verner	275 MX S3	Fairfax Ballroom A
8:00 am - 9:15 am	WG Functional Life Tests, De-energized Tap Changers (DETC) PC57.157	Power	P. Hopkinson	275 MX S3	Fairfax Ballroom B
9:15 am - 9:30 am	*Break (beverages only)*			Fairfax / Ash Grove Foyer	
	~~WG DGA Natural Ester Fluids PC57.155~~	~~IF~~	Work is complete. Guide submitted to REVCOM.		
9:30 am - 10:45 am	WG 1-Ph Submersible Transf. C57.12.23	UTNP	A. Traut	60 MX	Ash Grove A
9:30 am - 10:45 am	WG Station Service Voltage Transformers	IT	D. Wallace	80 MX	Great Falls
9:30 am - 10:45 am	TF Committee History	Mtgs	P. Balma	100 CL	Presidential Theat.
9:30 am - 10:45 am	WG Std Require for Bushings C57.19.01	Bush	S. Zhang	120 MX S2	Ash Grove BC
9:30 am - 10:45 am	WG Shunt Reactors C57.21	PCS	S. Som	275 MX S3	Fairfax Ballroom A
> 9:30 am - 10:45 am	WG Wind Turbine Transf. P60076-16 -- continued from Friday/Saturday	PCS	D. Buckmaster	275 MX S3	Fairfax Ballroom B
10:45 am - 11:00 am	*Break (beverages only)*			Fairfax / Ash Grove Foyer	
11:00 am - 12:15 pm	WG Liquid-immersed Secondary Network Transformers C57.12.40	UTNP	B. Klaponski	60 MX	Ash Grove A
11:00 am - 12:15 pm	WG Phase Shift Transf. 60076-57-1202	Power	R. Ahuja	80 MX	Great Falls
11:00 am - 12:15 pm	WG Impulse Tests C57.138 (Distribution)	DiTests	TBD	100 CL	Presidential Theat.
11:00 am - 12:15 pm	WG GSU Bushings PC57.19.04	Bush	C. Arpino	120 MX S2	Ash Grove BC
11:00 am - 12:15 pm	WG Guide for DGA in LTCs C57.139	IF	D. Wallach	275 MX S3	Fairfax Ballroom A
11:00 am - 12:15 pm	WG Loss Evaluation Guide C57.120	PCS	M. Miller	275 MX S3	Fairfax Ballroom B
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	240 RT (8/tbl)	Tysons Ballroom
	~~WG Distr. Substation Transf. C57.12.36~~	~~Dist~~	Will not meeting. Document out for ballot.		
1:45 pm - 3:00 pm	TF Fluid Terms Normalization	Stds	P. McShane	60 MX	Ash Grove A
1:45 pm - 3:00 pm	TF Tap-Changer C57.131 / 60214-1	Power	C. Colopy	80 MX	Great Falls
1:45 pm - 3:00 pm	WG 3-ph Transf. Connections C57.105	PCS	A. Bromley	100 CL	Presidential Theat.
1:45 pm - 3:00 pm	WG Revision to Low Frequency Tests	DiTests	B. Poulin	120 MX S2	Ash Grove BC
1:45 pm - 3:00 pm	WG DGA Factory Temperature Rise Tests PC57.130	IF	J. Thompson	275 MX S3	Fairfax Ballroom A
1:45 pm - 3:00 pm	WG DPV Grid Transformers PC57.159	PCS	H. Shertukde	275 MX S3	Fairfax Ballroom B
3:00 pm - 3:15 pm	*Break (beverages and Pretzels!)*			Fairfax / Ash Grove 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
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, October 21 (continued)					
3:15 pm - 4:30 pm	WG Dry-Type Test Code C57.12.91	Dry	D. Foster	60 MX	Ash Grove A
3:15 pm - 4:30 pm >	WG Tap-Changer Applic. Guide 60214-2 -- continued to Thursday pm	Power	C. Colopy	80 MX	Great Falls
3:15 pm - 4:30 pm	WG Test Data Reporting C57.12.37	Dist	T. Callsen	100 CL	Presidential Theat.
3:15 pm - 4:30 pm	WG Application of High-Temp Insulation Materials, IEEE P-1276	IL	M. Franchek	120 MX S2	Ash Grove BC
3:15 pm - 4:30 pm	TF Core Gassing & Grounding	PCS	D. Buckmaster	275 MX S3	Fairfax Ballroom A
3:15 pm - 4:30 pm	TF Switching Transients Induced by Transf/Breaker Interaction C57.142	PCS	J. McBride	275 MX S3	Fairfax Ballroom B
4:30 pm - 4:45 pm	*Break (beverages only)*			Fairfax / Ash Grove Foyer	
4:45 pm - 6:00 pm	WG Neutral Grounding Devices PC57.32	PCS	S. Kennedy	60 MX	Ash Grove A
4:45 pm - 6:00 pm	TF for Cross Reference of IEEE to IEC	Stds	V. Mehrotra	80 MX	Great Falls
4:45 pm - 6:00 pm	WG Tank Pressure Coordinat. C57.12.39	Dist	C. Gaytan	100 CL	Presidential Theat.
4:45 pm - 6:00 pm	WG Transf. Paralleling Guide PC57.153	Power	T. Jauch	120 MX S2	Ash Grove BC
4:45 pm - 6:00 pm	WG Revision to Gas Guide C57.104	IF	R. Ladroga	275 MX S3	Fairfax Ballroom A
4:45 pm - 6:00 pm	WG Revisions to Impulse Test Sections of C57.12.00 and C57.12.90	DiTests	P. Riffon	275 MX S3	Fairfax Ballroom B

Wednesday, October 22 -- Wednesday Breaks Sponsored by Delta-X Research **

	No Meeting Registration, No Technical Tours, No Spouse/Companion Tours				
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			270 RT (9/tbl)	Tysons Ballroom
8:00 am - 9:30 am	Breakfast - Spouses/Companions (no meeting attendees please)			88 RT (8/tbl)	McLean / Vienna
7:00 am - 7:50 am	**SC Meetings Planning**	Mtgs	G. Anderson	30 CL	Great Falls
7:00 am - 8:30 am	IEC TC-14 Technical Advisory Group -- Breakfast Meeting; arrive early -- All interested individuals welcome	++	P. Hopkinson	80 CL S2	Ash Grove BC
8:00 am - 9:15 am	**SC Instrument Transformers**	IT	R. McTaggart	40 CL 20 TH	Potomac
8:00 am - 9:15 am	**SC Insulation Life**	IL	B. Forsyth	300 CL S3 100 TH	Fairfax Ballroom
9:15 am - 9:30 am	*Break (beverages only)*			F Fairfax / Ash Grove Foyer	
9:30 am - 10:45 am	**SC Bushings**	Bush	P. Zhao	140 MX S2 (add 60 TH)	Ash Grove ABC
9:30 am - 10:45 am	**SC Distribution Transformers**	Dist	S. Shull	400 MX S3	Fairfax Ballroom
10:45 am - 11:00 am	*Break (beverages only)*			Fairfax / Ash Grove 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, October 22 (continued)					
11:00 am - 12:15 pm	**SC UG Transf. & Network Protectors**	UTNP	D. Mulkey	140 MX S2	Ash Grove ABC
11:00 am - 12:15 pm	**SC Dielectric Tests**	DiTests	M. Franchek	400 MX S3	Fairfax Ballroom
12:15 pm - 1:30 pm	Lunch (on your own)				
1:30 pm - 2:45 pm	**SC Dry Type**	Dry	C. Johnson	140 MX S2	Ash Grove ABC
1:30 pm - 2:45 pm	**SC Power Transformers**	Power	J. Watson	400 MX S3	Fairfax Ballroom
2:45 pm - 3:00 pm	*Break (beverages and treats)*			Fairfax / Ash Grove Foyer	
3:00 pm - 4:15 pm	**SC Insulating Fluids**	IF	D. Wallach	140 MX S2	Ash Grove ABC
3:00 pm - 4:15 pm	**SC Performance Characteristics**	PCS	E. teNyenhuis	400 MX S3	Fairfax Ballroom
4:15 pm - 4:30 pm	*Break (beverages only)*			Fairfax / Ash Grove Foyer	
4:30 pm - 5:45 pm	**SC Standards**	Stds	B. Bartley	400 MX S3	Fairfax Ballroom
6:00 pm - 10:00 pm	Dinner Social: Sunset Room at National Harbor Marina. Advance registration required. See flyer for info. -- Buses begin loading at Sheraton at 5:00 pm, last bus departs at 6:00 pm. Dinner served 7:30 pm. -- Buses start loading National Harbor at 8:30 pm. Last bus departs at 9:30 and returns ~10:00 pm.				
Thursday, October 23					
	No Meeting Registration, No Spouses/Companions Tours, No Technical Tours				
7:00 am - 8:00 am	Breakfast - Attendees (no spouses/companions please)			270 RT (9/tbl)	Tysons Ballroom
8:00 am - 9:30 am	Breakfast - Spouses/Companions (no meeting attendees please)			80 RT (8/tbl)	McLean only
8:00 am - 9:15 am	Technical Presentation #1: "TBD", by TBD ** Sponsored by TBD SC. See flyer on website			300 CL S1 150 TH	Fairfax Ballroom (combined rooms)
9:15 am - 9:30 am	*Break (beverages only)*			Fairfax / Ash Grove Foyer	
9:30 am - 10:45 am	Technical Presentation #2: "TBD", by TBD ** Sponsored by TBD SC. See flyer on website			450 MX S1	Fairfax Ballroom
10:45 am - 11:00 am	*Break (beverages only)*			Fairfax / Ash Grove Foyer	
> 11:00 am - 12:00 pm	Closing Session -- All attendees are encouraged to attend -- See separate document for meeting agenda		D. Platts	450 MX S1	Fairfax Ballroom
	Lunch (on your own)				
> 1:30 pm - 5:00 pm	WG Phase Shifting Transformers 60076-57-1202	Power	R. Ahuja	18 US	Ash Grove A
> 1:30 pm - 5:00 pm >	IEEE/IEC Joint Review WG Tap-Changer Application Guide 60214-2	Power	A. Kraemer	100 CL	Presidential Theat.
1:30 pm - 5:00 pm >	IEEE/IEC HVDC Transformers -- continued into Friday	HVDC	U. Radbrandt	18 US	Ash Grove B
1:30 pm - 5:00 pm	EPRI Transformers Task Force -- closed meeting, by invitation only	++	L. Van der Zel	18 US	Ash Grove C
Friday, October 24					
> 8:00 am - 5:00 pm	IEEE/IEC Joint Review WG Tap-Changer Application Guide 60214-2	Power	A. Kraemer	100 CL	Presidential Theat.
> 8:00 am - 5:00 pm	IEEE/IEC HVDC Transformers	HVDC	U. Radbrandt	18 US	TBD

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

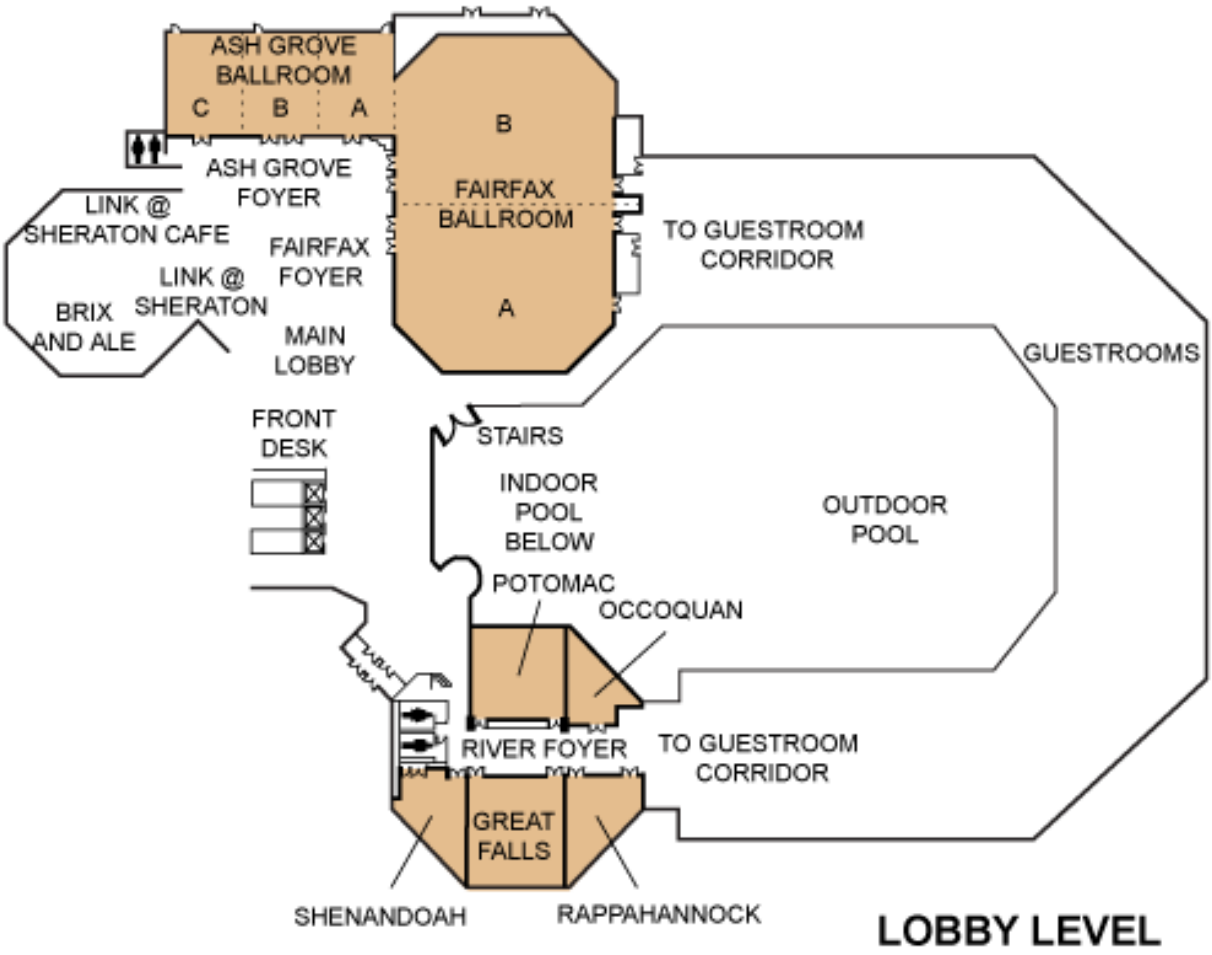
FUTURE COMMITTEE MEETINGS

Spring 2015 - April 12-16; San Antonio, Texas

Fall 2015 - November 1-5; Memphis, Tennessee

Sheraton Tysons Hotel

8661 Leesburg Pike; Tysons, Virginia 22182
(703) 448-1234



<u>Upper Lobby Level</u>
Tysons Ballroom (breakfasts & lunches)
McLean & Vienna (spouses/companions breakfasts)
Premier Boardroom
Falls Church / Westwood / Wolf Trap

<u>Lobby Level</u> (see above floorplan)

Fairfax Ballroom	**Great Falls**
Ash Grove	**Potomac**

<u>Lower Lobby Level</u>

Presidential Theater	**Madison Boardroom**
Jefferson Boardroom	**Montpelier Boardroom**
Washington Boardroom	**Monticello Boardroom**

4.0 APPROVAL OF AGENDA AND PREVIOUS MINUTES – DON PLATTS

The Chair asked if there were any comments or corrections to the Agenda, hearing none, the Agenda was approved.

A motion to approve the minutes was received from the Phil Hopkinson and seconded by Kent Miller. The motion was unanimously approved.

5.0 CHAIR'S REMARKS & REPORT – DON PLATTS

The Vice Chair's Report was presented at the Monday General Session.

Highlights:

Don opened welcoming the attendees and expressed his and the committees deep sadness at the loss of our friend and committee member Rowland James. A short tribute will be presented at the Tuesday Awards Luncheon.

Don announced that Dan Mulkey has taken over the Underground Transformers and Network Protectors SC for Carl Niemen.

Don mentioned that there are some issues with appearance of possible coercion of members to vote in a specific way and possible corporate dominance in the progress of our work. Don asked everyone to be aware of these issues and present any unethical or the appearance of unethical practices. If you are aware of any issues, please bring them to the Executive Committee Officers attention.

Don mentioned that there are also concerns with dictating the design of equipment and the commercial content of the documents. The documents need to be consensus standards and should not be directed to one particular manufacturer's product.

5.1 CHAIR'S REPORT – PRESENTED AT THE MONDAY GENERAL SESSION

5.1.1 IEEE Power & Energy Society Technical Council

The Technical Council of the IEEE Power Energy Society (PES) is presently composed of the Chairpersons of the PES Technical Committees, plus the Chairpersons of Standing Committees reporting to it. The Power Energy Society is Division VII of The Institute of Electrical and Electronics Engineers (IEEE). For operating functions it is responsible to the IEEE Technical Advisory Board and for technical activities to the IEEE Technical Activities Board.

The PES Technical Committees report to the Technical Council on matters concerning membership, technical publications, recognition, scope and the coordination of the Power Energy Society generated standards. For standards relating to their technical scope, the Technical Committees work directly with the IEEE Standards Board and the Power Energy Society Standards Coordinating Committee.

Please see http://www.ieee-pes.org/statement-of-purpose-and-scope-of-activities-for-the-pes-technical-council

for further details on the Statement of Purpose and Scope of Activities for the PES Technical Council.

5.1.2 Technical Council Officers & Membership

The officers and members of the Technical Council are listed below for your reference. Each individual listed here is the chair of that respective committee. Where available, the affiliation of the technical committee chair is also shown in parentheses.

TECHNICAL COUNCIL OFFICERS

Jeffrey H. Nelson, *Chair (TVA)*
Ken Edwards, Vice Chair-(BPA)
Miriam Sanders, Secretary (SEL University)
Damir Novosel, Past Chair (Quanta Technology)

STANDING COMMITTEES

Awards	John D. Randolph
Organization & Procedures	Miriam Sanders

Technical Sessions	Ken Edwards
Standards Coordination	Bill Bartley
Meetings & Marketing	Ken Edwards

COORDINATING COMMITTEES

Emerging Technologies	Branislav Djokic
Intelligent Grid	Steve Pullins
Marine Systems	Paul Bishop
Wind and Solar Power	R. J. Piwko

TECHNICAL COMMITTEES

Electric Machinery Committee	Michael Sedlak
Energy Development & Power Generation Committee	Randy Groves
Insulated Conductors Committee	Thomas C. Champion III
Nuclear Power Engineering Committee	George Ballassi
Power System Analysis, Computing & Economics Committee	Dagmar Niebur
Power System Communications Committee	Dan Nordell
Power System Dynamic Performance Committee	Thierry Van Cutsem
Power System Instrumentation & Measurements Committee	Rejean Arseneau
Power System Operations Committee	Antonio Conejo
Power System Planning & Implementation Committee	M. L. Chan
Power System Relaying Committee	Roger Hedding
Stationary Battery Committee	Lesley Varga
Substations Committee	Mike Dood
Surge Protective Devices Committee	Ron Hotchkiss
Switchgear Committee	Ted Olsen
Transformers Committee	Don Platts
Transmission & Distribution Committee	W. A. Chisholm
Power Engineering Education Committee	Anil Pahwa

5.1.3 Summary of IEEE Report to DOE QER on Priority Issues

This report was prepared by IEEE in response to a set of specific questions posed by U.S. DOE with a request for IEEE insights into these priority issues. The team endeavoured to keep the responses within the scope of the questions. There are many other grid-related issues that are not addressed here.
The past few years have brought about great strides in advancing knowledge on all fronts of interest to DOE. This pace of progress is expected to continue and the report should therefore be viewed as a snapshot reflecting the knowledge available today.
Responses discussed in this report are highlighted below.

- Effects of renewable intermittency on the electric power grid and the potential role of storage in addressing these effects
- Utility and other energy company business case issues related to microgrids and distributed generation (DG), including rooftop photovoltaics
- The technical implications for the grid (bulk and local distribution) of electric vehicle (EV) integration - and the timing you see as necessary to avoid having the grid status slow down any potential progress
- The implications and importance of aging infrastructure and the options for addressing these challenges, including asset management
- Recommendations for metrics for addressing Smart Grid issues, especially to help policy makers determine the importance and necessity of protocols
- Skilled workforce issues
- Report cards on the condition and performance of the electric grid

Download the Summary of IEEE Report to DOE QER on Priority Issues

5.1.4 PES Technical Council Activities

The Tech Council is undertaking a project to ensure that the activities of each of the technical committees fits within their scope, and that each has an updated O&P manual, and those that write standards also have a current P&P.
It appears that as some new technologies develop, they do not fit into the scope of the present committees, or that they may fit into several possible places due to scope overlaps, or gaps in the scopes. A program is underway to realign the technical committees with the industry today. There will likely be some changes in the standards documents assigned, and the scope of some of the technical committees. This project is the focus of a planning meeting scheduled for Nov. 2014.

5.1.5 Update on Geomagnetic Disturbance (GMD) Taskforce

The Technical Council Taskforce on GMD has made very little progress on the development of the position paper, since the last Chair's report in October 2013. The task force was able to complete an initial release of an article entitled ***Geomagnetic Disturbance and Its Impacts on the Power Grid*** in the PES Power & Energy Magazine in the July, 2013 edition to coincide with the GMD Super Session planned at the PES General Meeting in July, 2013 at Vancouver Canada. This project continues to fall further behind schedule, primarily due to fundamental differences of opinion of some of the contributors. The IEEE PES Technical Council still maintains strong support for the project and has urged the task force to proceed with the completion, even if the report needs to be a Stage 1 report, subject to revision and additions as time passes and knowledge grows. The chair has a plan to try to move the participants toward completion of the project by later this year.

5.1.6 Transformers Committee Activities

Officers Progression for the 2014-2015 Period

In accordance with the rules set forth in the Transformers Committee Policies and Procedures Manual, the Committee Officers (the Chair, the Vice Chair, and the Secretary) are recommended by the incumbent Chair of the Committee with the concurrence of the immediate Past Chair and are approved by the Chair of the Technical Council and is expected to serve two years a two-year term, and follows the established progression cycle for the next two-year period. The table below shows the progression of officer's assignment for the next two years beginning January 2014.

Officer Role	2014-2015 Term
Committee Chair	Donald W. Platts
Committee Vice-Chair	Stephen Antosz
Committee Secretary	Susan McNelly
Past Chair / Awards Chair	Bill Chiu
Committee Treasurer*	Greg W. Anderson
Standards Coordinator*	William (Bill) H. Bartley

* Treasurer and Standards Coordinator are excluded from the officer progression cycle.

Subcommittee Chairpersons & Technical Editor

In August, there was a change in the leadership for the Underground Transformers & Network Protectors Subcommittee. Dan Mulkey has agreed to take on the role of Chair, replacing Carl

Niemann, who had served as the Chair since mid-year 2000. Our current roster of the Subcommittee Chairs and Editor are:

• Bushings Subcommittee	Peter Zhao
• Dielectric Test Subcommittee	Michael Franchek
• Distribution Transformers Subcommittee	Stephen Shull
• Dry-Type Transformers Subcommittee	Charles Johnson
• HVDC Converter Transformers & Smoothing Reactors Subcommittee	Michael Sharp
• Instrument Transformers	Ross McTaggart
• Insulating Fluids Subcommittee	Susan McNelly
• Insulation Life Subcommittee	Bruce Forsyth
• Meetings Subcommittee	Gregory Anderson
• Performance Characteristics Subcommittee	Ed teNyenhuis
• Power Transformers Subcommittee	Joe Watson
• Standards Subcommittee	William Bartley
• Underground Transformers & Network Protectors Subcommittee	Dan Mulkey
• Technical Editor	Sanjib Som

5.1.7 What You Need to Know About IEEE Standards and the Law [an excerpt]

IEEE standards should be relevant and respond to regulatory and market needs. They should not distort the global or domestic market, have adverse effects on competition, or stifle innovation and technological development. Efforts should be made to avoid duplication or overlap with other standards, especially international standards.

Wherever appropriate, IEEE standards-developing groups should specify standards based on performance or function rather than design or product specifications.
The full brochure can be found at:
https://standards.ieee.org/develop/policies/stdslaw.pdf

5.1.8 The Standards Board Operations Manual

The following text has been approved by The Standards Board and will be implemented into our Operations Manual in January 2015. The accompanying text may provide an opportunity to educate the committee members as a whole.

"5.4.3 Conduct of the standards balloting process
The ballot process may include communication among the Sponsor comment resolution group and Sponsor balloting group members regarding the substantive merits and possible resolution of comments. However, no comment resolution member, Sponsor balloting group member, or standards participant shall intimidate or coerce a specific vote from any Sponsor balloting group member."
IEEE-SA supports communication among participants and members as a part of the technical discourse or comment resolution, and advocating a personal view or opinion can be a part of the discourse. However, the WG or TF should be mindful not to give specific recommendations and proposed text with instructions to other members. This could be seen as a form of coercion for a specific vote, which violates Clause 5.4.3 of the IEEE-SA Standards Board Operations Manual, "Conduct of standards balloting process."

Within our committee we want to operate in a manner that does not give the appearance, or cause anyone to perceive, that our actions would result in collusion or coercion by any members or activity leaders.

5.1.9 IEEE Standards Association (SA) Requirements

IEEE SA's Role

In the course of developing our standards, we as volunteers while having the best interest of advancing the technical understanding of our industry, are no doubt also influenced by those who sponsored our participation with other interests that potentially could influence our decisions. This is where a good understanding of the IEEE SA's role and its relevant policy and procedures will help in clarifying some of the dos and don'ts in the process of developing our standards.

IEEE SA is a standards development organization that:

- Develops voluntary standards, recommended practices, and guides
- Uses an accredited process that promotes consensus building among those with material interest in any given technology, and is based on proven imperative principles of openness, consensus, balance, due process, and right of appeal
- Oversees the process by which consensus is reached
- Has standards that are adopted by regulatory agencies and international bodies around the world
- Promotes standards implementation, but does not define laws or regulatory requirements
- Defines technical requirements, not market mechanisms
- Reviews documents based on technical merit, and established scientific findings

IEEE SA does not:

- Test or verify the content of standards
- Assure health or safety
- Make guarantees
- Make warrantees
- Establish law or regulation
- Define essential patents, essential patent holders, or licensing terms
- Define commercial terms or market mechanisms
- Infer that an IEEE standard endorses products, services, or companies

Press Releases Policy Relating to IEEE SA Work & Products

Press releases about IEEE standards by outside entities without approval by IEEE:

- Cannot claim that the IEEE standard endorses a product, service, or company
- Cannot claim that the standard establishes requirements based on information in informative text (including informative annexes)
- Cannot include marketing text about IEEE or IEEE-SA that may infer endorsement by IEEE or IEEE-SA
- Must clearly indicate that all statements are that of the entity and does not necessarily represent a position or opinion of either IEEE or the IEEE Standards Association

IEEE SA Disclaimers

A statement, written or oral, that is not processed in accordance with the IEEE-SA Standards Board Operations Manual shall not be considered the official position of IEEE or any of its committees and shall not be considered to be, nor be relied upon as, a formal position of IEEE. At lectures, symposia, seminars, or educational courses, an individual presenting information on IEEE standards shall make it clear that his or her views should be considered the personal views of that individual rather than the formal position of IEEE.

5.1.10 IEEE Code of Ethics

The IEEE Code of Ethics serves as the guiding light to keep us focused on maintaining and evolving our culture that makes the Transformers Committee one of the best technical committees in the Power & Energy Society's area. Below is the excerpt from the IEEE Policies, Section 7 – Professional Activities.

Affiliation

Given the core objectives of the standards development process to follow the concept of "openness" and "due process" in that it allows for equity and fair play we need to strive to have a balance of interests and not to be dominated by any single interest category. Moving forward, the disclosure of participants' affiliation shall include not just who you are, but also who is your financial sponsor.

5.1.11 IEEE Membership – Senior Grade

IEEE membership has several categories, with the senior level being the highest grade which a member can apply. IEEE has developed a streamlined process for members to request elevation of their membership status. The process is simple and can be done entirely online. The Chair strongly encourages everyone that has been an active contributor to the industry for at least five years to apply for this elevation in membership status. The basic qualifications are:

- be engineers, scientists, educators, technical executives, or originators in IEEE-designated fields;
- have experience reflecting professional maturity;
- have been in professional practice for at least ten years;
- show significant performance over a period of at least five of their years in professional practice.

Benefits of becoming a senior member include:

- **Recognition**: The professional recognition of your peers for technical and professional excellence.
- **Senior member plaque**: Since January 1999, all newly elevated Senior members have received an engraved Senior Member plaque to be proudly displayed for colleagues, clients and employers. The plaque, an attractive fine wood with bronze engraving, is sent within six to eight weeks after elevation.
- **US$25 coupon**: IEEE will recognize all newly elevated Senior members with a coupon worth up to US$25. This coupon can be used to join one new IEEE society. The coupon expires on 31 December of the year in which it is received.
- **Letter of commendation**: A letter of commendation will be sent to your employer on the achievement of Senior member grade (upon the request of the newly elected Senior member).
- **Announcements**: Announcement of elevation can be made in section/society and/or local newsletters, newspapers and notices.
- **Leadership Eligibility**: Senior members are eligible to hold executive IEEE volunteer positions.
- **Ability to refer other candidates**: Senior members can serve as a reference for other applicants for senior membership.
- **Review panel**: Senior members are invited to be on the panel to review senior member applications.
- **US$25 referral coupon**: Newly elevated Senior members are encouraged to find the next innovators of tomorrow and invite them to join IEEE. Invite them to join and the new IEEE member will receive $25 off their first year of membership.

IEEE Membership – Fellow Grade

The IEEE membership grade of Fellow recognizes unusual distinction in the profession and shall be conferred only by invitation of the Board of Directors upon a person of outstanding and extraordinary qualifications and experience in IEEE-designated fields, and who has made important individual contributions to one or more of these fields. IEEE Fellow nominees are classified into the following four categories:

- Application Engineer/Practitioner
- Educator
- Research Engineer/Scientist
- Technical Leader

IEEE Fellow is a distinction reserved for select IEEE members whose extraordinary accomplishments in any of the IEEE fields of interest are deemed fitting of this prestigious grade elevation.

According to IEEE Bylaw I-305.5, the total number of Fellow recommendations in any one-year must not exceed one-tenth of one percent of the voting membership on record as of 31 December of the year preceding. At the time the nomination is submitted, a nominee must:

- have accomplishments that have contributed importantly to the advancement or application of engineering, science and technology, bringing the realization of significant value to society;
- hold IEEE Senior Member or IEEE Life Senior Member grade;
- have been a member in good standing in any grade for a period of five years or more preceding 1 January of the year of elevation.

For further details please refer to the website
http://www.ieee.org/membership_services/membership/fellows/index.html

Transformers Committee Membership

All are welcome to participate in the work of the Transformers Committee. Membership in the Committee provides recognition of your peers and indication to your co-workers and management of your active role in Committee work. If you are presently not a Main Committee Member, and you have been actively participating in our work for at least two full year – and can secure the acknowledgement and sponsorship of at least 3 activity Chairs (WGs, but must include at least one Subcommittee Chair) affirming that participation, the Committee will look forward to welcoming you as a member. Membership requirements and application forms can be found in the Organization and Procedures Manual posted on the Committee website.

As our organization is a 100% volunteer based organization, we are very much in need of your continued participation and sharing of your expertise towards our world-class standards development efforts. Many of our long-standing committee members have made tremendous contributions towards our standards development effort over the years and their contributions are greatly appreciated.

Respectfully submitted,

Don Platts
Chair, IEEE/PES Transformers Committee

6.0 VICE CHAIR'S REPORT – STEPHEN ANTOSZ

6.1 IEEE PES CALENDAR OF UPCOMING EVENTS

Following are upcoming PES sponsored conferences and committee meetings. Please check the PES website at www.ieee-pes.org for further details, and additional events.

2015 IEEE PES Innovative Smart Grid Technologies Conference (ISGT)
February 17-20, 2015, Washington, DC

2015 IEEE/PES General Meeting
July 26-30, 2014, Denver, CO

6.2 CONFERENCE PAPERS SUBMITTED IN 2014

6.2.1 IEEE/PES T&D Conference and Expo Apr 14-17, 2014, Chicago IL

A total of 17 conference papers were submitted. After review, 5 papers were rejected and 8 papers were accepted and presented at the Poster Session. 4 papers were incomplete, as they were referred to revise and resubmit but there was no response from the author. In addition, one Transactions paper was accepted. The papers that were presented are:

ID	Title
14TD0004	PROBABILISTIC TRANSFORMER FAULT TREE ANALYSIS USING BAYESIAN NETWORKS
14TD0109	Development of Miniaturized AC Reactors with Lower-Losses Using Amorphous Wound Cores in 400-kVA UPS
14TD0295	Combining dry type Resin Impregnated Fiberglass Paperless Transformer Bushings With Built-in Novel Insulation Monitoring Function
14TD0298	Practical Aspects of Power Transformer Condition Monitoring
14TD0331	Advanced Transformer Fleet Monitoring System
14TD0380	A Process for Evaluating the Degree of Susceptibility of a fleet of Power Transformers to Effects of GIC
14TD0455	Advanced Tap Changer Control of Parallel Transformers based on IEC 61850 GOOSE Service
14TD0532	An Innovative Method for Cooling oil-immersed Transformers by Rayleigh-Benard Convection

6.2.2 IEEE/PES General Meeting July 27-31, 2014, Washington, DC

A total of 27 conference papers were submitted. After review, 15 papers were rejected and 10 papers were accepted and presented at the Poster Session. 2 papers were incomplete, as they were referred to revise and resubmit but there was no response from the author. In addition, one Transactions paper was accepted. The papers that were presented are:

ID	Title
14PESGM0192	An Economic Evaluation Model of Transformers Considering Outage Consequence

14PESGM0245	A Diffusion-Driven Model for Investigating Moisture Effects on Dielectric Response Measurement of Transformer Insulation
14PESGM0272	Differential Partial Discharge Extraction Technique for Online Power Transformer Insulation Assessment
14PESGM0372	Investigating the Sensitivity of Frequency Response Analysis on Transformer Winding Structure
14PESGM0631	Analysis on the Effects of Energization Mode for Magnetically Controlled Shunt Reactor
14PESGM0782	Detection of Minor Axial Winding Movement within Power Transformers Using Finite Element Modeling
14PESGM0871	Application of FRA Polar Plot Technique to Diagnose Internal Faults in Power Transformers
14PESGM1039	Application of Multifractal Spectrum to the Vibration Analyses of Power Transformer under DC Bias
14PESGM1539	Performance Evaluation of On-Line Transformer Winding Short Circuit Fault Detection Based on Instantaneous Voltage and Current Measurements
14PESGM1597	Research on Chaotic Dynamic Characteristics of On-load Tap Changers

On Oct 24, 2014 the paper submission web site to open to authors for 2015 General Meeting.

Stephen Antosz
Vice Chair
IEEE PES Transformers Committee
October 20, 2014

7.0 SECRETARY'S REPORT – SUSAN MCNELLY

7.1 MEMBERSHIP REVIEW

Voting Committee Members – five new committee members were approved and added at the Spring 2014 Savannah, Georgia meeting as shown in the table below:

Name	Affiliation	Sponsor #1	Sponsor #2	Sponsor #3	Membership Category
Alexsandr Levin	Weidmann	Hemchandra Shertukde C57.159 & TF (Since 2008)	Chuck Johnson Dry-Type SC (2yrs)	Richard Marek PC57.96 (3yrs)	Producer
Michael Miller	WE Energies	Steve Shull Distribution Transf. SC (3yrs)	Craig Colopy C57.15 (2yrs)	Alan Traut C57.120 (3yrs)	User
Diego M. Robalino	Megger	Wally Binder WG C57.125 (2.5yrs)	Joe Watson PTSC (2.5yrs)	Greg Anderson PTSC / WG C57.150 (1.5yrs)	Producer
William J. Solano	ABB	Steve Snyder PCS / WG C57.12.00 (2yrs)	Mike Lau WG C57.93 (1 yr)	William Bartley Standards SC (2yrs)	Producer
Susmitha Tarlapally	ABB, Inc.	Michael Franchek Dielectric Test SC & WG C57.138 (1.5yrs)	Mark Perkins WG C57.12.90 (1.5yr)	Steve Snyder PSC / WG C57.12.00 (4yrs)	Producer

The Transformers Committee AMS database of people currently has three general categories of participation in our activities. These are: **Interested Individual**, **Active Participant**, and **Committee Member**. Anyone can join the AMS 123 system as the system is designed for self-registration. A new participant will automatically be assigned the role of Interested Individual when they first sign up. Based on the level of participation, the committee administrative staff will upgrade the participation status to "Active Participant" when appropriate. The Committee Member status however, can only be attained through a formal application with the sponsorship of a minimum of three WG or SC chairmanships. Details of the application requirements and approval process by the Administrative Subcommittee are outlined in our O&P manual.

The following table contains a count of the participants grouped by the three general categories.

Membership Status	Mar-12	Oct-12	Mar-13	Oct-13	Mar-14	Oct-14
Interested Individual	1132	1205	1277	1376	1381	1386
Interested Individual - IEEE Life Member	6	7	8	16	12	10
Total Interested Individuals	**1138**	**1212**	**1285**	**1392**	**1393**	**1396**
Active Participant	232	231	173	178	192	201
Active Participant - IEEE Life Member	6	6	5	5	5	6
Total Active Participants	**238**	**237**	**178**	**183**	**197**	**207**
Committee Member	182	182	186	170	166	170
Committee Member - Emeritus Member	6	6	6	3	09	10
Committee Member - IEEE Life Member	29	30	31	25	21	20
Total Committee Members	**217**	**218**	**223**	**198**	**196**	**200**
Past Committee Member					15	18
Past Committee Member - IEEE Life Member					6	6
Total Past Committee Members					**21**	**24**
TOTAL IN AMS DATABASE	**1593**	**1667**	**1686**	**1773**	**1810**	**1827**

It is the responsibility of each individual to keep his/her profile updated, (except for the category).

7.2 NEW MEMBER APPLICATIONS

Eight new applications for Committee Membership have been received since the previous meeting in Savannah, Georgia.

Name	Affiliation	Sponsor #1	Sponsor #2	Sponsor #3	Membership Category
Axel Kraemer IEEE/PES/SA status confirmed	MR	Joe Watson Power TR SC (2 yrs+)	Raj Ahuja WG PC57.157 (2 yrs)	Phil Hopkinson WG PC57.131 (10+ yrs)	Producer
Thomas R. Melle IEEE/PES/SA Status Confirmed	HighVolt (Prev. Siemens)	Wallace Binder WG C57.125 (3 yrs)	Sheldon Kennedy WG C57.32 (2 yrs)	Joe Watson Power TR SC (3 yrs)	Producer
Poorvi Patel IEEE/PES/SA Status Confirmed	ABB Inc.	Ali Nadarian WG PC57.161 (2 yrs)	Tom Prevost WG Moisture in Inuslation (---)	Ed teNyenhuis Performance Char. SC (2 yrs)	Producer
Leslie D Recksiedler IEEE/PES/SA Status Confirmed	Manitoba Hydro International	Peter Zhao Bushing SC (7 yrs)	Michael Sharp HVDC Converter & Reactor SC (3 yrs)	Greg Anderson WG C57.150 (5 yrs)	User
Adam M. Sewell IEEE/PES/SA Status Confirmed	Quality Switch	Wallace Binder WG C57.125 (3 yrs)	Phil Hopkinson WG PC57.131 (3 yrs)	Joe Watson Power TR SC (3 yrs)	Producer
Charles E. Simmons IEEE/PES/SA Status Confirmed	Duke Energy	Alan Traut WG C57.12.20 (6+ yrs)	Stephen Shull Distribution SC (6+ yrs)	Ali Ghafourian WG C57.12.38 (6 yrs)	User
Kenneth R. Skinger IEEE/PES/SA Status Confirmed	Chicago Bridge & Iron	Wallace Binder WG C57.125 (2 yrs)	Michael Franchek Dielectric Test SC (3 yrs)	Ed teNyenhuis Performance Char. SC (2 yrs)	User
Troy Tanaka IEEE/PES/SA Status Confirmed	Burns & McDonnell	Michael Franchek Dielectric Test SC (2.5 yrs)	Eric Davis WG External Dielectric Clearances (3 yrs)	Shibao Zhang WG C57.19.01 (2 yrs)	User

The Committee welcomes and encourages active participants to become Members of the Committee. Requirements and application forms can be found in the Organization and Procedures (O&P) Manual, accessible on the Committee website. A link to the Membership Application form can be found on the TransformersCommittee.org homepage in the Committee Information Box. Subcommittee Chairs are encouraged to recommend new members and to communicate the process of attaining membership through **active participation** and **contribution** at the WG and SC level. WG and SC Chairs are reminded also that signing an application sponsoring a new member signifies their sponsorship that the applicant has met the requirement of membership and active participation for at least one year in the WG or SC they Chair. New member applications may be submitted to the Committee Secretary's attention at any time. Applications will be collected for review and approval in batches at each Administrative Subcommittee meeting.

7.3 COMMITTEE, SUBCOMMITTEES, AND WORKING GROUP ROSTERS

In order to provide indemnification to working group and subcommittee members it is crucial that membership lists be maintained. The AM system has these functions built-in to ease these administration tasks. It is important that each subcommittee and working group chair keep the rosters updated so that this information can be provided to the IEEE SA.

A similar main committee roster has also been developed to track attendance for the Main Committee General Session meeting on Monday & Thursday. The data will be used to update participant's membership profile.

7.4 IEEE/PES AND IEEE/SA MEMBERSHIP REQUIREMENTS

As a reminder, all members of the Transformers Committee must also be members in good standing of the Power & Energy Society (IEEE/PES) and the Standards Association (IEEE/SA). There are a number of Transformers Committee members who have lapsed and must renew their SA and/or PES affiliation. These memberships are renewed annually along with your IEEE Membership renewal, which typically occurs around October/November of each year.

WG Chairs must also be a member of the SC, IEEE, PES, and SA.

There are a number of Transformers Committee Members who are not PES or SA members. They will be sent a reminder to renew required memberships. If they do not comply then they will be dropped as Members. It is not fair to the other Members who adhere to this rule and pay the annual fees. Moreover, a person CANNOT participate in any ballot activity if they are not an SA member, and this is one of the basic responsibilities of an active member.

7.5 COMMITTEE MEMBERSHIP MAINTENANCE

The following members were removed: Ravi Rahangdale, Paul Buchanan (retired), and Rowland James who passed away September 26.

7.6 ESSENTIAL PATENT CLAIMS

The Transformers Committee asks each participant at the time of meeting registration if they are aware of an essential patent claim, and if so to provide details. An Essential Patent Claim is any Patent Claim the use of which was necessary to create a compliant implementation of the IEEE Standard when there was no commercially and technically feasible non-infringing alternative. In other words, if an IEEE Standard REQUIRES the use of a product or process that is already patented, then this could be an essential patent claim. If they did, they would be instructed to have the patent holder's legal team file a Letter of Assurance (LOA) with the IEEE-SA Standards Board Patent Committee. There is a link to this information on the transformerscommittee.org website under Patent Disclosure Requirements.

For the Fall 2014, Washington DC Metro Area meeting, most people indicated No to the Patent question. There were 9 people who answered YES that they were aware of an essential patent claim. Of these, 6 provided no details and were therefore not considered any further. The remaining 3 were reviewed: 1 referred to US Patent 6613250 for the application of natural esters and 2 referred to Letters of Assurance (LOA) related to C57.139. The next steps that should be taken will be reviewed by IEEE.

7.7 AFFILIATION

According to the IEEE Standards Board Bylaws, there is a requirement that participants of an IEEE meeting must disclose their employer and affiliation. Consultants must state if they are sponsored, or not. One cannot simply announce that "My name is John Smith, and I'm a consultant." If a client is sponsoring

an attendees presence, it must be disclosed. If the consultant does not have a sponsor, the proper introduction is something like."My name is John Smith, I am a consultant, and I represent myself at this meeting."

7.8 MEETING MINUTES

The minutes of the Savannah, Georgia Transformers Committee Spring 2014 meeting were posted to the committee website in August of 2014.

Subcommittee Chairs are requested to submit their SC Minutes for the Washington DC Metro Area meeting by **January 1**, 2014.

The minutes should be submitted via e-mail to the Committee Secretary, Susan McNelly [sjmcnelly@ieee.org], who will also make sure that they are posted on the Committee website.

The submittal file should be saved as a Word document formatted Similar to this document. Attendance, indication of quorum, names of members making any motion, seconding any motion, and the result of any votes (affirmative and negative count) for each SC, WG, and TF meeting are to be included in all minutes.

Respectfully submitted,

Susan McNelly
Secretary
IEEE PES Transformers Committee
Revised October 17, 2014

8.0 TREASURER'S REPORT – GREGORY ANDERSON

Greg mentioned some housekeeping items such as the IEEE WiFi access and other meeting specific issues.

MEMORANDUM

October 17, 2014

To: Donald W. Platts, Chair
IEEE/PES Transformers Committee

RE: IEEE/PES Transformers Committee
Treasurer's Report
Fall 2014 Meeting
(for reporting period 01/28/2014 to 08/31/2014)

Dear Don,

The finances of the Committee are in excellent condition. As of 31st of August 2014 (end of this reporting period), the balance was $68,054.50.

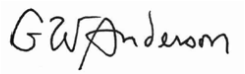
FYI: August 31st is essentially a "snap-shot" in time after all income & expenses are resolved from the previous Savannah Meeting, and before we start spending significant funds for the DC Meeting.

No significant assets (PC projectors, etc.) were purchased during this reporting period.

See attached summary for balances for this reporting period and the previous periods.

Let me know if you have any questions or concerns.

Sincerely,



Gregory W. Anderson, Treasurer
IEEE/PES Transformers Committee

IEEE/PES TRANSFORMERS COMMITTEE

Treasurer's Report - Fall 2014 (REVISED 10/29/2014)

(for reporting period 01/28/2014 to 08/31/2014)

AAAAA	**Balance before Fall 2012 Meeting , as of 09/01/2012**	**$56,563.01**
AAAA	**Balance before Spring 2013 Meeting , as of 02/25/2013**	**$83,852.95**
AAA	**Balance before Fall 2013 Meeting , as of 08/01/2013**	**$55,388.96**
AA	**Balance before Spring 2014 Meeting , as of 01/28/2014**	**$72,586.57**
	Misc Income, not related to a specific meeting	
	-- interest, approx 6 months	$106.93
	-- misc income (shirt sales, CD-ROM sales, book sales, etc.)	$260.00
B	Total Misc Income, not meeting related	$366.93
	Misc Expenses, not related to a specific meeting	
	-- 123Signup subscription fee, for approx 6 months	$2,637.00
	-- awards	$0.00
	-- equipment purchases, major assets (projectors & cases, etc.)	$0.00
	-- technology (mobile app, WiFi equip, printers & ink, cables, etc)	$1,039.99
	-- conferences, remote meetings, etc.	$1,795.00
	-- other misc expenses (shirts, CD-ROMs, books, etc.)	$67.76
C	Total Misc Expenses, not meeting related	$5,539.75
	Fall 2013 Meeting	
	-- late income, meeting registrations (rolling reserve paybacks)	$2,698.00
	-- misc late income (incentives, late sponsor contributions, etc.)	$0.00
	-- late meeting expenses	$0.00
D	Total Late Income/(expenses), Fall 2013 Meeting	$2,698.00
	-- reported prelim. gain/(loss), as of 01/28/2014, from previous Treasurer's Report	$24,308.05
	Actual Gain/(Loss), Fall 2013 Meeting (between 08/01/2013 and 01/28/2014)	$27,006.05
	Spring 2014 Meeting	
	-- income, meeting registration	$169,955.83
	-- income (coffee break sponsors)	$7,500.00
	-- meeting expenses	$177,233.08
E	Income minus expenses, Spring 2014 Meeting (between 01/28/2014 and 08/31/2014)	$222.75
	-- meeting expenses, before 01/28/2014, from previous Treasurer's Report	$1,787.70
	Preliminary Total Gain/(Loss), Spring 2014 Meeting	($1,564.95)
	Expenses, Future Meetings (deposits paid, etc)	
	-- meeting expenses, Fall 2014 Meeting	$2,280.00
	-- meeting expenses, other future meetings	$0.00
F	Total Expenses, future meetings, paid between 01/28/2014 to 08/31/2014	$2,280.00
G	**Net Income (loss), between Spring 2014 and Fall 2014 meetings (B - C + D + E**	**($4,532.07)**
A	**Balance before Fall 2014 Meeting , as of 08/31/2014 (AA + G)**	**$68,054.50**

Gregory W. Anderson,
Treasurer IEEE/PES Transformers Committee

9.0 RECOGNITION AND AWARDS REPORT – BILL CHIU

The Awards were presented at the Tuesday Awards Luncheon. No report was made at the Monday General Session.

9.1 COMMITTEE MEMBERSHIP CERTIFICATES

The Transformers Committee welcomes five new full committee members. Each of the following new members was presented with a membership certificate:

New Member	Affiliation
Thomas R. Melle	*HighVolt*
Poorvi Patel	*ABB Inc.*
Leslie D. Recksiedler	*Manitoba Hydro*
Adam M. Sewell	*Quality Switch*
Charles E. Simmons	*Duke Energy*
Kenneth R. Skinger	*Chicago Bridge & Iron*
Troy Tanaka	*Burns & McDonnell*

9.2 GENERAL SERVICE AWARDS CERTIFICATE OF APPRECIATION

Certificate of Appreciations were presented to the following list of recipients for their contributions to the Transformers committee:

Name of Award Recipients	Affiliation	Contributions
Jane Ann Verner	*PEPCO*	*Meeting Host – Fall 2014*
Potomac Electric Company	*PEPCO*	*Host Company– Fall 2014*
Carl G. Niemann		*Subcommittee Chair Underground Transformers & Network Protectors (2000 – 2014)*
Brian F. Klaponski	*Carte International Inc.*	*"Outstanding Contributor" to the Transformers Committee*

9.3 IEEE SA STANDARDS BOARD AWARDS

In addition to the Committee Awards above, the IEEE SA SB presents its own Award to the WG Chair upon publication of a new or revised document, and offers the WG Chair the opportunity to nominate significant contributors to the project for an IEEE SA SB Certificate of Appreciation. All Working Group Chairs chose to have their awards sent direct to their residence or place of business. The award recipients were called forward for recognition during our Awards Luncheon on Tuesday.

IEEE SA Award Reccipients:

Revision of C57.134 - Guide for Determination of Hottest-Spot Temperature in Dry-Type Transformers

Paulette Payne Powell - Working Group Chair
Timothy L. Holdway - Significant Contributor
Charles W. Johnson - Significant Contributor
Richard P. Marek - Significant Contributor

Revision to C57.96 - Guide for Loading Dry-Type Distribution and Power Transformers

Richard P. Marek – Working Group Chair
Timothy L Holdway – Significant Contributor
Aleksandr A Levin – Significant Contributor
Dhiru S Patel – Significant Contributor
Sanjib K Som – Significant Contributor

Revision of IEEE 638 - Standard for Qualification of Class 1E Transformers for Nuclear Power Station

Craig Swinderman – Working Group Chair
Roger Wickes – ballot comment resolution
Richard Marek – dry type transformer aspects
Kent Brown – insight from user's perspective
William Bartley – ballot process, PAR issues, etc.

Revision to C57.116 - Guide for Xfmrs Directly Connected to Generators

Gary Hoffman - WG Chair
Bill Griesacker - WG Vice Chair
Randall Kyle - WG Secretary
Peter Balma - Special Editor
Mark Baldwin, Joe Watson, Randall Kyle Task Force Chair

WG & TF Contributing Members	
Wallace Binder	***Roderick Sauls****
David Harris	***Stephen Schroeder***
Jose Izquierdo	***Eduardo Tolcachir***
John Lackey*	***David Wallach****
Jeffrey Ray*	***Kipp Yule****

* Technical Contributor
** Ballot Resolution Committee Members

Revision to C57.12.28 & C57.12.29 - Standard for Pad Mounted Equipment - Enclosure Integrity (& Coastal Environments)

Robert C. Olen & Daniel Mulkey - WG Co-Chairs

Revision to C57.12.38
Std. for Pad-Mounted Type, Self-Cooled, Single Phase, Dist Transformer, <250kVA

Ali Ghafourian – Working Group Chair
Michael D. Faulkenberry – WG Vice Chair

International Joint Working Group Chair Award
IEEE SA Award - IEC/IEEE 65700-19-03
Standard Requirements – Terminology and Test Code for Bushings for DC Applications

Leslie D. Recksiedler & John Graham **– WG Chair**
Pierre Riffon **– WG Co-Chair**
Reiner Krump **– significant contributor**
Ulf Radbrandt **– significant contributor**

9.4 IEEE PES DISTINGUISHED SERVICE AWARD

The Transformers Committee recognized two very special individuals in the form of Power & Energy Society Distinguished Service Award at this meeting. This award is reserved for members of PES who has

devoted a very significant portion of their career contributing to one of the technical committees within the PES umbrella.

Each Technical Committee is allotted a maximum of one recipient per year for outstanding distinguished individual service. This very special award and personal recognition acknowledges the efforts of those individuals with sustained performance, over many years and/or has contributed to the advancement of the committee technology. This award recognizes contributions in the following categories:

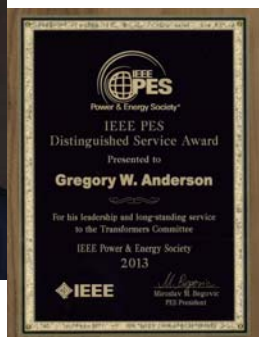
- Enhancing the process through continued service on its major action committees.
- Leadership in developing new aspects of what the technical committee can do to improve its procedural process.
- Interaction on behalf of technical committee to promote national and international growth of standards as a product of IEEE.
- Representing the technical committee at various levels within IEEE Societies/Committees and other standards-developing organizations (ASME, IEC, etc.), which encourages the implementation of the IEEE Standards and also the mission and goals of Power & Energy Society - To be the leading provider of scientific and engineering information on electric power and energy for the betterment of society, and the preferred professional development source for our members.

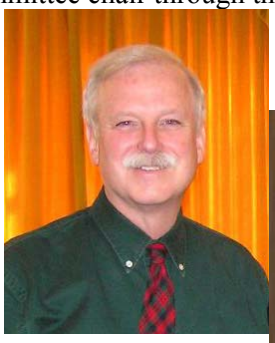
As in the criteria mentioned earlier, there is only a maximum of one award given each year in this category from each of the 14 technical committee. Because we did not take advantage of this category for the past couple of years, we negotiated with the PES Awards approval committee for us to use some of the past allotment. They were kind enough to have made a special dispensation to grant us two award recipient this year. So I do want to acknowledge my appreciation to the PES Awards Chair, Dr. Mariesa Crow for providing this generous variance. This recognition consists of an engraved brass plate mounted on a wooden plaque, although there is no honorarium attached to this award.

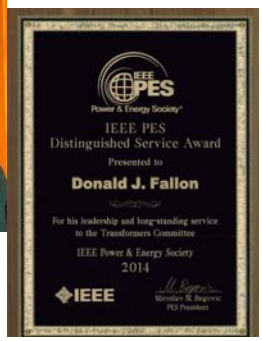
Our first recipient, Gregory W. Anderson, started attending our committee meetings in the mid-1990's and has been a very active contributor event since. This individual really didn't take much time to get himself indoctrinated with the committee. He jumped right in and hosted a meeting in the Spring of 1995 when we had our meeting in Kansas City. Over the years, he has continued to play a pivotal role for the success of the committee over the past couple of decades in carrying out his vision on what it takes to facilitate our meetings. He has led many of the innovations that we now take for granted. Many of you remembered what it was like to plan and host a meeting. The host had to physically mail out invitation letters and collect the registration fees from individual members, not to mention tracking individual attendees' correspondence, on top of making all the local arrangements, from hotel lodging accommodations to food and beverages and everything else in between. During the past couple of decades, this individual has provided countless leadership in breaking the boundary of our traditional thinking on meeting arrangements. As an example of the many notable accomplishments, this individual spearheaded the transition to the Association Management System - AMS-123, which has profoundly changed the way we run our meetings, and greatly simplified some of the tedious task of managing the contact information of our attendees, tracking the meeting attendance, membership rosters, and streamlining the communications for each of the activities that are key to our successes.

Our next recipient, Donald J. Fallon, has been a long term contributor since the mid-1980's. Don has tirelessly contributed to many of our documents despite some recent travel restriction and continued to participate through correspondences. An example of this is during the previous revision to one of our core document of C57.12.80 several years ago, Don tirelessly went through the more than 500 definitions and made sure we didn't overlook or had conflicts between the terminologies. Don also held a continuous attendance record over a 25-year period where he had not miss a single meeting. Don had a series of impressive leadership role in the committee. He served as WG and TF chairs for many of the documents, been a Performance Characteristic Subcommittee Chair, and a former officer of the main committee. Although not able to actively attend our meetings for a few years, due to travel restrictions, I know I speak for many in that we are very glad that he is able to join us again at this meeting even though he is almost retired from his work. For me, not only did Don made his mark in a series of very significant leadership

role for our committee, but Don was also a trusted advisor for me over the past 10 years or so in my progression from a standards coordinator and standards subcommittee chair through the officer's ranks.







We will continue to present our PES Technical Committee Distinguished Service Award each year to one of our members who is recognized by his peers as having contributed significantly and consistently to Committee Standards activities. This personal recognition acknowledges the efforts of those individuals whose sustained performance, over many years, has contributed to the advancement of the committee technology. Please see the Awards Chair if you have suggestions for future recipients. We are always seeking nominations for this award.

9.5 TRANSFORMERS COMMITTEE MERITORIOUS SERVICE AWARDS

There is also a process of additional recognition for Meritorious Service and Outstanding Contributions to the Committee. Suggested qualifications have been developed from a review of similar awards presented by other IEEE Technical Committees or Societies. General examples for qualification for the awards include the following:

- To recognize continuing exemplary service in notable technical contributions to multiple Committee projects/documents over a sustained period of time.
- To recognize an achievement of major value and significance to the Committee. The achievement can be a specific, concisely characterized accomplishment, as opposed to a collection of different efforts.
- As with the IEEE Education Society Meritorious Service Award – "to recognize pioneering contributions to the administrative efforts of the Society over a period of years, as evidenced by dedication, effort, and contributions."

If you have any additional thoughts on qualifications for Meritorious Service Awards, and if you have potential nominees to suggest, please contact me. Award nominees will be reviewed by the Awards Chair and the SC Officers.

9.6 IEEE STANDARDS ASSOCIATION (SA) AWARDS AND RECOGNITION

The IEEE SA sponsors additional awards besides the WG Chair Awards reviewed above. Discussion of these awards can be found on the IEEE SA Awards web pages (http://standards.ieee.org/sa/aw/). Note particularly the IEEE SA Standards Medallion. Excerpting from the website: "The Standards Medallion is awarded for major contributions to the development of standards. Examples of such contributions may include leadership in standardization of new technologies, assuring achievement of standards development goals, identifying opportunities to better serve the needs of standards users or other such contributions viewed as deserving of this award…" Please review, and if you have suggestions for nominations see our Committee Awards Chair.

9.7 OTHER IEEE PES AWARDS

The IEEE PES recognizes important technical, educational and service contributions through the conferral of numerous awards. The listing below highlights the various other awards that are available through the IEEE PES organization.

- IEEE PES Award for Excellence in Power Distribution Engineering
- IEEE PES IAS A.P. Seethapathy Rural Electrification Excellence Award
  Nominations due by February 1st
- IEEE PES Charles Concordia Power Systems Engineering Award
  Nominations due by January 31st
- IEEE PES Cyril Veinott Electromechanical Energy Conversion Award
  Nominations due by February 1st
- IEEE PES Douglas M. Staszesky Distribution Automation Award
  Nominations due by January 1st
- IEEE PES Lifetime Achievement Award
  Nominations due by February 1st
- IEEE PES Leadership in Power Award
  Nominations due by February 1st
- IEEE PES Meritorious Service Award
- IEEE PES Nari Hingorani Custom Power Award
  Nominations due by January 31st
- IEEE PES Nari Hingorani FACTS Award
  Nominations due by January 31st
- IEEE PES Outstanding Chapter Award
- IEEE PES Outstanding Power Engineering Educator Award
  Nominations due by January 31st
- IEEE PES Outstanding Young Engineer Award
  Nominations due by Februrary 1st
- IEEE PES Prabha S. Kundur Power System Dynamics and Control Award
  Nominations due by January 31st - Call for Nominations
- IEEE PES Prize Paper Award
- IEEE Power & Energy Society Ramakumar Family Renewable Energy Excellence Award
- IEEE PES Robert P. Noberini Distinguished Contributions to Engineeering Professionalism Award
  Nominations due by February 1st

- IEEE PES G. Ray Ekenstam Memorial Scholarship
  Nominations due by June 30th

- IEEE PES Scholarship Plus Initiative
  Applications due by June 30th

- IEEE PES Roy Billinton Power System Reliability Award
  Nominations due by February 1st

- IEEE PES Student Prize Paper Award in Honor of T. Burke Hayes
  Nominations due by December 15th

- IEEE PES Uno Lamm High Voltage Direct Current Award
  Nominations due by November 30th

- IEEE PES Wanda Reder Pioneer in Power Award
  Nominations due by January 15th

- IEEE PES Working Group Recognition Awards
  The PES Working Group Recognition Awards recognize "the most outstanding and timely publications" by a PES Working Group (or Committee or Subcommittee) from among the nominations. The PES Recognition Award is divided into two categories: 1) for technical reports; 2) standards and guides. Each Technical Council Committee may nominate one report from each category, published by IEEE, during the previous three year period." This award consists of a plaque which will be presented to the Working Group Chair at the PES Summer Meeting Awards Luncheon. A framed certificate will be presented to each Working Group member at a designated meeting of the parent Technical Committee.

- IEEE PES CSEE Yu-Hsiu Ku Electrical Engineering Award

Respectfully submitted,

Bill Chiu
Chair, Awards Subcommittee

10.0 ADMINISTRATIVE SUBCOMMITTEE MEETING REPORT

10.1 INTRODUCTIONS

10.2 Introductions

The attendees were asked to introduce themselves. The chair asked each attendee to state his/her affiliation. If the attendee is a consultant, the attendee must state if he is representing a company other than his own consulting interest. Introductions were made by members and guests.

10.3 Attendance

Members Present:

Chair	Donald Platts
Vice Chair	Stephen Antosz
Secretary	Susan McNelly
Treasurer	Gregory Anderson
Standards Coordinator	William Bartley
Awards/Past Chair	Bill Chiu
Bushings	Peter Zhao
Dielectric Tests	Michael Franchek
Distribution Transformers	Stephen Shull
Dry Type Transformers	Charles Johnson
HVDC Converter Transformers & Reactors	Michael Sharp
Instrument Transformers	Ross McTaggart
Insulating Fluids	David Wallach
Insulation Life	Barry Beaster
Performance Characteristics	Ed teNyenhuis
Power Transformers	Joe Watson
Underground Transformers & Network Protectors	Dan Mulkey
Guests	Peter Balma, Erin Spiewak, Greg Marchini, and Noelle Humenick

10.4 Approval of Previous Meeting Minutes

The Chair asked for comments from the Spring 2014 Savannah Administrative Subcommittee meeting minutes. Hearing no comments or requests to change the draft minutes, the minutes were approved.

10.5 Approval of Agenda

The Chair reviewed the draft agenda with the attendees. There were no changes or additions.

Approved Agenda

1.	Introduction of Members and Guests (:05)	All
2.	Approval of Spring 2014 Minutes from Savannah (:03)	D. Platts
3.	Additions to and/or Approval of the Agenda (:02)	D. Platts
4.	Chair's Report (:05)	D. Platts
5.	Vice Chair's Report (:05)	S. Antosz
6.	Secretary's Report & New Committee Membership Approval (:10)	S. McNelly
7.	Treasurer's Report (:05)	G. Anderson
8.	Recognition & Awards Report (:05)	B. Chiu
9.	Standards Report (:30)	B. Bartley

10. IEEE Staff Update (:10) — E. Spiewak
11. Meeting Planning (:10) — G. Anderson
    a. Washington DC Metro Area Meeting Update
    b. Future Meetings

Break & Time Check – 3:30 pm

12. Old Business
    a. WG Data – Confidentiality, Storage, Access, & Use (:10) — S. McNelly/E. Spiewak
    b. Meeting Improvement Initiative (:10) — D. Platts/B. Bartley

13. New Business
    a. Committee P&P Refresher: Moving A Standard to Ballot, etc (:10) — P. Balma
    b. Committee O&P: Volunteers needed (:05) — P. Balma

Time Check – 4:30 PM

14. Subcommittee Reports – Roundtable (not intended to indicate order of reporting)

Bushings (:03)	P. Zhao
Dielectric Test (:03)	M. Franchek
Distribution Transformers (:03)	S. Shull
Dry Type Transformers (:03)	C. Johnson
HVDC (:03)	M. Sharp
Instrument Transformers (:03)	R. McTaggart
Insulating Fluids (:03)	D. Wallach
Insulation Life (:03)	B. Forsyth
Performance Characteristics (:03)	E. teNyenhuis
Power Transformers (:03)	J. Watson
Underground Transformers & Network Protector (:03)	D. Mulkey

15. Adjourn

10.6 Chair's Report – Donald Platts

Refer to Section 5.0 for a complete "Chair's Report."

- Technical Council:

  A summary of the DOE QER report was provided in the Chairs Report

- Technical Committee Structure

  The scope of each technical committee will be reviewed to make sure that all documents assigned to the technical committees belongs in that committee and that new technologies have a place that they can fit into.

- Proposals to add lanquage to standards

  What you need to know about IEEE Stds and the law excerpt is provided in the report. Wherever appropriate, IEEE standards-developing groups should specify standards based on performance or function rather than design or product specifications.

  The full brochure can be found at:

  https://standards.ieee.org/develop/policies/stdslaw.pdf

  There will be a mention at the General Meeting regarding conduct of the standards balloting process. We need to make sure that we operate in a manner that does not give the perception of collusion in order to get members to vote in a certain way.

10.7 Vice Chair's Report – Stephen Antosz

Refer to Section 6.0 for a complete "Vice Chair's Report."

Highlights:

IEEE/PES T&D Conference and Expo Apr 14-17, 2014: A total of 17 conference papers were submitted. After review, 5 papers were rejected and 8 papers were accepted and presented at the Poster Session

IEEE/PES General Meeting July 27-31, 2014: A total of 27 conference papers were submitted. After review, 15 papers were rejected and 10 papers were accepted and presented at the Poster Session

Most of the papers that were rejected were of very poor quality. Some of the papers had comments requesting revision and the documents were never resubmitted. Ed T indicated that the quality of the papers is improving. Most of the papers are submitted by students or professors.

10.8 Secretary's Report – Susan McNelly

Refer to Section 7.0 for a complete "Secretary's Report."

Highlights:

The Secretary presented a list of membership requests for this meeting. Eight new requests for membership were received. The eight new committee members were approved with the stipulation that Poorvi Patel provide a 3rd reference meeting the minimum 2 year participation requirement. Poorvi responded that the Moisture TF/WG has been meeting for over 2 years, therefore, this application was also approved.

Patents - Dave Wallach indicated that the LOA for C57.139 is in place. He indicated that he did not know if this needed to be identified each time. Erin indicated that if the LOA is in place, it does not need to be disclosed in the patent notification.

10.9 Treasurer's Report – Gregory Anderson

Refer to Section 8.0 for a complete "Treasurer's Report."

Highlights:

The Treasurer reported that at the end of August there was approximately $68,000 in the account.

10.10 Recognition & Award's Report – Bill Chiu

Refer to Section 9.0 for a complete "Recognition & Award's Report."

Highlights:

The Recognition & Awards Chair presented

There will be a short tribute for Rowland James who passed away in September of this year. There will also be an Outstanding Service Award presented to Don Fallon and one other member that will be announced at the Tuesday Awards Luncheon.

IEEE/PES WG award – Bill indicated he would like to propose C57.152 (Field Testing Guide). He indicated that this group spearheaded the way using Web conferencing between meetings.

10.11 Standard's Report – William Bartley

Refer to Section 11.0 for a complete "Standards's Report."

Highlights:

The Standard Coordinator presented.

There were 6 revisions to Standards and 1 Corrigenda approved

There is 1 ballot pending approval on the October Agenda – PC57.155

There were 8 PARs approved in the last 6 months.

There were 3 PAR modifcations approved in the last 6 months

There were 4 PAR extentions approved in the last 6 months; one with a 3 year extension, which is very unusual.

There are 12 PARs pending at present; 1 was approved by NESCOM but won't come before the Standards Board until October 24.

Bill reiterated that Standards now have a ten year life cycle.

Ballot pools for C57.12.00 and C57.12.90 have been formed and will be released for Ballot shortly.

There are 5 PARs expiring at the end of 2014. They have all been taken care of.

Bill will be presenting "Moving a Standard to Ballot" at the Monday Standards Luncheon. Also, Greg Marchini will be presenting on the tools that are available.

10.12 IEEE Staff Update – Erin Spiewak

IEEE Staff Attendance at this meeting: Erin Spiewak (Technical Programs), Greg Marchini (Tools & Solutions), Lisa Weisser (NESCOM), Karen Evangelista (REVCOM), and Noelle Humenick (Strategy & Engagement).

IEEE-SA Public Review Policy

Status update and target dates were reviewed. There will be training at the ADMIN SC meeting at the Spring 2015 meeting and at the Standards Luncheon meeting. She asked for other training ideas, such as WebEx for WG Chairs.

10.13 Meeting Planning Report – Gregory Anderson

No written report provided.

Highlights:

The Meeting host is Jane Ann Verner and PEPCO.

The next meeting will be a hostless meeting in San Antonio, Texas.

A question was raised that if we are not going to have a host, do we want to consider allowing someone to sponsor the Sunday Reception. This will be taken under consideration.

10.14 Old Business

10.14.1 WG Data Confidentiality – E. Spiewak

Erin indicated that the agreement has been finalized by IEEE.
Steve Shull asked whether there will be a place that WGs can put documents that are needed for standards and guides so that they can be made available the next time a revision is needed, such as sketches, figures, etc. Erin will follow up on this and Sue indicated she

would request a special Data folder be set up with a special password for storage of this type of materials.

10.14.2 Commercial or exclusion issues

Don indicated that we need to make sure that documents do not respresent only certain devices or suppliers products. An equal balance of content is needed and needs to remain uncommercial.

10.15 New Business

10.15.1 Committee P& P Refresher: Moving a Standard to Ballot – Peter Balma

Don asked each of the SC Chairs to give new WG Chairs a little direction on how to get started and where to go next, so that they have some guideance before calling Bill Bartley.
Don also brought up the issue of Corporate dominance. Based on perception or actual dominance, corporate representation as an officer of a WG or TF needs to be limited to one.
Peter presented a refresher on Moving a Standard to Ballot.
In addition to the TC P&P and the WG P&Ps. There are three additional documents that need to be referred to: IEEE Standards Assoc Operations Manual, IEEE-SA Standards Board Bylaws, and IEEE-SA Standards Board Operations Manual.
A 2/3 majority vote of the working group to proceed is needed to move a document forward to ballot. After this, the WG Chair brings the project to the appropriate SC and makes a motion to proceed to Sponsor Balloting. The SC reviews this on a procedural basis, not a technical basis. The technical work belongs in the WG, but does not prevent the WG from surveying the SC on the content.
The WG may form subgroups (often called Task Forces). Membership in the subgroup must follow the same rules as the WG regarding meeting minutes and members. At the time of formation, the WG shall determine the scope and duties delegated to the subgroup.
O&P Manual – Developing a New Standards Project.
In this manual there is a scope for each SC. Each of the SC Chairs needs to review this scope and determine if it still covers everything which the SC is involved with.
Peter indicated that a process for how a new standards project is developed needs to be addressed in the O&P Manual.
A process for how a new standards project is developed, Standards Revision Project, and PAR submittal are also needed.
Bill Bartley, Chuck Johnson, Dan Mulkey, Joe Watson, Steve Antosz volunteered to help with this effort.
Don requested clarification on the 2/3 approval to proceed to ballot. Don indicated that it is being recommended that the wording be changed to 2/3 of the members, not 2/3 of the quorum. There was a long discussion on this and the difficulty in getting responses back will make this difficult to achieve. Steve Shull indicated that responses to these types of request is typically low.
Don indicated to the group, that Corresponding Member will no longer be an option. If Members are unable to attend, it will be up to the WG Chair to determine if a member is participating and even though cannot attend will be retained as a member. There was considerable discussion regarding how this will affect quorums and WG business.
Don indicated he would like to appoint a task force to look at the P&P documents and identify any changes needed. He asked for volunteers to lead this effort. Dan Mulkey, Chuck Johnson, Joe Watson, Peter Balma, and Don Platts volunteered to work on this. Steve Shull volunteered to lead the effort. The TF scope will address issues that need revision within the WG P&P, specifically Meeting notice, voting requirement, what to do with existing Corresponding Members that will be eliminated. The TF deadline is by the Spring 2015 meeting.
Don asked the SC Chairs to be aware of WGs straying from their intended scope of work and reign them back in.
A new TF is being formed to determine a process

10.15.2 Succession Planning

Don indicated it would be nice to have a list of people available for possible succession planning in the event a SC or WG Chair was to step down or pass away, such as in Rowland James' situation.

10.16 Subcommittee Reports

Subcommittee	**Report/Hot Topic**
Bushings – P. Zhao	Scott Digby will be the WG Chair for GSU Bushing. C19.04
Dielectric Test – M. Franchek	John Crotty resigned as Chair of WG. Art Molden may take on this role Revision of Table 4 and 5 and for revision of Class 1 & 2 definitions. These revisions will be in the next revision of C57.12.00 that will be sent for ballot shortly.
Distribution Transformers – S. Shull	C57.12.37 Will need a new chair as John Crotty has stepped down. New joint WG between Distribution bushings and the Bushings SC. Expect to have WG start at next meeting.
Dry Type Transformers – C. Johnson	New WG C57.12.51 – General Requirements for 501 kVA and higher Ventilated Dry Type TRs - Sanjib Som will chair Casey Ballard will be the new SC Secretary. He no longer works for ABB, so there will be no conflict in having multiple representation from one company.
HVDC – M. Sharp	Ulf Radbrandt will be the new WG chair for the joint Standard for Converter TRs
Instrument Transformers – R. McTaggart	C57.13 is close to being ready for moving toward ballot
Insulating Fluids – D. Wallach	C57.104 PAR extension was approved and hopefully can progress now that data confidentiality has been moved forward.
Insulation Life – B. Forsyth	A PAR for Amendment of IEEE 1538 has been filed. The TF on WTIs needs closure
Performance Characteristics – E. teNyenhuis	New WG/TF Chairs: Rick Marek WG C57.110 PAR Approved Sanjib Som WG C57.21 PAR Approved Adam Bromley TF C57.105 Vinay Mehrota TF C57.109 There are 14 WGs presently in progress.
Power Transformers – J. Watson	C57.140 will need a new Chair due to Rowland James passing. Paul Boman will become Chair and Brian Sparling will be VC. A straw ballot had been taken.
Standards SC – Bill Bartley	Bill indicated that if a new WG Chair has been assigned, he needs to be notified so that this information can be made in My Project.
Underground Transformers & Network Protector – D. Mulkey	George Payerle will be the new VC for the SC.

10.17 Adjournment

11.0 STANDARDS REPORT – WILLIAM BARTLEY

The Standards Report follows on the next page.

IEEE / PES /TRANSFORMERS COMMITTEE

Standards Report

To: Members of IEEE Transformers Committee — Oct 23, 2014

From: William H. Bartley, Standards Coordinator — Rev #1

Executive Summary

This report covers the Transformers Committee Standards activity for the 6 month period from March 1, 2014 to October 17, 2014. In the last six months, no new Standards, six Revisions and one Corrigendum were approved by Standards Board. In this same period, the Standards Board approved seven PARs for new standards or revisions to standards; three PAR modifications, and four PAR Extensions.

In this Report:

I. Standards approved since March, 2014

NEW Transformer Standards Approved none

REVISIONS to Transformer Standards approved

PC57.12.44 - Standard Requirements for Secondary Network Protectors

PC57.116 - Guide for Transformers Directly Connected to Generators

PC57.12.28 - Standard for Pad Mounted Equipment - Enclosure Integrity

PC57.12.29 - Standard for Pad Mounted Equipment - Enclosure Integrity for Coastal Environments

P65700-19-03 - Standard for Bushings for DC applications

PC57.12.38 - Standard for Pad-Mounted Type, Self-Cooled, Single Phase, Dist Transformer, <250kVA.

CORRIGENDA approved:

PC57.12.31/Cor 1 Standard for Pole-Mounted Equipment - Enclosure Integrity - Corrigendum 1: Correction to the SCAB Corrosion Test in Section 4.5.6

Standards Pending:

The following Balloted REVISION has been submitted to REVCOM and is on their Oct 2014 agenda

PC57.155 Guide for Interpretation of Gases Generated in Natural & Synthetic Ester Transformers

II. PARs approved since March, 2014

PARs for New Standards and Revisions

PC57.163 Guide for Establishing Power Transformer Capability while under GMD <*new*>

PC57.15 Standard Requirements, Terminology, and Test Code for Distribution Overhead and Substation Step-Voltage Regulators <*revision*>

P1538 a - Guide for Determination of Max Winding Temperature Rise in Liquid-Filled Transformers - <*Amendment "A"* >

P60214-2 Tap-Changers - Part 2: Application Guide <*new*>

PC57.110 - Establishing Power and Distribution Transformer Capability When Supplying Nonsinusoidal Load Currents <*revision*>

PC57.12.23 - Standard for Submersible 1-Phase Transformers: 250 kVA or less, <*revision*>

PC57.12.51 - Standard for Ventilated Dry-Type Power Transformers, > 501 kVA, 3-Phase, with High-Voltage less than 34.5kV, Low-Voltage 208Y/120 V to 4160 V <*revision*>

PC57.21 Standard Requirements, Terminology, and Test Code for Shunt Reactors Rated Over 500 kVA <*revision*>

Above PARs were approved until December 2018

PAR Modifications approved

P1276 Guide for the Application of High-Temperature Insulation Materials in Liquid-Immersed Distribution, Power and Regulating Transformers

PC57.15 Standard Requirements, Terminology, and Test Code for Distribution Overhead and Substation Step-Voltage Regulators

PC57.153 Guide for Paralleling Regulating Transformers

PAR Extensions approved

PC57.19.01 Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings - *Extension Approved until December 2017*

PC57.120 Guide for Loss Evaluation of Distribution and Power Transformers and Reactors *Extension Approved until December 2016*

PC57.130 DGA Guide for Factory Temperature Rise Tests *Extension Approved until December 2015*

PC57.637 Guide for the Reclamation of Mineral Insulating Oil and Criteria for Its Use *Extension Approved until December 2015*

PARS Pending

The following PAR requests have been submitted and are already on the December NESCOM Agenda

❶

Submitted by	Sub-Committee	PAR Number	Request Type	Title
Tom Prevost 22-Aug-2014	Ins Life	PC57.119 ❷	PAR Request	Performing Temperature Rise Tests on Power Transformers at Loads above Nameplate Ratings
Adam Sewell 26-Sep-2014	Pwr Trans	PC57.157	PAR Modification Request	Functional Life Tests on Switch Contacts used in Transformers Tap Changers
Paulette Payne Powell 05-Sep-2014	Dry Type	PC57.12.59	PAR Modification Request	Guide for Dry-Type Transformer Through-Fault Current Duration
David Buckmaster 26-Aug-2014	Perf Char	P60076-16	PAR Modification Request	Power Transformers - Part 16: Transformers for wind turbine application
William Bartley 08-Oct-2014	Pwr Trans	PC57.153	PAR Modification Request	Guide for Paralleling Regulating Transformers
Tom Jauch 16-Oct-2014	Pwr Trans	PC57.153	PAR Extension Request	Guide for Paralleling Regulating Transformers
Ross McTaggart 29-Sep-2014	Instrument	PC57.13	PAR Extension Request	Standard Requirements for Instrument Transformers
Henry Alton 14-Oct-2014	Instrument	PC57.13.7	PAR Extension Request	Standard for Current Transformers with a Maximum Secondary Current of 250mA
Richard Ladroga 26-Aug-2014	Ins Fluid	PC57.104	PAR Extension Request	Guide for the Interpretation of Gases Generated in Oil-Immersed Transformers
William Bartley 06-Oct-2014	Ins Fluid	PC57.121a	PAR Withdrawal Request	AMENDMENT A for Guide for Acceptance and Maintenance of Less Flammable Hydrocarbons -
William Bartley 06-Oct-2014	Instrument	PC57.13-2008 Corrigenda 1	PAR Withdrawal Request	CORRIGENDUM for Standard Requirements for Instrument Transformers
William Bartley 06-Oct-2014	Perf Char	PC57.136	PAR Withdrawal Request	Guide for Sound Level Abatement and Determination for Transformers > 500 kVA

❶ *The names in the "Submitted-By" column are not necessarily the WG Chair.*

❷ *This PAR was "accepted" by NESCOM on October 9th but won't come before the Standards Board until Oct 24th.*

III. 2015 IEEE Standards Board Meeting Schedule

Starting in 2015, the Standards Board wil have only three *physical* board meetings per year. But they will supplement this with three (3) teleconference meetings. The full list of meetings is shown in the calendar on the next page.

Deadlines for 2015 Standards Board Submissions:

Standards Board Meeting	Submission Deadline
January teleconference	December 19, 2014
March 2015	February 13, 2015
June teleconference	April 24, 2015
August 2015	July 17, 2015
Oct teleconference	Sept 4, 2015
December 2015	October 23, 2015

III. 2014 Standards Board Meeting Schedul IV. Transformers Committee Ballot Status *(as of Oct 17, 2014)*

PAR / Standard #	Status	Ballot Opened	Ballot Closed	# of Balloters	Number of Ballot Comments
Distribution SC					
PC57.12.36	In Ballot	5-Oct-2014	5-Nov-2014	142	2
Insulating Fluids SC					
PC57.637	*Comment Resolution*	2-Jun-2014	2-Jul-2014	91	182
PC57.130	*Comment Resolution*	2-Jun-2014	2-Jul-2014	109	92
PC57.155 #	*Submitted to Revcom*				
Power Transformers SC					
PC57.125	*Comment Resolution*	2-Sep-2014	2-Oct-2014	167	158
P60076-57-1202	*Comment Resolution*	18-Aug-2014	18-Sep-2014	75	67
PC57.153	Recirculation 1	7-Oct-2014	17-Oct-2014	182	1
Standards SC					
PC57.12.90	Ballot Pool formed			241	0
PC57.12.00	Ballot Pool formed			244	0

this Balloted REVISION has been submitted to REVCOM and is on their Oct 2014 agenda

V. Transformer Committee PAR Status *(as of Oct 1, 2014)*

PAR Number	Project Type	Title	PAR Approval Date	PAR Expiration	Status
Bushings					
PC57.19.01	Revision	Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings	12/8/10	12/31/2017	Draft Development
PC57.19.04	New	Standard for High Current Power Transformer Bushings with Rated Continuous Current in Excess of 5000 A	6/16/11	12/31/2015	Draft Development
Dielectric Test					
PC57.138	Revision	Recommended Practice for Routine Impulse Test for Distribution Transformers	2/2/11	12/31/2015	Draft Development
PC57.160	New	Guide for the Electrical Measurement of PD in HV Bushings and Instrument Transformers	3/6/13	12/31/2017	Draft Development
PC57.161	New	Guide for Dielectric Frequency Response Test	8/23/13	12/31/2017	Draft Development

Distribution					
PAR Number	Project Type	Title	PAR Approval	PAR Expiration	Status
PC57.12.39	New	Standard Requirements for Distribution Transformer Tank Pressure Coordination	2/6/12	12/31/2016	Draft Development
PC57.12.37	Revision	Standard for the Electronic Reporting of Distribution Transformer Test Data	12/7/11	12/31/2015	Draft Development
PC57.12.20	Revision	Standard for Overhead-Type Distribution Transformers 500 kVA or less	6/8/12	12/31/2016	Draft Development
PC57.12.34	Revision	Standard Requirements for Pad-Mounted, Self Cooled, Three Phase Distribution Transformers, 10 MVA or less	3/31/11	12/31/2015	Draft Development
PC57.12.36	Revision	Standard Requirements for Liquid-Immersed Distribution Substation Transformers	12/7/11	12/31/2015	Ballot Open
PC57.15	Revision	Standard Requirements, Terminology, and Test Code for Distribution Overhead and Step-Voltage Regulators	3/27/14	12/31/2018	Draft Development
Dry Type					
PC57.12.01	Revision	Standard for General Requirements for Dry-Type Distribution and Power Transformers	12/9/09	12/31/2015	RevCom Agenda
PC57.12.51	Revision	Standard for Ventilated Dry-Type Power Transformers, 501 kVA or greater	8/21/14	12/31/2018	Draft Development
PC57.12.59	Revision	Guide for Dry-Type Transformer Through-Fault Current Duration	12/7/11	12/31/2015	Draft Development
PC57.94	Revision	Rec Practice for Installation, Application, Operation, and Maint of Dry-Type Distribution and Pwr Transformers	6/12/14	12/31/2015	Draft Development
Insulating Fluid					
PC57.637	Revision	Guide for the Reclamation of Mineral Insulating Oil and Criteria for Its Use	12/11/13	12/31/2015	Comment Resolution
PC57.104	Revision	Guide for the Interpretation of Gases Generated in Oil-Immersed Transformers	2/5/10	12/31/2014	Draft Development
PC57.106	Revision	Guide for Acceptance and Maintenance of Insulating Oil in Equipment	11/9/11	12/31/2015	Draft Development
PC57.121a	Amendment	Guide for Acceptance and Maint of Less Flammable Hydrocarbon Liquid in Transformers: Amendment a	8/23/13	12/31/2017	PAR Withdrawal Submitted
PC57.130	New	Guide for Use of DGA for Factory Temperature Rise Tests for Mineral Oil-Immersed Transformers	12/11/13	12/31/2015	Comment Resolution
PC57.139	Revision	Guide for Dissolved Gas Analysis in Transformer Load Tap Changers	6/16/11	12/31/2015	Draft Development
PC57.147	Revision	Guide for Acceptance and Maintenance of Natural Ester Fluids in Transformers and Other Electrical Equipment	2/6/12	12/31/2016	Draft Development
PC57.155 #	New	Guide for Interpretation of Gases Generated in Natural Ester and Synthetic Ester Immersed Transformers	3/25/10	12/31/2014	RevCom Agenda
Insulation Life					
PC57.162	New	Guide for the Interpretation of Moisture Related Parameters in Transformers and Reactors	8/23/13	12/31/2017	Draft Development
P1276	Revision	Guide for the Application of High-Temperature Materials in Liquid-Immersed Dist, Pwr and Reg Transformers	3/27/14	12/31/2016	Draft Development
P1538a	Amendment	Guide for Determination of Max Winding Temp Rise in Liquid-Filled Transformers - Amendment a	6/12/14	12/31/2018	Draft Development
PC57.119 ##	Revision	Performing Temp Rise Tests on Oil-Immersed Pwr Transformers at Loads Beyond Nameplate Ratings	Pending		NesCom Agenda ##

 # on RevCom Agenda 15-Oct-2014 ## on NesCom Agenda 09-Oct-2014

PAR Number	Project Type	Title	PAR Approval	PAR Expiration	Status
Instrument					
PC57.13	Revision	Standard Requirements for Instrument Transformers	3/25/10	12/31/2014	PAR Ext request submitted
PC57.13-2008/Cor 1	Corrigendum	Standard Requirements for Instrument Transformers - Corrigendum 1: Figure 3 Correction	9/30/10	12/31/2014	PAR Withdrawal Submitted
PC57.13.7	New	Standard for Current Transformers with a Maximum mA Secondary Current of 250mA	9/30/10	12/31/2014	Draft Development
PC57.13.8	New	Standard Requirements for Station Service Voltage Transformers	12/11/13	12/31/2017	Draft Development
Performance Characteristics					
PC57.110	Revision	RecPractice for Establishing Transformer Capability When Supplying Nonsinusoidal Load Currents	6/12/14	12/31/2018	Draft Development
PC57.120	Revision	Guide for Loss Evaluation of Distribution and Power Transformers and Reactors	3/25/10	12/31/2016	Draft Development
PC57.136	Revision	Guide for Sound Level Abatement and Determination for Power Transformers Rated Over 500 kVA	9/30/10	12/31/2014	PAR Withdrawal Submitted
PC57.158	New	Guide for the Application of Tertiary and Stabilizing Windings in Power Transformers	5/15/12	12/31/2016	Draft Development
PC57.159	New	Guide on Transformers for Application in Distributed Photovoltaic (DPV) Power Generation Systems	6/8/12	12/31/2016	Draft Development
PC57.21	Revision	Standard Requirements, Terminology, and Test Code for Shunt Reactors Rated Over 500 kVA	8/21/14	12/31/2018	Draft Development
PC57.32	Revision	Standard Requirements, Terminology, and Test Procedures for Neutral Grounding Devices	12/7/11	12/31/2015	Draft Development
P60076-16	New	Standard Requirements for Wind Turbine Generator Transformers	6/8/12	12/31/2016	Draft Development
Power Transformers					
P60214-2	New	Tap-Changers - Part 2: Application Guide	6/12/14	12/31/2018	Draft Development
PC57.125	Revision	Guide for Failure Investigation, Documentation, Analysis, and Reporting for Power Transformers	2/2/11	12/31/2015	Comment Resolution
P60076-57-1202	New	Standard Requirements for Liquid Immersed Phase-Shifting Transformers	6/8/12	12/31/2016	Comment Resolution
PC57.140	Revision	Guide for Evaluation and Reconditioning of Liquid Immersed Power Transformers	3/31/11	12/31/2015	Draft Development
PC57.153	New	Guide for Paralleling Regulating Transformers	8/21/14	12/31/2014	Comment Resolution
PC57.156	New	Guide for Tank Rupture Mitigation of Liquid-Immersed Power Transformers and Reactors	6/16/11	12/31/2015	Draft Development
PC57.157	New	Guide for Conducting Functional Life Tests for De-energized Tap-changer Contacts	12/7/11	12/31/2015	Draft Development
PC57.93	Revision	Guide for Installation and Maintenance of Liquid-Immersed Power Transformers	3/29/12	12/31/2016	Draft Development

Standards					
PC57.12.00	Revision	Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers	6/16/11	12/31/2015	PreBallot
PC57.12.90	Revision	Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers	6/16/11	12/31/2015	PreBallot
PC57.163	New	Guide for Establishing Power Transformer Capability while under Geomagnetic Disturbances	3/27/14	12/31/2018	Draft Development
Underground & NW Protector					
PC57.12.23	Revision	Standard for Submersible Single-Phase Transformers: 250 kVA and Smaller	8/21/14	12/31/2018	Draft Development
PC57.12.24	Revision	Standard for Submersible, Three-Phase Transformers, 3750 kVA and Smaller:	11/9/11	12/31/2015	Draft Development
PC57.12.40	Revision	Standard for Network, 3-Phase Transformers, 2500 kVA or less; Subway and Vault Types (Liquid Immersed)	8/30/12	12/31/2016	Draft Development

PARS due to EXPIRE DEC 2014 *(as of Oct 17, 2014)*

PC57.13 Standard Requirements for Instrument Transformers *(Extension Request Submitted)*

PC57.13-2008 Standard Requirements for Instrument Transformers - Corrigendum 1:
(PAR Withdrawal Submitted)

PC57.13.7 Standard for Current Transformers with a Max mA Secondary Current of 250mA
(Extension Request Submitted)

PC57.136 Guide for Sound Level Abatement and Determination for Transformers > 500 kVA
(PAR Withdrawal Submitted)

PC57.153 Guide for Paralleling Power Transformers
(Currently in Ballot Recirculation –Extension Request Submitted)

Please note: this report reflects the changes that took place over the last six months. It does not include the changes that have taken place during our 2014 Fall Committee meeting.

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
65700-19-03	Standard Requirements, Terminology, and Test Code for Bushing for DC Applications	Recksiedler 204 474 3192	2014 **12/31/2024**		Approved IEEE /IEC Dual Logo Approved by SASB in June 2014
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 **12/31/2017**	Approved +PAR for Revision Formally Std. IEEE 24 Reaffirmed in 2005. PAR for Rev first approved Dec 2010 Mar '10: NesCom extended PAR, unitl December 2013 PAR Extension until 2017 approved in March 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

STANDARD PROJECT	TITLE	Working Group Chair Phone Email	Pub Year Rev Due Dat	PAR Issue Dat PAR Expiration	Standard Status Remark
SubCommittee **DIELECTRIC TESTS** Chair **Franchek M. A.**		(802) 751-3539 michael.franchek@wicor.com			
PC57.161	Guide for DFR Measurements	Naderian A. a.naderian@gmail.com		8/22/2013 **12/31/2017**	New project
C57.113	IEEE Guide for Partial Discharge Measurement in Liquid-Filled Power Transformers and Shunt Reactors	Poulin B. (450) 652-2901 bertrand.f.poulin@ca.abb.com	1991 **6/17/2020**		Approved std Revision approved June 2010
C57.127	IEEE Guide for the Detection of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers	Gross gross@pdix.com	2007 **12/31/2018**		Approved
C57.138 PC57.138	IEEE Recommended Practice for Routine Impulse Test for Distribution Transformers	Crotty J.W. 573 659 6265 john.w.crotty@us.abb.com	1998 **12/31/2018**	2/2/2011 **12/31/2015**	Approved - Reaffirmed in June '05 Reaffirmation approved by RevCom on 6/8/05. Dec '10: Nescom approved new PAR until Dec31 2015
C57.98	IEEE Guide for Transformer Impulse Tests	Molden A. (845) 225-0993 a.molden@ieee.org	1994 **12/31/2021**		Approved - PAR to Revise IEEE Std C57.98-1994 PAR extension requested and approved to 12/31/2009. Dec '10: PAR mod and extension approved by Nescom

STANDARD PROJECT	TITLE	Working Group Chair Phone Email	Pub Year Rev Due Dat	PAR Issue Dat PAR Expiration	Standard Status Remark
SubCommittee Chair	**DISTRIBUTION TRANSFORMERS** **Shull S.**	(417) 625-6110 sshull@empiredistrict.com			
PC57.12.33	Guide for Distribution Transformer Loss Evaluation	Pekarek T. J. (330) 761-7800 tjpekarek@firstenergycorp.com			PAR WITHDRAWN - Inactive WG Decision made at Las Vegas Meeting to discontinue this activity.
PC57.12.39	Standard Requirements for Distribution Transformer Tank Pressure Coordination	Gaytan C. (52) 818 03022 133 carlos.gaytan.cavazos@indsys.ge.com		2/6/2012 **12/31/2016**	New Project
C57.12.20 PC57.12.20	Standard for Overhead Type Distribution Transformers, 500 kVA and Smaller, High-Voltage 34 500 Volts and Below; Low-Voltage, 7970/13 800 Y Volts and Below	Traut A. 706-548-3121 atraut@ieee.org	2011 **6/16/2021**	6/8/2012 **12/31/2016**	Approved Standard with approved PAR for Revision PAR for Revision approved June 2012
C57.12.28	Standard for Pad Mounted Equipment - Enclosure Integrity	Olen R. 414-837-8365 robertcolen3@eaton.com	2014 **12/31/2024**		Approved Previously NEMA/ANSI C57.12.28-1999
C57.12.29	Standard for Pad Mounted Equipment - Enclosure Integrity for Coastal Environments	Olen R. 414-837-8365 robertcolen3@eaton.com	2014 **12/31/2024**		Approved Previously NEMA/ANSI C57.12.29-1991
C57.12.30	Std for Pole-Mounted Eqpt - Enclosures for Coastal Environment	Olen R. 414-837-8365 robertcolen3@eaton.com	 **6/17/2020**		Approved new standard new standard approved June 2010
C57.12.31	IEEE Standard for Pole Mounted Equipment - Enclosure Integrity	Olen R. 414-837-8365 robertcolen3@eaton.com	2002 **12/31/2024**		Approved
C57.12.32	Standard for Submersible Equipment - Enclosure Integrity	Olen R. 414-837-8365 robertcolen3@eaton.com	2002 **12/31/2018**		Approved Published 3/7/2003. Reaffirmation approved Mar 2008
C57.12.34 PC57.12.34	Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase DistributionTransformers, 2500 kVA and Smaller: High-Voltage, 34 500GrdY/19 920 Volts and Below; Low Voltage, 480 Volts and Below	Shull S. (417) 625-6110 sshull@empiredistrict.com	 **12/9/2019**	3/31/2011 **12/31/2015**	Approved + PAR for Revision Originally Std. 1447, Combined C57.22-1980 & C57.12.26-1992 Revised Standard approved Dec09 Mar '11: Nescom approved new PAR for Revision
C57.12.35 PC57.12.35	IEEE Standard for Bar Coding for Distribution Transformers	Matthews P (601) 422-1533 lmatthews@howard-ind.com	2007 **12/31/2023**	6/17/2010 **12/31/2014**	Approved Formally P1265. Revision approved December 2013
C57.12.36 PC57.12.36	Standard Requirements for Liquid-Immersed Distribution Substation Transformers	Murphy J.R. (407) 824-4194 jerry.murphy@ieee.org	2007 **12/31/2018**	12/7/2011 **12/31/2015**	Approved std and approved PAR for Revision approved by SA Board on 9/27/2007 PAR for Revision approved Dec '11

STANDARD / PROJECT	TITLE	Working Group Chair / Phone / Email	Pub Year / Rev Due Dat	PAR Issue Dat / PAR Expiration	Standard Status / Remark
SubCommittee Chair **DISTRIBUTION TRANSFORMERS** **Shull S.**		(417) 625-6110 sshull@empiredistrict.com			
C57.12.37 PC57.12.37	IEEE Standard for the Electronic Reporting of Transformer Test Data	Crotty J.W. 573 659 6265 john.w.crotty@us.abb.com	2006 **12/31/2018**	12/7/2011 **12/31/2015**	Approved with PAR for Revision Formally C57.132, IEEE Std 1388-2000 D11d approved by SA Board on 3/30/2006. Published 7/21/2006. New PAR for Revision submitted Sept'11 -approved Dec'11
C57.12.38	Standard for Pad-Mounted, Compartmental-Type, Self-Cooled, Single-Phase Distribution Transformers with Separable Insulated High-Voltage Connectors; High Voltage, 34500 GrdY/19920 Volts and Below, Low Voltage, 240/120 Volts; 167 kVA and SmallerRequirements	Ghafourian A. A. ashhar.ghafourian@gmail.com	2014 **12/31/2024**		Approved This std replaces C57.12.21 & C57.12.25
C57.15 PC57.15	IEEE Standard Requirements, Terminology, and Test Code for Step-Voltage Regulators	Colopy C. A. (262) 896-2342 ccolopy@cooperpower.com	1999 **9/11/2019**	3/27/2014 **12/31/2018**	Approved Also known as 60076-21-2011 PAR for Revision approved March 2014 PAR Modification approved June 2014

STANDARD / PROJECT	TITLE	Working Group Chair / Phone / Email	Pub Year / Rev Due Dat	PAR Issue Dat / PAR Expiration	Standard Status / Remark
SubCommittee **DRY TYPE TRANSFORMERS** Chair **Johnson, Jr. C. W.**		(276) 688-1512 charles.w.johnson@us.abb.com			
C57.12.01 PC57.12.01	IEEE Standard General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin Encapsulated Windings	Holdway T. (276) 688-1512 charles.w.johnson@us.abb.com	2005 **12/31/2018**	12/9/2009 **12/31/2015**	Approved with PAR 1998 version was revised and approved in 2005 /Published 2006 PAR for Revision approved Dec 09. PAR extension granted until Dec 2015 Ballot Invitation opened Aug 16; Submitted to Revcom Aug 2014
C57.12.51 PC57.12.51	Ventilated Dry-Type Power Transformers, 501 kVA and Large, Three-Phase, with High-Voltage 601 to 34500 Volts; Low-Voltage 208Y/120 to 4160 Volts - General Requirements	Som S.K. 724 472 7809 sanjib.som@siemens.com	 **12/31/2018**	8/21/2014 **12/31/2018**	Approved + Active PAR for Revision Previously NEMA document C57.12.51, original publication by NEMA in 1981, Reaffirmed in 1998. This document was transferred to IEEE in Dec., 2002. Approved by SA Sept 2008. PAR for Revision approved Aug 2014
C57.12.52	Standard Requirements for Sealed Dry-Type Power Transformers, 501 kVA and Larger, Three-Phase, with High-Voltage 601 to 34 500 Volts, Low-Voltage 208Y/120 to 4160 Volts	Kennedy S. P. (716) 896-6500 skennedy@niagaratransformer.com	1981 **12/31/2022**		Approved Previously ANSI C57.12.52-1981 SA approved Dec 2012
C57.12.58	IEEE Guide for Conducting a Transient Voltage Analysis of a Dry-Type Transformer Coil	Kline A. D. (843) 705-2698 AKLINE1490@AOL.COM	1991 **12/31/2018**		Approved - Active Reaffirmed Sept 2008
C57.12.59 PC57.12.59	IEEE Guide for Dry-Type Transformer Through-Fault Current Duration	Powell P. A. (202) 388-2335 papayne@ieee.org	2001 **12/31/2018**	12/7/2011 **12/31/2015**	Approved + Active PAR for Revision Reaffirmation approved in 12/5/2006. PAR for Revision submitted Oct'11 and approved by Std Bd Dec'11 PAR Modification (changing Scope) is on NESCOM Dec 2014 Agenda
C57.12.60	IEEE Guide for Test Procedures for Thermal Evaluation of Insulation Systems for Solid Cast and Resin-Encapsulated Power and Distribution Transformers	Wicks R. C. (804) 383-3300 roger.c.wicks@usa.dupont.com	1998 **11/9/2019**		Approved with Corrigenda IEEE Std C57.12.56-1986 and IEEE Std C57.12.60-1998 merged together in 2009 Corrigenda 1 approved by SA June 2013
C57.12.91	IEEE Standard Test Code for Dry-Type Distribution and Power Transformers	Foster D. R. (815) 678-2421 dfoster@olsun.com	2001 **12/31/2021**		Approved
C57.124	IEEE Recommended Practice for the Detection of Partial Discharge and the Measurement of Apparent Charge in Dry-Type Transformers	Johnson, Jr. C. W. (276) 688-1512 charles.w.johnson@us.abb.com	1991 **12/9/2019**		Approved Reaffirmed Dec09
C57.134	IEEE Guide for Determination of Hottest Spot Temperature in Dry Type Transformers	Powell P. A. (202) 388-2335 papayne@ieee.org	2000 **12/31/2023**	12/7/2011 **12/31/2015**	Approved Reaffirmation approved 3/30/2006 PAR for Revision approved Dec'11 Std apprroved by SASB Dec 11 2013

STANDARD / PROJECT	TITLE	Working Group Chair / Phone / Email	Pub Year / Rev Due Dat	PAR Issue Dat / PAR Expiration	Standard Status / Remark
SubCommittee **DRY TYPE TRANSFORMERS**		(276) 688-1512			
Chair **Johnson, Jr. C. W.**		charles.w.johnson@us.abb.com			
C57.16 PC57.16	IEEE Standard Requirements, Terminology, and Test Code for Dry-Type Air- Core Series-Connected Reactors	Dudley R. F. (416) 298-8108 richardd@ca.trenchgroup.com	1996 **12/31/2021**		Approved Revision approved by Std Bd Sept 2011
C57.94 PC57.94	IEEE Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type General Purpose Distribution and Power Transformers	Stankes S (603) 545-3026	1982 **12/31/2018**	12/9/2011 **12/31/2015**	Approved Reaffirmation approved by the SA Board on 12/6/2006 PAR for Revision approved Dec'11
C57.96 PC57.96	IEEE Guide for Loading Dry Type Distribution and Power Transformers	Marek R. P. (804) 383-2376 Richard.P.Marek@usa.dupont.com	1999 **12/31/2023**	12/9/2009 **12/31/2013**	Approved - Active RevCom approved reaffirmation on 9/22/2004 Previous revision in 1994. PAR for Revision approved Dec 2009 Ballot completed and on Dec2013 Revcom agenda. Approved by SASB Dec11 2013
IEEE 259	IEEE Standard Test Procedure for Evaluation of Systems of Insulation for Dry-Type Specialty and General-Purpose Transformers	Stankes S (603) 545-3026	1999 **3/25/2020**		Approved 9/22/04 - RevCom approved reaffirmation Reaffirmed March 2010
SubCommittee **HVDC CON TX & SMRs**		416-298-8108			
Chair **Sharp M.**		mikes@ca.trenchgroup.com			
C57.129	IEEE General Requirements and Test Code for Oil Immersed HVDC Converter Transformers	Dudley R. F. (416) 298-8108 richardd@ca.trenchgroup.com	2007 **12/31/2018**		Approved Trial use std published 6/6/2000; upgraded to full use 3/2002 Approved by SA Board 9/27/2007
IEEE 1277	IEEE General Requirements and Test Code for Dry-Type and Oil-Immersed Smoothing Reactors for DC Power Transmission	Dudley R. F. (416) 298-8108 richardd@ca.trenchgroup.com	2000 **12/31/2020**		Approved. Ballot approved March 2010

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SubCommittee Chair	**INSTRUMENT TRANSFORMERS** **McTaggart R.**	(416) 751-8570 rossdm@ca.trenchgroup.com			
PC57.13.7	Standard for Instrument Transformer with max output of 250ma	Alton		9/30/2010 **12/31/2014**	New Project New project approved by NESCOM Sept 2010 PAR Extension request submitted Oct 2014
PC57.13.8	Standard Requirements for Station Service VTs	Wallace david.wallace@us.abb.com		12/11/2013 **12/31/2017**	New Project PAR approved Dec13 SB
PC57.13.8	Standard Requirements for Station Service Voltage Transformers	Wallace david.wallace@us.abb.com		12/11/2013 **12/31/2017**	Active PAR
C57.13 PC57.13	IEEE Standard Requirements for Instrument Transformers	McTaggart R. (416) 751-8570 rossdm@ca.trenchgroup.com	2008 **12/31/2018**	9/30/2010 **12/31/2014**	Approved - Active PAR for Corrigenda PAR to Extend PC57.13- submitted to NESCOM Oct 2014 PAR for Corrigenda will be withdrawn Dec 2014
C57.13.2	Conformance Test Procedure for Instrument Transformers	Smith J. E. (601) 346-9104 jes1@ieee.org	2005 **6/17/2020**		Approved PAR to Revise Std C57.13.2-1991; harmonize with C57.13-1993 D4 approved by RevCom on 6/8/2005; Published 9/29/2005. Reaffirmed 6/17/2010
C57.13.5 PC57.13.5	Standard of Performance and Test Requirements for Instrument Transformers of a Nominal System Voltage of 115 kV and Above	Riffon P. (514) 840-3000 x3424 riffon.pierre@hydro.qc.ca	2006 **9/11/2019**		Approved Reference Std. 1400 Previously C57.13.5 was a trial use Upgraded to Full Use 3/30/2006
C57.13.6	Standard for High Accuracy Instrument Transformers	Smith J. E. (601) 346-9104 jes1@ieee.org	**6/17/2020**		Approved Document published in 12/9/2005 Reaffiremed 2010

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SubCommittee **INSULATING FLUIDS**		(980) 373-4167			
Chair **Wallach D.J.**		david.wallach@duke-energy.com			
PC57.130	IEEE Trial-Use Guide for the Use of Dissolved Gas Analysis During Factory Temeprature Rise Tests for the Evaluation of Oil-Immersed Transformers and Reactors	Thompson J. A. 605-534-3571 serve1@svtv.com		6/16/2010 **12/31/2015**	New Project New PAR approved June 2010 - currently under ballot resolution. PAR extension requested and approved to 12/31/2007. PAR Modification approved Dec 2013 Another Extension granted until Dec 2015 in Aug 2014
PC57.155	DGA Guide for Esters filled Transformers	Boman P.E. (785)256-7161 paul_boman@hsb.com		3/24/2010 **12/31/2014**	New Project PAR approved by NESCOM - March-2010 Ballot Invitation Opened Aug 15, 2013
C57.104 **PC57.104**	IEEE Guide for the Interpretation of Gases Generated in Oil-Immersed Transformers	Ladroga R. K. 978 410 5507 richard.ladroga@rmiengineers.com	1991 **12/31/2018**	1/9/2010 **12/31/2014**	Active + New PAR for Revision Original PAR and document withdrawn in Dec. 2005. New PAR approved Jan 2010 PAR Extension request submitted Oct 2014
C57.106 **PC57.106**	IEEE Guide for Acceptance and Maintenance of Insulating Oil in Equipment	Rasor B. Bob.Rasor@sdmyers.com	2006 **12/31/2018**	11/9/2011 **12/7/2016**	Approved Standard PAR for Revision approved Dec'11
C57.111	IEEE Guide for Acceptance of Silicone Insulating Fluid and Its Maintenance in Transformers	Boman P.E. (785)256-7161 paul_boman@hsb.com	1983 **3/19/2019**		Approved
C57.121	IEEE Guide for Acceptance and Maintenance of Less-Flammable Hydrocarbon Fluid in Transformers	Sundin 903 231 3141 dsundin@svbchemicals.com	1998 **12/9/2019**		Approved Was to be administratively withdrawn in Dec., 2004 Reaffirmation ballot pool invitation initiated in October, 2005. Reaffirmed Dec 2009
C57.139 **PC57.139**	Guide for Dissolved Gas Analysis in Transformer Load Tap Changers	Wallach D.J. (980) 373-4167 david.wallach@duke-energy.com	2010 **12/8/2020**	6/16/2011 **12/31/2015**	Approved PC57.139 was approved as a new standard by IEEE-SA Dec 8, 2010 PAR for revision approved June 2011
C57.146	Guide for Interpretation of Gasses Generated in Silicone-Immersed Transformers	Murphy J.R. (407) 824-4194 jerry.murphy@ieee.org	2005 **6/16/2021**		Approved Reaff approved 16-June-11.
C57.147 **PC57.147**	Guide for Acceptance and Maintenance of Natural Ester Fluids in Transformers	McShane C. P. 262 366 1091 patrick_mcshane@cargill.com	 **12/31/2018**	2/6/2012 **12/31/2016**	Active with active PAR for Revision New Standard approved May 2008

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SubCommittee **INSULATING FLUIDS**		(980) 373-4167			
Chair **Wallach D.J.**		david.wallach@duke-energy.com			
IEEE 637	IEEE Guide for the Reclamation of Insulating Oil and Criteria for Its Use	Thompson J. A.	1985	12/10/2008	Approved + Active PAR for Revision
PC57.637		605-534-3571	**12/31/2018**	**12/31/2015**	Reaffirmation approved by SA Board 9/27/2007 PAR for Revision approved Dec 2008 PAR extension approved June 2012, until Dec 2014 PAR modification approved Dec 2013 Another Extension granted until Dec 2015
		serve1@svtv.com			
SubCommittee **INSULATION LIFE**		405-622-8816			
Chair **Forsyth B. I.**		bruce.forsyth@ieee.org			
PC57.145	Guide for the Definition of Thermal Duplicate Liquid-Immersed Distribution, Power, and Regulating Transformers	Beaster B. L. (601) 422-1302 blbeaster@ieee.org	0		PAR WITHDRAWN Dec 2004 Previously P1524 Modified PAR to expire in 2004 PAR administratively withdrawn in December, 2004
PC57.162	Guide for Interpretation of Moisture in Transformers	Prevost T. A. 781-672-6219 tprevost@ieee.org		8/23/2013 **12/31/2017**	New Project
C57.100	IEEE Standard Test Procedure for Thermal Evaluation of Liquid-Immersed Distribution and Power Transformers	Wicks R. C. (804) 383-3300 roger.c.wicks@usa.dupont.com	1999 **12/31/2021**		Approved Standard Requested PAR for revision on 10/18/2004. 1st Ballot -2010; 1st Recirc Sept 2011; 2nd Recirc closed 20-Oct'2011 APPROVED Dec 2011
C57.119 PC57.119	IEEE Recommended Practice for Performing Temperature Rise Tests on Oil Immersed Power Transformers at Loads Beyond Nameplate Ratings	Kennedy G. R. (402) 362-7317 grkennedy@ieee.org	2001 **12/31/2018**		Approved Previously IEEE 838. Published 3/12/2002. Reaffirmed Mar 2008 PAR for Revision is on Oct 9 Agenda
C57.154 PC57.154	Design, Testing and App of Liquid-Immersed Transformers with High-Temp Insulation	Marek R. P. (804) 383-2376 Richard.P.Marek@usa.dupont.com	2012 **12/31/2022**	3/19/2009 **12/31/2013**	New Standard PAR for new standard approved March 2009 Standard Bd approved Aug 30, 2012
C57.91	IEEE Guide for Loading Mineral-Oil-Immersed Transformers	Duckett D. A. (407) 942-9401 don.duckett@pgnmail.com	1995 **12/31/2021**		Approved Combined from C57.91-1981 & C57.92-1981 & C57.115-1991
IEEE 1276 P1276	IEEE Guide for the Application of High-Temperature Insulation Materials in Liquid-Immersed Power Transformers	Franchek M. A. (802) 751-3539 michael.franchek@wicor.com	1997 **12/31/2018**	2/6/2012 **12/31/2016**	Approved with active PAR for Revision Reaffirmation approved by SA Board in 3/30/2006 PAR for Revision approved by Std Bd Feb 2012 PAR Mod approved Mar 2014
IEEE 1538 P1538a	IEEE Guide for Determination of Maximum Winding Temperature Rise in Liquid Filled Transformer	Forsyth B. I. 405-622-8816 bruce.forsyth@ieee.org	2000 **12/31/2021**	6/12/2014 **12/31/2018**	Approved PAR for Amendment approved June 2014

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SubCommittee Chair	**PERFORMANCE CHARACTERISTICS** **TeNyenhuis E.G.**	(519) 837-4691 ed.g.tenyenhuis@ca.abb.com			
P60076-16	Standard Requirements for Wind Turbine Generator Transformers	Buckmaster D.E. 980-321-8381 david.buckmaster@shawgrp.com		6/8/2012 **12/31/2016**	Approved PAR PAR approved June 2012 /This is an IEC Joint development PAR Modification (changing title and scope) is on NESCOM Dec'14 Agenda
PC57.133	Guide for Short-Circuit Testing of Distribution and Power Transformers	Fortin M. 450-922-0925 fortin.marcel@ieee.org			PAR WITHDRAWN This PAR was withdrawn by consensus of PCSC. Proposed contents are reportedly addressed in C57.12.90.
PC57.158	Guide for the Application of Tertiary and Stabilizing Windings in Power Transformers	Betancourt E. (52-80)-30-2135 enrique.betancourt.ramirez@indsys.ge.c		5/15/2012 **12/31/2016**	Approved PAR
PC57.159	Guide for Application in Distributed Photovoltaic (DPV) Transformers in Power Generation Systems	Shertukde H.M. (860) 768-4847 shertukde@mail.hartford.edu		6/8/2012 **12/31/2016**	Approved PAR
C57.105	IEEE Guide for Application of Transformer Connections in Three-Phase Distribution Systems	Bromley A. 970 221 6673 abromley@fcgov.com	1978 **12/31/2018**		Approved Was to be administratively withdrawn in Dec., 2004. But extended to 2006. Reaffirmation ballot initiated in October, 2005. Reaffirmed 2008 2014 - New TF formed for Revision of 105: no PAR yet
C57.109	IEEE Guide for Liquid-Immersed Transformers Through-Fault-Current Duration	Mehrota V. (262) 547 0121 x1353 Vinay.Mehrotra@spx.com	1993 **12/31/2018**		Approved Reaffirmed Mar 2008 2014: New TF formed for Revision of 109; no PAR yet
C57.110 **PC57.110**	IEEE Recommended Practice for Establishing Transformer Capability When Supplying Nonsinusoidal Load Currents	Marek R. P. (804) 383-2376 Richard.P.Marek@usa.dupont.com	2008 **12/31/2018**	6/12/2014 **12/31/2018**	Approved Approved by SA Mar 2008 PAR for Revision approved June 2014
C57.120 **PC57.120**	IEEE Loss Evaluation Guide for Power Transformers and Reactors	Traut A. 706-548-3121 atraut@ieee.org	1991 **12/31/2018**	3/24/2010 **12/31/2016**	Approved - revision in progress Reaffirmation approved by RevCom 6/8/2006. PAR for Revision submitted 2010 to merge C57.120 & C57.12.33 PAR extended until 2016 by SASB, in June 2014
C57.123	IEEE Guide for Transformer Loss Measurement	TeNyenhuis E.G. (519) 837-4691 ed.g.tenyenhuis@ca.abb.com	2002 **6/17/2020**		Approved std Ref Std. IEEE 1098 Revision approved June 2010
C57.136 **PC57.136**	IEEE Guide for Sound Level Abatement and Determination for Liquid- Immersed Power Transformers and Shunt Reactors Rated Over 500 kVA	Antosz S. (412) 498-3916 santosz@comcast.net	2000 **12/31/2018**	9/30/2010 **12/31/2014**	Approved + Active PAR for Revision PAR for Revision approved by NESCOM Sept 2010 PAR for Revision will be Withdrawn in December 2014
C57.142 **PC57.142**	A Guide To Describe The Occurrence And Mitigation Of Switching Transients Induced By Transformer-Breaker Interaction	Degeneff R. C. (518) 276-6367 degenr@rpi.edu	2010 **12/8/2020**		Approved PC57.142 was approved as a new standard on December 8, 2010

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SubCommittee Chair	**PERFORMANCE CHARACTERISTICS** **TeNyenhuis E.G.**	(519) 837-4691 ed.g.tenyenhuis@ca.abb.com			
c57.149	Guide for the Application and Interpretation of Frequency Response Analysis for Oil Immersed Transformers	Sweetser C.L. (781) 672-6214 <charles.sweetser@omicronusa.com>	2012 **12/31/2022**	6/24/2004 **12/31/2012**	APPROVED
C57.18.10	IEEE Standard Practices and Requirements for Semiconductor Power Rectifier Transformers	Kennedy S. P. (716) 896-6500 skennedy@niagaratransformer.com	1998 **1/30/2019**		Approved Replaced the C57.18-1964 for pool cathode mercury-arc rectifiers. Amendment 1: Technical and Editorial Corrections was approved 3/27/08 Reaffirmed March 2009
C57.21 PC57.21	IEEE Standard Requirements, Terminology, and Test Code for Shunt Reactors Rated Over 500 kVA	Som S.K. 724 472 7809 sanjib.som@siemens.com	1990 **12/31/2018**	8/21/2014 **12/31/2018**	Approved + Active PAR for Revision Reaffirmation approved on 6/23/2004. Revised Std approved Mar 2008 PAR approved Aug 2014
IEEE 32 PC57.32	IEEE Standard Requirements, Terminology, and Testing Procedures for Neutral Grounding Devices	Kennedy S. P. (716) 896-6500 skennedy@niagaratransformer.com	1972 **12/31/2018**	12/7/2011 **12/31/2015**	Approved - Active PAR to revise std Dec. 2002 - Sponsor changed from PES/SPD to PES/TR; PAR Modified and extended to Dec 2011; PAR stalled Oct'11, without a ballot. PAR withdrawn & New PAR submitted Oct'11, approved by Stds Bd Dec '11

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SubCommittee **POWER TRANSFORMERS**		561 371 9138			
Chair **Watson J.D.**		joe_watson@ieee.org			
P60076-57-12	Standard Requirements for Phase Shifting Transformers	Ahuja R. K. (408) 957-8348 raj.ahuja@waukeshaelectric.spx.com		6/8/2012 **12/31/2016**	Approved PAR PAR approved June 2012 This is an IEC Joint development
P60214-2	Tap Changers- Part 2: Application Guide	Colopy C. A. (262) 896-2342 ccolopy@cooperpower.com		6/12/2014 **12/31/2018**	New PAR
PC57.153	Guide for Paralleling Power Transformers	Jauch E.T. (727) 866-0632 jauch@ieee.org		3/27/2008 **12/31/2014**	New Project PAR approved Mar 2008 PAR Extension granted May 2012, until Dec2014 PAR Modification approved Aug 2014 PAR Extension request submitted Oct 2014
PC57.156	Guide to Tank Rupture Mitigation	Zhao P. (417) 345-5926 peter.zhao@HydroOne.com		6/16/2011 **12/31/2015**	New Project
PC57.157	Guide for Conducting Functional Life Tests for De-energized Tap-changer Contacts	Hopkinson P. J. (704) 846-3290 phopkinson@ieee.org		12/7/1011 **12/31/2015**	New Project PAR for New standard approved Dec'11 PAR Modification (changing title and scope) is on NESCOM Dec 2014 Agenda
C57.116	IEEE Guide for Transformers Directly Connected to Generators	Hoffman G. (973) 621-6600 grhoffman@advpowertech.com	2014 **12/31/2024**		Approved Std approved by SASB Mar 2014
C57.117 **PC57.125**	IEEE Guide for Reporting Failure Data for Power Transformers and Shunt Reactors on Electric Utility Power Systems	Binder, Jr. W. B. (724) 654-3839 wbbinder@aol.com	1986 **12/31/2018**	2/1/2011 **12/31/2015**	Active Previously IEEE 786-1986, original approval date 6/19/1986. Oct 2010 decision to merge with C57.125. This standard is still Active because of PAR for revison of C57.125. This will be withdrawn when Revision of C57.125 is approved.
C57.12.10	Standard Requirements for Liquid-Immersed Power Transformers	Hoffman G. (973) 621-6600 grhoffman@advpowertech.com	1997 **9/30/2020**	6/14/2013 **12/31/2017**	Approved standard with Corrigenda Formally NEMA/ANSI document. Corrigenda 1 approved December 2012 PAR for Corrigenda 2 approved June 2013 Corrigenda 2 approved by SASB Oct 2013
C57.125 **PC57.125**	IEEE Guide for Failure Investigation, Documentation, and Analysis for Power Transformers and Shunt Reactors	Binder, Jr. W. B. (724) 654-3839 wbbinder@aol.com	1991 **12/31/2018**	2/1/2011 **12/31/2015**	Approved Oct'10: decision to merge with C57.117. Feb'11: NESCOM approved new PAR to merge 117 and 125.

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SubCommittee **POWER TRANSFORMERS**		561 371 9138			
Chair **Watson J.D.**		joe_watson@ieee.org			
C57.131	IEEE Standard Requirements for Load Tap Changers		1995 **12/31/2022**		Approved Standard PAR Modified Dec 09 and extended to Dec 2010. Dec '10: Nescom & Revcom extend untul Dec31 2011 1st Ballot closed May'11; 1st Recirc closed 21-Oct; Std was approved Mar 2012
C57.135	IEEE Guide for the Application, Specification and Testing of Phase- Shifting Transformers	Sim H. J. (919) 580-3234 jin.sim@ieee.org	2001 **6/16/2021**		Approved Approved for IEEE/IEC Dual Logo Dec. 2005 - IEC 62032 Ed. 1
C57.140 PC57.140	Evaluation and Reconditioning of Liquid Immersed Power Transformers	James R.I. (504) 576-6246 r.james@ieee.org	2006 **12/31/2018**	3/31/2011 **12/31/2015**	Approved D18 approved by RevCom 11/16/2006 Mar '11: Nescom approved new PAR until Dec31 2015
C57.143	Guide for Application for Monitoring Equipment to Liquid-Immersed Transformers and Components	Chu D. (212) 460-3456 chud@coned.com	 **12/31/2023**		Approved
C57.148	Standard for Control Cabinets for Power Transformers	Watson J.D. 561 371 9138 joe_watson@ieee.org	2011 **9/10/2021**		Approved Standard Approved by Std Bd Sept 2011
C57.150	Guide for the Transportation of Large Power Transformers and Reactors	Anderson G. W. (402) 680-1111 gwanderson@ieee.org	2012 **12/31/2022**		Approved
C57.17	Standard Requirements for Arc Furnace Transformers	Ganser R. (330) 492-8433 rganser@aol.com	 **12/31/2022**		Approved ANSI issued the original C57.17 standard in 1965.
C57.93 PC57.93	IEEE Guide for Installation of Liquid-Immersed Power Transformers	Lau M. Y. (604) 528-3201 mike.lau@bchydro.bc.ca	1995 **12/31/2018**	3/29/2012 **12/31/2016**	Approved Standard - with approved PAR for Revision Rev of ASA C57.93-1958, IEEE Std C57.12.11-1980, & C57.12.12-1980 PAR to Revise IEEE Std C57.93-1995 Approved by RevCom 12/2007 PAR for Revision was approved March 2012
IEEE 638 P638	IEEE Standard for Qualification of Class 1E Transformers for Nuclear Power Generating Stations	Swinderman C. (724) 778-5234 craig.swinderman@meppi.mea.com	1992 **12/31/2023**	6/7/2007 **12/31/2013**	Approved - Active Reaffirmation approved by SA Board 3/30/2006. New PAR for revision approved 6/7/2007. PAR extended until Dec 2012. PAR extended until Dec 2013. Standard approved by SASB Dec 11 2013

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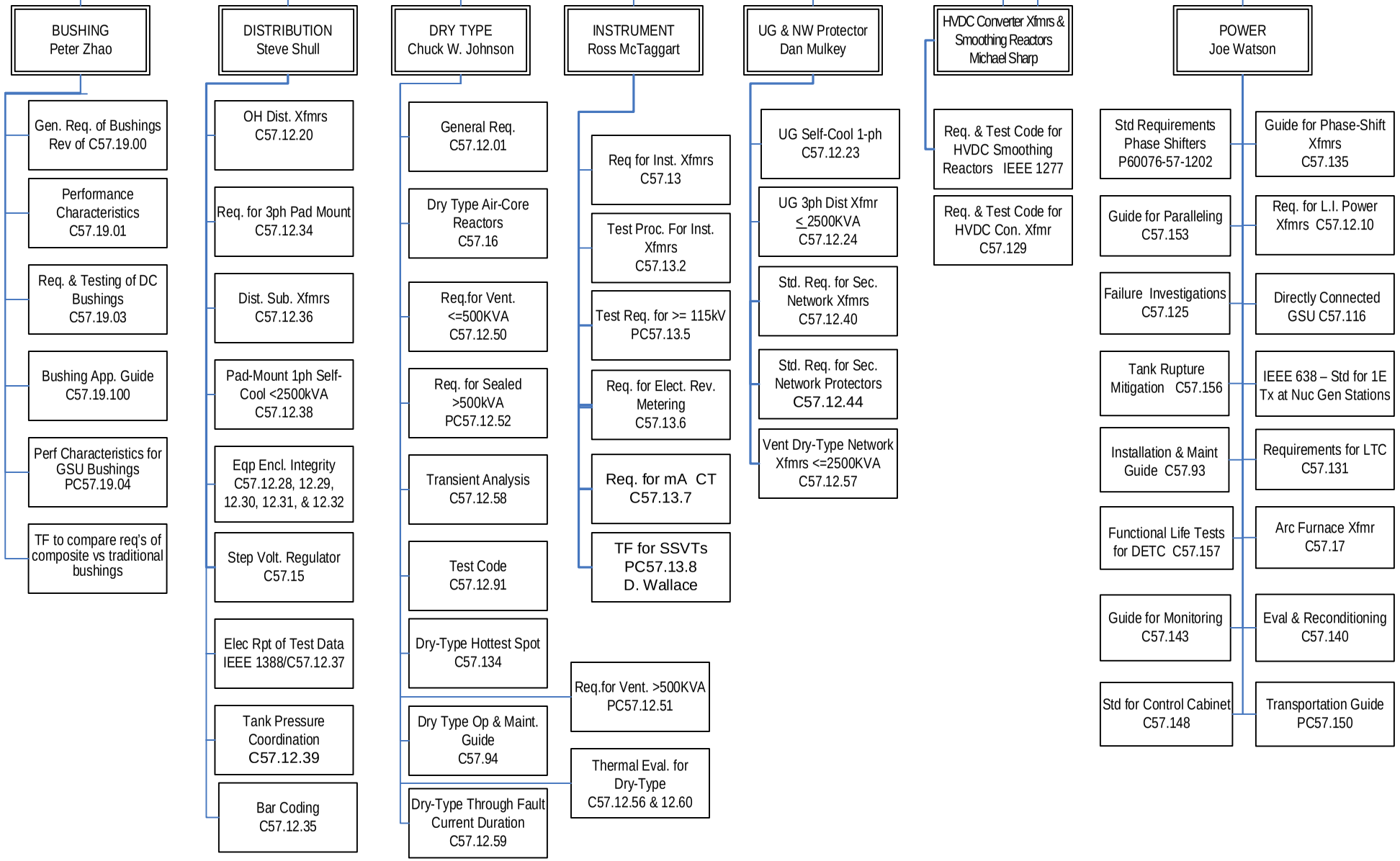
SubCommittee **STANDARDS** Chair **Bartley W. H.**		(860) 205-0803 whbartley@gmail.com			
PC57.163	Guide for Establishing Power Transformer Capability while under Geomagnetic Disturbances	Verner J. A. 202 872-2812 javerner@pepco.com		3/27/2014 **12/31/2018**	New PAR
C57.12.00 PC57.12.00	IEEE Standard for General Requirements For Liquid-Immersed Distribution, Power, and Regulating Transformers	Snyder S. L. (731) 288-4282 slsnyder@ieee.org	2010 **6/17/2020**	6/16/2011 **12/31/2015**	Approved 2010 rev approved by SA Board in June, 2010. Published 9/10/2010. PAR for Continuous Revision approved June 2011
C57.12.70	IEEE Standard Terminal Markings and Connections for Distribution and Power Transformers	Shull S. (417) 625-6110 sshull@empiredistrict.com	2000 **12/31/2021**		Approved Published 3/16/2001. Reaff approved by RevCom 3/30/2006. New Revision approved by Std Board Dec 2011
C57.12.80	IEEE Standard Terminology for Power and Distribution Transformers	Chiu B. (626) 308-6086 bill.chiu@sce.com	2002 **9/30/2020**		Approved std Amendment PAR approved to add thermally upgraded definition Revision approved Sept 2010
C57.12.90 PC57.12.90	IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers	Antosz S. (412) 498-3916 santosz@comcast.net	2006 **6/17/2020**	6/16/2011 **12/31/2015**	Approved Published Oct 2010 PAR for Continuous Revision approved June 2011
C57.144	Guide for Metric Conversion of Transformer Standards	Balma P.M. (973) 430-8259 peter.balma@pseg.com	2004 **3/25/2020**		Approved Published 10/22/2004 Reaffirmed March 2010
C57.152	IEEE Guide for Diagnostic Field Testing of Power Apparatus - Part 1: Oil Filled Power Transformers, Regulators, and Reactors	Verner J. A. 202 872-2812 javerner@pepco.com	1995 **12/31/2023**		Approved Originally IEEE 62. Reaff was successful.in 2005. New WG formed to revise document on a continuous basis based on TF recommendation. Revision changed to C57 series,

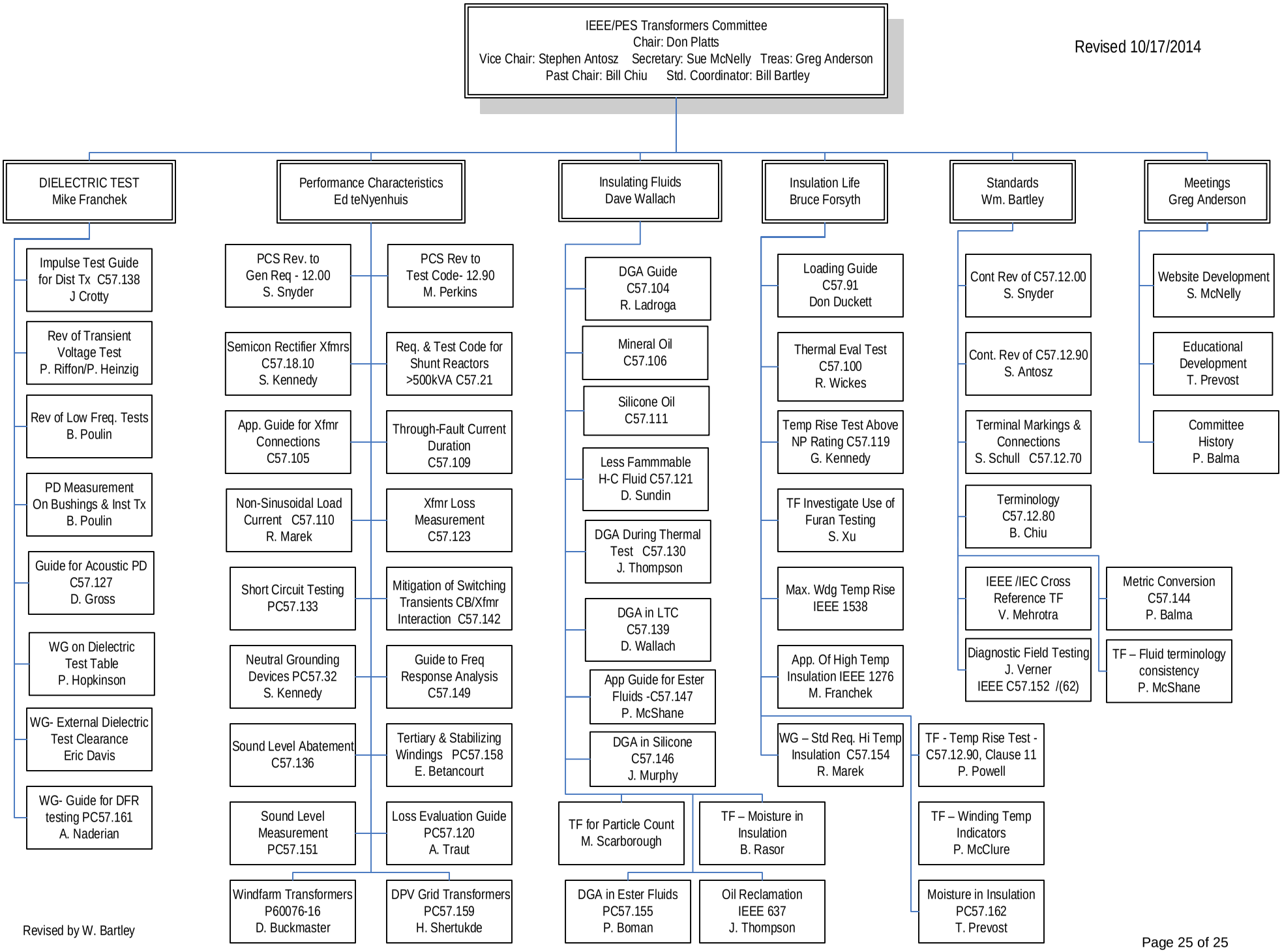
STANDARD PROJECT	TITLE	Working Group Chair Phone Email	Pub Year Rev Due Dat	PAR Issue Dat PAR Expiration	Standard Status Remark
SubCommittee	**UNDERGROUND TR & NW PROTECT**	(415) 973-4699			
Chair	**Mulkey D. H.**	DHM3@PGE.COM			
C57.12.23 PC57.12.23	IEEE Standard for Underground Type, Self-Cooled, Single-Phase Distribution Transformers with Separable Insulated High-Voltage Connectors; High Voltage 25kV and Below; Low Voltage 600V and Below	Traut A. 706-548-3121 atraut@ieee.org	2009 **3/19/2019**	8/21/2014 **12/31/2018**	Approved + active PAR for Revision Published 4/20/2009 PAR for Revision approved Aug 2014
C57.12.24 PC57.12.24	Requirements for Transformers - Underground-Type, Three Phase Distribution Transformers: High Voltage (34 500 GrdY/19 920 V and Below) and Low Voltage (480V and Below, 2500 kVA and Smaller	Termini G. (610) 941-1524 giuseppe.termini@peco-energy.com	2000 **6/17/2019**	11/9/2011 **12/31/2015**	Approved standard New PAR for Revision approved Nov '11
C57.12.40 PC57.12.40	Standard for Requirements for Secondary Network Transformers - Subway and Vault Types (Liquid Immersed)	Klaponski B. (204) 633-7220 brian.klaponski@carte.ca	2011 **12/31/2021**	8/30/2012 **12/31/2016**	Approved Standard with approved PAR for Revision Approved - C57.12.40-2011
C57.12.44	IEEE Standard Requirements for Secondary Network Protectors	Wimmer W. G. (804) 771-4225 bill_wimmer@dom.com	2014 **12/31/2024**		Approved PC57.12.44 -2014 approved by SASB March 2014
C57.12.57	Requirements for Ventilated Dry-Type Network Transformers 2500 kVA and Below, Three-Phase with High Voltage 34 500 Voltas and Below, Low Voltage 216Y/125 and 480Y/125 Volts	Robinson A. L. (361) 289-4001 alrobinson@aep.com	1992 **12/31/2000**		Standard WITHDRAWN in 2001 Existing standard withdrawn by IEEE on 1/15/2001. No longer endorsed by IEEE.

IEEE/PES Transformers Committee
Chair: Don Platts
Vice Chair: Stephen Antosz Secretary: Sue McNelly Treas: Greg Anderson
Past Chair: Bill Chiu Std. Coordinator: Bill Bartley

Revised 10/17/2014



Revised by W. Bartley


IEEE/PES Transformers Committee
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Revised 10/17/2014
DIELECTRIC TEST
Mike Franchek
Impulse Test Guide for Dist Tx C57.138
J Crotty
Rev of Transient Voltage Test
P. Riffon/P. Heinzig
Rev of Low Freq. Tests
B. Poulin
PD Measurement On Bushings & Inst Tx
B. Poulin
Guide for Acoustic PD C57.127
D. Gross
WG on Dielectric Test Table
P. Hopkinson
WG- External Dielectric Test Clearance
Eric Davis
WG- Guide for DFR testing PC57.161
A. Naderian
Performance Characteristics
Ed teNyenhuis
PCS Rev. to Gen Req - 12.00
S. Snyder
PCS Rev to Test Code- 12.90
M. Perkins
Semicon Rectifier Xfmrs C57.18.10
S. Kennedy
Req. & Test Code for Shunt Reactors >500kVA C57.21
App. Guide for Xfmr Connections C57.105
Through-Fault Current Duration C57.109
Non-Sinusoidal Load Current C57.110
R. Marek
Xfmr Loss Measurement C57.123
Short Circuit Testing PC57.133
Mitigation of Switching Transients CB/Xfmr Interaction C57.142
Neutral Grounding Devices PC57.32
S. Kennedy
Guide to Freq Response Analysis C57.149
Sound Level Abatement C57.136
Tertiary & Stabilizing Windings PC57.158
E. Betancourt
Sound Level Measurement PC57.151
Loss Evaluation Guide PC57.120
A. Traut
Windfarm Transformers P60076-16
D. Buckmaster
DPV Grid Transformers PC57.159
H. Shertukde
Insulating Fluids
Dave Wallach
DGA Guide C57.104
R. Ladroga
Mineral Oil C57.106
Silicone Oil C57.111
Less Fammmable H-C Fluid C57.121
D. Sundin
DGA During Thermal Test C57.130
J. Thompson
DGA in LTC C57.139
D. Wallach
App Guide for Ester Fluids -C57.147
P. McShane
DGA in Silicone C57.146
J. Murphy
TF for Particle Count
M. Scarborough
TF – Moisture in Insulation
B. Rasor
DGA in Ester Fluids PC57.155
P. Boman
Oil Reclamation IEEE 637
J. Thompson
Insulation Life
Bruce Forsyth
Loading Guide C57.91
Don Duckett
Thermal Eval Test C57.100
R. Wickes
Temp Rise Test Above NP Rating C57.119
G. Kennedy
TF Investigate Use of Furan Testing
S. Xu
Max. Wdg Temp Rise IEEE 1538
App. Of High Temp Insulation IEEE 1276
M. Franchek
WG – Std Req. Hi Temp Insulation C57.154
R. Marek
TF - Temp Rise Test - C57.12.90, Clause 11
P. Powell
TF – Winding Temp Indicators
P. McClure
Moisture in Insulation PC57.162
T. Prevost
Standards
Wm. Bartley
Cont Rev of C57.12.00
S. Snyder
Cont. Rev of C57.12.90
S. Antosz
Terminal Markings & Connections
S. Schull C57.12.70
Terminology C57.12.80
B. Chiu
IEEE /IEC Cross Reference TF
V. Mehrotra
Diagnostic Field Testing
J. Verner
IEEE C57.152 /(62)
Metric Conversion C57.144
P. Balma
TF – Fluid terminology consistency
P. McShane
Meetings
Greg Anderson
Website Development
S. McNelly
Educational Development
T. Prevost
Committee History
P. Balma
Revised by W. Bartley
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12.0 EDITOR'S REPORT

Between Spring 2014 meeting and this meeting a total of 73 new & resubmitted papers in the transformer area was under review of IEEE Transactions on Power Delivery for possible publication. For all of these papers the recommendations were as follows:

Accept: 22
Revise and Resubmit: 15
Reject: 15
Under review 21

The above numbers include reviews managed by all editors.

The papers which were accepted for publication are shown below:

Number	Paper ID	Title
1	TPWRD-01259-2013.R1	Contributions to differences between on - site and factory measured noise levels of Power Transformers
2	TPWRD-01123-2013.R2	CFD Study on Thermal Performance of Radiators in a Power Transformer: Effect of Blowing-Direction and Offset of Fans
3	TPWRD-01010-2013.R2	Investigations into the Stray Gassing of Oils in Fault Diagnosis of Transformers
4	TPWRD-00526-2013.R4	Accelerating Dielectric Response Measurements on Power Transformers Part II: A Regression Approach
5	TPWRD-00367-2013.R3	A Novel Approach to Investigate the Effect of Maintenance on the Replacement Time for Transformers
6	TPWRD-00950-2013.R2	Finite Element Modeling for Analysis of Radial Deformations within Transformer Windings
7	TPWRD-01348-2012.	Evaluation of Power Transformers Effective Hot-spot Factors by Thermal Modeling of Scrapped Units
8	TPWRD-01205-2013.R2	Temperature Reduction in the Clamping Bolt Zone of Shunt Reactors: Design Enhancements
9	TPWRD-01226-2012.R4	Partial discharge localization in power transformers using neuro-fuzzy technique
10	TPWRD-00876-2013.R2	"A method for averting saturation from series transformers of dynamic voltage restorers"
11	TPWRD-01075-2013.R2	Tools for Characterization and Assessment of Ferroresonance Using 3-D Bifurcation Diagrams"
12	TPWRD-01194-2013.R2	Models of Ferroresonant Transformers"
13	TPWRD-01287-2013.R2	Development of a Low Cost Self-Diagnostic Module for Oil-Immerse Forced Air Cooling Transformers
14	TPWRD-01237-2013.R2	High-Frequency Model of Power Transformer Based on Frequency Response Measurements"
15	TPWRD-01400-2013.R1	New Electric Current Transformer with a Self-Contained Power Supply"
16	WRD-01450-2013.R2	Online Transformer Internal Fault Detection Based on Instantaneous Voltage and Current Measurements Considering Impact of Harmonics"
17	TPWRD-01446-2013.R2	Design and Analysis on the Turn-to-turn fault protection Scheme for the Control Winding of Magnetically Controlled Shunt Reactor
18	TPWRD-01406R1-2013	Experimentally Validated Reversible Multi-Winding Transformer Model for the Accurate Calculation of Low-Frequency Transients
19	TPWRD-01474-2013.R1	On-line Detection of Inter-turn Winding Fault in Single-Phase Transformers Using a Terminal Measurement Based Modeling Technique
20	TPWRD-00208-2014-R1	An Updated Model to Determine the Life Remaining of Transformer Insulation
21	TPWRD-00099-2014.R1	Magnetic Amplifier–based Power Flow Controller
22	TPWRD-00213-2014-R2	Decomposition of hot-spot factor

Two significant changes have taken place in favor of paper submitters.

Firstly, on first submission three reviewers are required compared to earlier practice of four.

Secondly, IEEE overall has changed its policy to allow for up to 40% commonality in comparison to earlier publication.

The first step has made the process faster while the second step allows authors to convert their ideas faster into papers.

I would like to thank all of the reviewers who volunteered for this effort and donated their time, and would like to encourage everyone associated with IEEE Transformers Committee activities to consider becoming a Reviewer. I would like to encourage those Reviewers that already have an account on IEEE Manuscript Central to keep their profile information updated and complete the areas for key words and areas of interest. We need more reviewers and I encourage any of you that have not signed up as reviewers to sign up per the instructions at the end of this document.

It is important for all interested individuals to follow the norm for writing papers as provided in IEEE; the link is http://www.ieee.org/publications_standards/publications/authors/authors_journals.html and the link to upload the paper is http://mchelp.manuscriptcentral.com/gethelpnow/training/author/.

Please inform me at sanjib.som@siemens.com as soon as you do sign up so that we are able to utilize your efforts.

- I would also like to take this opportunity to personally acknowledge the reviewers involved in the transformer committee who have been regularly and consistently reviewing papers. This is an important contribution since it maintains the high standards for our papers and it gives back to the industry their expert knowledge.

Special mention must also go out to the editors who have worked hard to make this possible; they are Dr Kulkarni, Dr. Francisco De Leon, and Dr. Wilsun Xu.

Respectfully Submitted,
Sanjib Som
Editor, IEEE Transactions on Power Delivery from Transformer Committee

13.0 UNFINISHED (OLD) BUSINESS

No old business was discussed.

14.0 NEW BUSINESS

No new business was discussed.

15.0 MONDAY GENERAL SESSION ADJOURNMENT

The meeting adjourned at 9:10am.

THURSDAY GENERAL SESSION

16.0 LIAISON REPORTS

16.1 STANDARDS COORDINATING COMMITTEE, SCC NO. 4 (ELECTRICAL INSULATION) – DON PLATTS FOR PAULETTE PAYNE POWELL

IEEE PES TRANSFORMERS COMMITTEE
LIAISON REPORT FOR GENERAL SESSION MEETING – OCTOBER 20, 2014
Standards Coordinating Committee on Electrical Insulation – SCC 04

1. Scope:

- To formulate guiding principles for the evaluation of insulation materials and systems for electrical and electronic applications.
- To formulate principles for the identification of insulation materials and systems based on functional tests and/or experience.
- To coordinate the preparation of standards for functional test programs and diagnostic methods for the evaluation of insulation materials and systems.

2. Standards:

- IEEE 1-2000 (R2011) Recommended Practice – General Temperature Limits in the Rating of Electrical Equipment and for the Evaluation of Electrical Insulation
- IEEE 98-2002 (R2007) Standard for the Preparation of Test Procedures for the Thermal Evaluation of Solid Electrical Insulating Materials
- IEEE 99-2008 Recommended Practice for the Preparation of Test Procedures for the Thermal Evaluation of Insulation Systems for Electrical Equipment

3. Current Activities:

- **PC 98** – The draft has been balloted; resolution of comments is in progress with the assistance of Roger Wicks. The WG Chair has resigned; the SCC 04 Chair has assumed the position. The goal is to complete this project before expiration of the PAR in December 2015.
- **IEEE 99** – The SC will conduct a preliminary review for preparation of the PAR and to determine the extent of work required for the revision. An invitation is extended to anyone interested in chairing the Working Group

Anyone interested in joining the SC or WG activities *even as a corresponding member* should contact:

Paulette Payne Powell
Chairperson SCC 04
papayne@ieee.org

Respectfully submitted,
Paulette Payne Powell

16.2 STANDARDS COORDINATING COMMITTEE, SCC NO. 18 (NFPA/NEC) – DON PLATTS FOR NED BRUSH

Gmail by Google

Edwin Brush <ned.efbrush@gmail.com>

SCC-18 Report 10-22-2014
1 message

Edwin Brush <ned.efbrush@gmail.com> Wed, Oct 22, 2014 at 12:11 PM
To: Edwin Brush <ned.efbrush@gmail.com>

To: Don Platts

From: Ned Brush

The 2014 NEC code has been issued, and the 3-year process of seeking, reviewing and approving any code changes to be included in the 2017 Code has begun.

SCC-18 met last week to begin review activities for NEC-2017 code change submissions.

Suggestions for 2017 changes must be submitted by November 7, 2014. Submissions for support by IEEE were required by early October - 7 modifications were submitted by IEEE-PCIC (Petroleum-Chemical) and 6 were approved for IEEE companion support. (Most involved "arc-flash" and improved safety for personnel).

The initial NFPA/NEC meeting is January, 2015, which will review all (PCIC and "public") submissions. There will be another SCC18 meeting to review all submissions, and a report on progress will be made in San Antonio.

Respectively submitted,
NED BRUSH

16.3 IEC TC14 TECHNICAL ADVISOR TO USNC – PAUL JARMAN FOR PHIL HOPKINSON

No report submitted.

16.4 CIGRE – PAUL JARMAN FOR RAJ AHUJA

Report follows on next page.

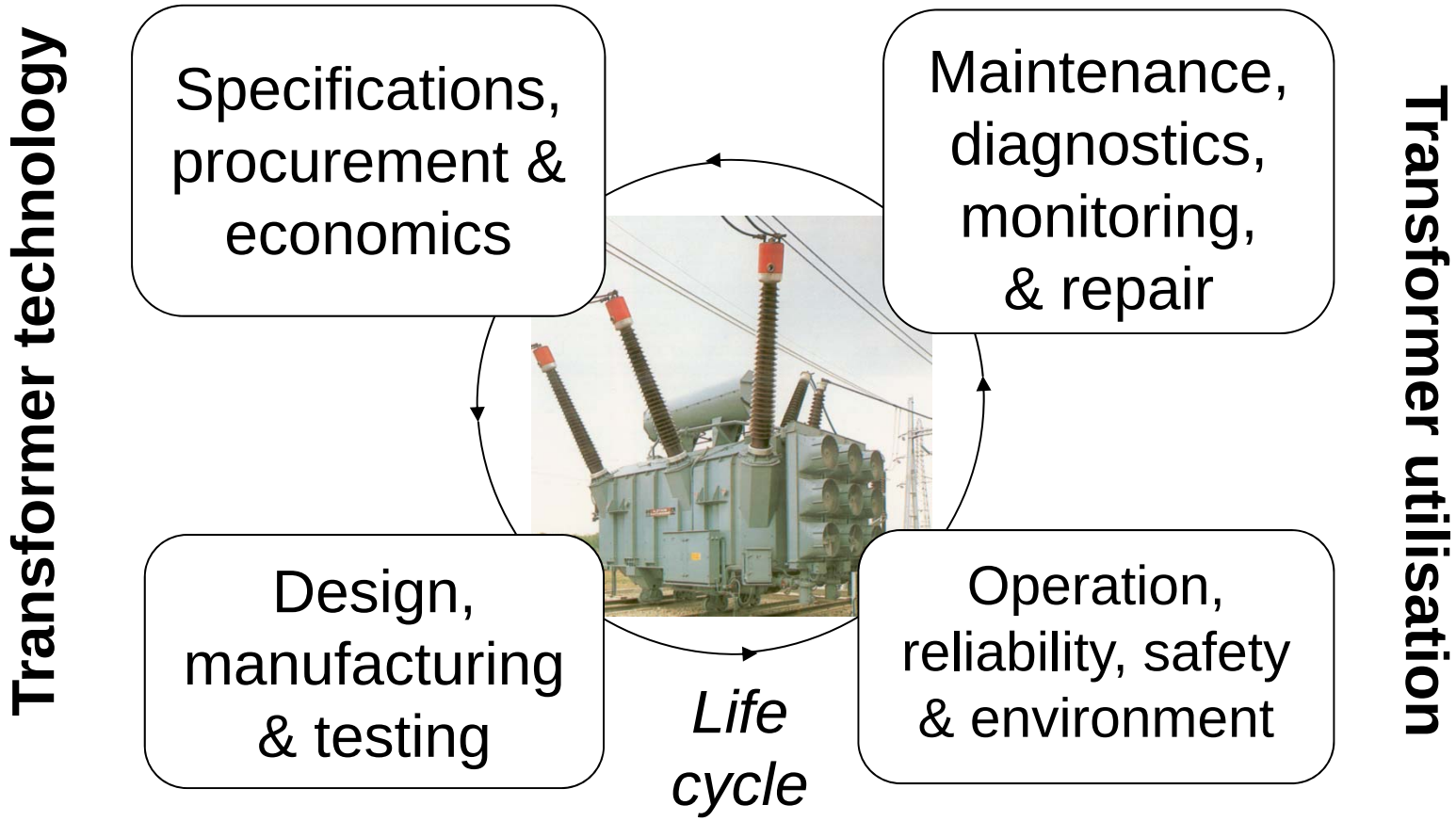
CIGRE Liaison Report on SCA2 Transformers
For IEEE Transformer Committee Meeting
October 19-23, 2014, Washington DC

Raj Ahuja

Overview of CIGRE Study Committees
approx. 3000 Experts in 16 Study Committees

- SC A1 Rotating Electrical Machines
- SC A2 Transformers
- SC A3 High Voltage Equipment
- SC B1 Insulated Cables
- SC B2 Overhead Lines
- SC B3 Substations
- SC B4 HVDC and Power Electronics
- SC B5 Protection and Automation
- SC C1 System Development and Economics
- SC C2 System Operation and Control
- SC C3 System Environmental Performance
- SC C4 System Technical Performance
- SC C5 Electricity Markets and Regulation
- SC C6 Distribution Systems and Dispersed Generation
- SC D1 Materials and Emerging Test Techniques
- SC D2 Information Systems and Telecommunication

Study Committee A2 Transformers: Key domains



Chairman: Claude Rajotte (CA)
Secretary: Patrick Picher (CA)

SC A2 Members/Activities

- 24 regular member Countries
- 19 observer member Countries
- 10 Working Groups and 5 Joint WG's
- Approx. 350 experts from 43 countries
- 5 Advisory Groups

SC A2 Working Groups

WG A2-37	**Transformer Reliability Survey** - S. Tenbohlen (DE)
WG A2-38	**Transformer Thermal Modelling** - J. Lapworth (UK)
WG A2.40	**Copper sulphide long-term mitigation and risk assessment** J. Lukic (RS)
JWG A2/D1.41	**Oil conductivity under DC condition –** A. Küchler (DE)
WG A2.42	**Guide on transformer Transportation** - A. Mjelve (NO)
WG A2.43	**Transformer bushings reliability** - A. Mikulecky (HR)
WG A2.44	**Transformer Intelligent Condition Monitoring** C. Dupont (BR)
WG A2.45	**Transformer Failure Invest. & post-mortem Analysis** M.C. Lessard (CA)
JWG A2/D1.46	**Field experience with trans. solid insulating ageing markers** R. Mertens (BE)
JWG D1/A2.47	**New frontiers of Dissolved Gas Analysis (DGA) interpretation for power transformers and their accessories** M. Duval (CA)
WG A2.48	**Technology and utili. of Oil Insulated HV Shunt Reactors** S. Ryder (UK)
WG A2.49	**Condition Assessment of Power Transformers** P. Cole (AU)
WG A2.50	**Effect of the distributed energy sources and consequent induced reverse power flow (step up) on T&D transformers** J. C. Riboud (FR)
JWG A2/D1.51	**Improvement to Partial Discharge Measurements for Factory and Site Acceptance Tests of Power Transformers** - S. Coenen (DE)
JWG A2/C4.52	**HF transformer models for non-standard waveforms** Bjorn Gustavsen (No)

Recent CIGRE BROCHURES

Scope	*Ref*	*Year*
Transient Interac. Transformers&Power System	577	2014
Guide for Specifications	528	2013
Guide for Design Review	529	2013
Guide for Factory Capability Assessment	530	2013
Guide for Fire Safety	537	2013
Guide on Transformer Maintenance	445	2011
HVDC Tr. – Test, ageing, reliability in service	406	2010
HVDC Tr. – Guidelines for design review	407	2010
Experience in service with new insulating liquids	436	2010
Copper Sulphide in Transformer Insulation	378	2009
Thermal Performances	393	2009
Mechanical Cond. Assessment of Xfo Windings	342	2008
Recom. for Condition Monitoring & Assessment	343	2008
Moisture Equilibrium within Transfo. Insulation	349	2008

2015 SC A2 Colloquium

2015 Colloquium in Shanghai September 20-15) with SC B3 and C3)

Preferential Subjects;

•EHV/UHV and EHVDC/UHVDC Transformers and its components

- Specification, design, manufacturing and testing
- Transportation constraints, installation and commissioning
- Reliability, operation and maintenance

•Equipment technologies for substations of the future and Smart Grid

- HV equipment using innovative efficient and environmentally friendly interrupting media and dielectric materials
- Optimization of substation design, O&M and equipment in efficiency, compactness, noise, costs, low maintenance, etc.

2015 SC A2 Colloquium

- Improved control of switching devices and means to reduce network stresses
- Increased application of semi conductor technologies and superconductivity

- **Making the Best use of the Existing transformer fleet**
  - Life Management techniques, criticality evaluation, fleet ranking
  - Improvements to condition monitoring, diagnostic techniques and on-site testing
  - Influence of more severe weather and new environmental considerations
  - Mitigation techniques to cope with higher stresses applied on aged transformers

Future WG activities

Future WG - under discussions

- FRA Interpretations
- Phase Shifting Transformers
- Effects of GIC
- Life Extension
- Transformer Typical and Minimum Sound Level
- Efficient and eco-design transformers

Thanks for Your attention

http://a2.cigre.org/

17.0 CHAIR'S REMARKS AND ANNOUNCEMENTS

Don mentioned that IEEE sent out a notice yesterday regarding the C57 Collection CD is now available. The price is fairly high. A comment was made that the upcoming C57.12.00 and C57.12.90 updates are not in this and members were urged to wait if they were thinking of buying this compilation.

18.0 MEETING'S PLANNING SC MINUTES & REPORT – GREGORY ANDERSON

Greg thanked Jane Ann Verner for being this meetings host. He indicated that she has been very helpful in the arrangements and keeping the meeting on budget.

Greg provided some meeting logistics, indicating that St. Louis is still our largest meeting to date.

Future Meetings: Greg reminded everyone that all of this information is on the website. The next meeting (April 12-16, 2015) will be a hostless meeting in San Antonio, TX at the Hyatt Regency Riverwalk Hotel. The Fall 2015 meeting will be in Memphis, TN at the Peabody Hotel, November 1-5.

Greg gave a brief overview of the Committee Finances including existing funds and meeting expenses.

Greg thanked a group of people who helped with making the meeting run smoother (Abbey Allen, Jennifer Stranko, and Tammy Behrens). He indicated he is looking for people to help with projector set up and dispersment during the meetings.

He also invited people to contact Tom Prevost if they have ideas for Presentations for upcoming meetings.

19.0 REPORTS FROM TECHNICAL SUBCOMMITTEES (DECISIONS MADE DURING THE WEEK)

Reports from each Technical SC were provided. Their minutes are included in full in the attached Annexes.

20.0 REPORTS FROM STANDARDS SUBCOMMITTEE AND STANDARDS (ISSUES FROM THE WEEK)

21.0 NEW BUSINESS

No new business was raised.

22.0 THURSDAY GENERAL SESSION ADJOURNMENT

The meeting was adjourned at 12:00PM.

Annex A Bushings Subcommittee

October 22, 2014
Washington DC Metro Area, USA

Chair: Peter Zhao
Secretary: Eric Weatherbee

A.1 Opening of the Meeting

A.1.1 Introductions

The Chair opened the meeting with group introduction

A.1.2 Attendance

Membership count was taken with the following results: 23 of 38 members were present and 82 guests for a total of 105 attendees. There were 11 new membership requests. There was a quorum.

A.1.3 Chairman's Remarks

The Chair informed the SC that an award was presented to the DC working group who completed the first joint IEEE/IEC standard. The WG was led by Mr. John Graham for IEC and Mr. Les Recksiedler for IEEE.

The Chair introduced the new Working Group Chair for PC57.19.04 GSU Bushing Standardization, Mr. Scott Digby.

The Chair stressed the importance for all WG Chair's to ensure their scheduled meetings take place if they are unable to attend. They need to verify that the Vice Chair and or Secretary are present to host the meeting. The conference attendees travel great distances to support the working groups and task forces and we must ensure that scheduled meetings do take place.

The Chair stressed that it is very important that we all need to be more diligent to avoid commercialization during the various meetings at the conference. He mentioned that it has been brought up several times in the past and improvements still need to be made.

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.

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. The Chair informed the SC that Mr. Spitzer had to leave the conference early. However, he did discuss with Mr. Spitzer the need to have a version of overloading added back into the standard and therefore he should start establishing a method to complete that for the next revision.

A.1.4.4 WG PC57.19.04 – Chair, Scott Digby; JD Brafa, Vice Chair; Secretary, Op

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

The first dual logo standard was approved June of 2014, as such no meeting was held.

A.2 External Liaison reports

A.2.1.1 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.2.1.2 IEEE 693 – Eric Weatherbee, IEEE Liaison

Mr. Weatherbee gave a brief presentation on the current state of the IEEE 693 revision progress. The presentation was submitted for hosting on the website. Following the presentation the Chair informed the SC that only two transformer and bushing OEMs attend the 693 meetings and urged the SC attendees to consider attending the 693 meetings so that there is an appropriate useable update.

A.2.1.3 WG PC57.160 – Thang Hochanh, Chair; Thomas Sizemore, Secretary

See complete minutes in Appendix E of this report.

A.3 Unfinished Business

A.3.1 Oil to SF6 Bushings – John Graham

Mr. Graham asked if the group wants to have this defined in a standard. It was mentioned that Mr. Elliott stated in the previous SC meeting that the current form of 00 and 01 exclude these types of bushings and therefore are beyond the scope and would require significant revision to include these so it may be best to start a new standard. Mr. Devki Sharma mentioned that he is a member of the GIS SC and that they use the existing IEC document for terminations and the IEEE bushing standard for dimensional values and he feels that is sufficient. The Chair suggested that we should form a taskforce to determine what the best way to proceed is. Mr. David Geibel agreed that a new standard should be written to look at these types of bushings. The Chair presented three alternate methods to the members for vote on how they would like to proceed however no agreements could be made at this time. It was suggested by Mr. Wayne Johnson that a formal written version be emailed to the members containing each proposal so that they could be better assessed.

A.3.2 Study Report on Distribution Transformer Bushings – Stephen Shull

The Chair informed the SC that Mr. Stephen Shull will Chair the TF for establishing a bushing standard that covers this type.

A.4 New Business

A.4.1 Taskforce for Composite Bushings – John Graham

The Chair expressed a need to form a taskforce to look at the definition, and application of composite bushings based on the comments made during the recent SC meetings. The Chair asked for the SC members to vote on the formation of the Taskforce and did receive a quorum vote of 18 members in agreement. The Chair then asked Mr. John Graham if he would be interested in leading this Taskforce which he agreed to do so.

A.5 Adjournment 10:36AM

Appendix A

IEEE/PES TRANSFORMERS COMMITTEE
Status Report of Transformers Standards

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
65700-19-03	Standard Requirements, Terminology, and Test Code for Bushing for DC Applications	Recksiedler 204 474 3192	2014 **12/31/2024**		Approved IEEE /IEC Dual Logo Approved by SASB in June 2014
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 **12/31/2017**	Approved +PAR for Revision Formally Std. IEEE 24 Reaffirmed in 2005. PAR for Rev first approved Dec 2010 Mar '10: NesCom extended PAR, unitl December 2013 PAR Extension until 2017 approved in March 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

WG Revision C57.19.01 Standard Requirements for Bushings.

MINUTES OF WORKING GROUP MEETING – F14 Washington DC Metro Area

The working group met on Tuesday October 21, 2014, at 9:30 am with a total of 37 participants. Of those, 22 members and 15 guests. Working Group membership is currently 50 members therefore a quorum was not achieved.

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

Name	Number of recent meetings (3 recent for membership)	Member Status Change
Barry Beaster	3	Changed to member after this meeting
Jose Izquierdo	3	Changed to member after this meeting
Kumar Mani	1	2 more meeting needed

1. Introductions and Distribution of Attendance Rosters
    a. The committee officers were introduced.
    b. Attendance rosters were circulated.
2. Establishment of Quorum
    a. A slide of WG membership was displayed. A count was performed and a quorum was not established as 22 members were present.
3. Minutes Approval
    a. Draft meeting minutes for S13 Savannah minutes were displayed on screen for a couple of minutes as refresher of activity however could not be voted on.
4. Old Business
    a. PAR Extension (to end of 2017) – reviewed timeline
    b. Scope – a slide showing the present PAR scope was displayed. The sentence referring users to 1991 guide for breaker bushings was discussed. One attendee thought it should be moved to body but not in scope and another suggested it remain in scope to allow users to quickly understand where to find breaker bushing guidance. General consensus was to leave the statement about breaker bushings in the scope paragraph. Juan Castellanos questioned if the term "free air" was defined. General consensus was free air meant to mean not inside any enclosure. Keith Ellis recommended that we call out exclusion of bus duct application which is unusual condition.
    c. Voltage Class – preferred and supplementary
        i. Slide was presented with proposed voltages. There was discussion about the 73 kV line-to-ground value that has never been published. The last 30 years it has been 88 kV at 550 kV BIL. Group discussed that 550 kV BIL should be 88 kV line to ground and 650 kV BIL should be 102 kV for 138 kV system applications. The nominal system voltage helps end-users but has drawbacks. There was much discussion but suggestion is to restore to 1991 version and not try to correct rated maximum line to ground voltages. Peter Zhao recommended we consider bushings of the future and not the past however users have legacy transformers with legacy bushings designs to retrofit.
    d. Bushing dimensions of 115 to 345 kV – up to 5,000 A

i. 230 kV add 5000 A. 345 kV and above a 5000 A bushing is likely not needed in the standard because of very low demand. Shibao will circulate a spreadsheet with voltage classes and ratings for comment.

e. Transformer Breaker Interchangeability (TBI) cantilever test requirement
   i. Table 4 has cantilever requirements. Annex A proposed to cover TBI as information which does not apply. The scope says the standard is not for breakers. Since it is not it applicable for breakers that we should not give treatment of TBI.

f. RIP power factor limit
   i. Table 6 has power factor limits including 0.85% for RIP and whether it should be reduced to 0.5%. Comments from the study group were shared. Limit was established for end users to have confidence and have reference.

5. New Business
   a. Power Factor Test Voltage – no time to discuss at this meeting.
6. Adjournment
   a. Meeting was adjourned at 10:50 am.

Minutes by: David Wallach, WG Secretary.
e-mail: david.wallach@ieee.org
Sheraton Tysons Hotel, October 21, 2014.

Minutes: WG PC57.19.04 – LV Bushings rated >5000A and applied in Bus Enclosures
Date: October 21, 2014 @ 11:00am – Washington DC USA

1) Attendance:
   a) 30 Attendees:
      i) 17 of 24 Members were present (>50%). A quorum was reached.
      ii) 13 Guests
         (1) 9 new, 4 repeat
      iii) 1 guest requested membership and was granted
      iv) 1 member was terminated (Richard Websper – retired)
2) Summary:
   1. Meeting opened w/ the introduction of Scott Digby as the new Chair
   2. Par expires Dec. 31, 2015. We have until October 2015 to file for a par extension or complete the standard. An extension will be required.
   3. Draft has been identified. Revision 1 will be circulated to the members before the end of this week. The following minor modifications were discussed and made for the initial release of the draft:
      - Remove cantilever table and include a single statement defining the cantilever strength for all bushings applicable for this standard
      - Remove power factor and partial discharge limits table (duplicate from C57.19.01)
      - Remove statement recommending users reference C57.19.01 for other current ratings
   4. Task force consisting of members – M. Williams and S. Zhang along with guests - D. Geibel, S. Riopel, K. Mani was formed to create section defining the Thermal Basis of Rating. Agreed deadline was set for Jan. 31, 2015 for circulation and comments for Spring 2015 meeting.
   5. Task force consisting of members – M. Williams, A. Natale, S. Nambi, and E. Weatherbee along with guests – D. Geibel and S. Riopel was formed to create a first draft of voltage, current, and dimensions table. Agreed deadline was set for February 28, 2015.
   6. E. Weatherbee agreed to write a brief summary regarding power factor and partial discharge limits for these types of bushings with reference to the applicable table of C57.19.01
      - One notable comment was made to clarify bushing nameplate PF and capacitance measurements are recorded without bus duct around the bushing, and for that matter any other external factors that may influence the C1 or C2 results (BCT's, etc)
   7. D. Sharma volunteered to be our liaison to IEEE C37.23 (Metal Enclosed Bus Standard). Jim Smith (jamesesmith@eaton.com) was identified as the chair of this standard.
      - We are seeking their input into the maximum, minimum, and 24hr average air temperature in metal enclosed bus as we attempt to define the usual service conditions of this environment
   8. It was noted that there would likely need to be special testing considerations defined in order to provide for validation of bushings complying with this new standard.
3) Adjournment: Meeting was adjourned at 12:15p

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. Three meetings have been held in Geneva the latest in August 2014 with 8 members from 6 countries present. The main items discussed were;

- Extension of test values to cover UHV bushings. Values are proposed for transformers following IEC60076, other values for switchgear are required.
- Extension of routine impulse testing following IEC60076-3 for bushings greater than 72.5kV rating was agreed.
- Thermal classification of resin impregnated synthetics (RIS) insulation is introduced.
- Temperature rise test conditions need further clarification. Application of thermal modelling was discussed in preference to the existing calculation which is seen as limited validity.
- The validity of the 120% rated current rule to cover overload currents needs clarification. All current ratings are based on daily mean ambient temperature.
- Altitude correction.
- A survey of the group has been made on the definition and characteristics for RIP, see attachement.

A working draft has been circulated to the Maintenance Team. The next meeting is expected before end of 2014 unless agreement is reached to circulate the draft as an official CD.

IEC/IEEE6570.19.03 "Bushings for DC Application"
The document was published in July 2014.

IEC61463 "Seismic qualification of bushings"
SC36A MT6 has been formed with Paolo Cardano, Alstom P&V as convenor. The team has reviewed other existing standards including IEEE693 to strengthen the document. A second internal working group draft has circulated been circulated April 2014. A CD should be issued by end of 2014.
Any comments from the IEEE committee would be welcome.

Other Work –
IEC61464 Dissolved gas analysis of oil impregnated paper bushings – No work done.
IEC62271-pt211 Bushings for direct connection transformer/GIS – re-numbered from IEC61693. Document published in April 2104. 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 9th meeting is Split Croatia in October 2014.
The group has three task forces;
It is aimed to publish the brochure during 2015.

John Graham
10 October 2014

	Manufacturer	A	B	C	D	E	F	G
1	Do you distinguish between Resin Impregnated Paper (RIP) and EPOXY Resin Impregnated Paper (ERIP)?	No	No	No	No	No	By introducing our bushings in USA we also wanted to specify them as Epoxy Resin Impregnated Paper. Important point for us is like in IEC 60137 it has to be vacuum impregnated.	No
2	Are other resin systems used that should be recognized in the specification?	No	No	No	No	No	No We have only one type of RIP formulation.	No Other resins may be used in future
3	Do all resin systems used classify for 120C hot spot temperature?	Yes	Yes	Yes	Yes	No	Yes 120°C is the standard insulation class for transformer bushing.	Yes
4	Is the proposed tan delta limit of 0.5% acceptable to all (for all products)?	Yes	Yes	Yes	Yes	No only 0.7% is acceptable at this moment	Yes it's acceptable for all products, measured at room temperature	Yes
5	What year did you introduce RIP manufacture?	1996	1960s	1999	1986	1972	1958	2000

WG PD in Bushings & PTs/CTs – PC57.160

Meeting Minutes October 20, 2014

The meeting of this working group was led by Thang Hochanh. Roster sheets were circulated for attendees and guests to sign in. Interested individuals could also indicate an interest in joining the working group on these forms.

A check was made to determine if a quorum was present. A total of 17 WG members were present which did fulfill the quorum requirements. This was followed by introductions.

The chairman presented comments in the format of a spreadsheet gathered from a circulation of the draft. Shibao Zhang, Reiner Krump and Stefano Pellegrino provided an extensive set of comments in response to the draft being circulated. These comments were discussed as detailed below. Other comments were also provided by Pierre Riffon and John Graham.

Figure 1 c-2 was shown and discussed. The focus of this conversation was about if typical values for C1, C2 and C3 could be presented in the document. David Geibel commented that C3 was unusual and is often shielded. Detlev Gross commented on test taps and voltage taps. Both David Geibel and Shibao Zhang commented that C3 is not in existing standards so consideration needs to be given to how this should be represented for consistency sake. Several comments were made that concerned the detailed test procedures. Bertrand Poulin commented on the need to stay on topic and within the scope of the working group. It was commented that a guidance may need to be added for how to deal with situations involving high capacitance.

The second comment on the draft was discussed. It was noted that voltage taps are relatively rare. Shibao Zhang mentioned situations where the signal to noise ratio would be a concern. In many cases this relates to the laboratory performing the test. This comment was also made in the email from Reiner Krump. Dirk Russwurm asked about calibration in this type of circuit.

Shibao Zhang requested the calibration circuit be shown. The chairman explain that for all type of test circuit, the calibration injections points are always the same and the injections point are independent of the test circuit configuration.

It was noted that for instrument transformers an example is needed showing a grounded case.

Detlev Gross next mentioned that IEC 60270 is progressing as a standard and is relevant to this guide.

Pierre Riffon commented on the text requiring that the background noise is not to exceed 50% of the limit to be measured. During discussion it was point out that this requirement may be too strict. This is a desirable goal but is unnecessary as a requirement. Dirk Russwurm and Detlev Gross comment that in cases where this stipulation cannot be met it may be necessary to perform calibration at a higher point. David Geibel requested clarification about the conditions present when defining the background noise. Does this include only the laboratory conditions or everything except the unit to be tested? At the end the working tend to agree that the lower 50% of the PD limit should stay as it is in the recommendations. Due to a situation of non-quorum, a survey will be held to get the opinion of the WG.

At this point Thang Hochanh moved to showing partial discharge test patterns for bushings and asking for comments from the attendees. Several patterns were discussed briefly including some due to internal voids and the power source. A few patterns for instrument transformers were shown. Most of these patterns were of void type defects. One particular pattern was noted as not identified. Detlev Gross suggested the pattern might be easier to interpret if the scale was linear instead of logarithmic.

The chair mentioned that in the Guide there will have many identified patterns and the proposition is to present other patterns not defined, although they will be identified as internal or external and in future revision of the guide, people will have opportunities finding the type of faults.

The meeting concluded due to time constraints.

Secretary: Thomas Sizemore

Chairman: Thang Hochanh

Annex B Dielectric Tests Subcommittee

October 22, 2014
Washington D.C

Dielectric Tests Subcommittee		
Chair: Michael Franchek	**Vice-Chair: Thang Hochanh**	**Secretary: Ajith M. Varghese**
Room : Fairfax Ballroom	Date : October 22 ,2014	Time: 11:00 am to 12:20 pm
Members : 103	Present at time of checking : 53	Present per attendance roster & recorded to AM System: 74
Guests : 86	Membership requested :11	Membership accepted: 6

B.1 Chair's Remarks

The Chair briefly highlighted the requirement that while introducing one need to state their employer/ company and sponsor if difference from company.

The Chair reminded the WG on attendance requirement for new membership and for continuation and touched upon scope of DTSC and requirement to have attendance updated in AM system. Chair noted the changes related to corresponding members requiring their status to be changed to guest or active members.

19 new membership requests were received during Savannah meeting and 11 were accepted. 8 requests were not granted based on attendance requirements. List of new members were presented during the meeting.

The Chair shared details of upcoming PES sponsored meeting as well as details of next transformer committee.

Current Status of PARs was presented. Bertrand Poulin noted that C57.160 was missed on list presented and Title of C57.113 should be recommended practice and not guide.

B.2 Quorum, Approval of Minutes and Agenda

The membership list was shown and a show of hands of committee members present showed that a quorum of members were in attendance at the start of the meeting. 53 out of 103 members were present at time of checking, so there was a quorum

All attendance is recorded in AM System.

The revised minutes of the Spring 2014 meeting in Savannah were approved without correction unanimously.

Chair presented agenda for the meeting. A motion to approve agenda for the meeting was made by Phil Hopkinson and was seconded by Don Platt.

B.3 Working Group Reports

B.3.1 Working Group on External Dielectric Clearances, Eric Davis, Chair; Troy Tanaka, Secretary

The Working Group met on October 20, 2014 at 9:30 am with 52 people attending the meeting; 13 of 24 members, and 39 guests. Four guests requested membership. A quorum was achieved. The full attendance record is available in the AM System.

David Wallace moved that the Spring 2014 meeting minutes be approved as written. Luke Dorpmanns seconded the motion. There were no revisions or additions to the minutes. The motion passed unanimously.

The WG reviewed the results of the recent Survey sent to the Working Group.

- A concern was raised with the reference to C57.12.22-1993 for pad mounted compartment type distribution transformers as the standard is not an active standard. It was noted that the reference verbiage should be changed to C.57.12.34-2009 (3 phase units) and C.57.12.38-2014 (single phase units). The Chair agreed to review the two references and send the results of his findings to the Working Group.

- In response to a survey comment that clearances are sometimes much shorter for distribution transformers than for power transformers at the same BIL, the working group agreed to use a single value for both, eliminating the distinction between them. The Working Group decided to use the smaller clearances as specified for distribution transformers.

- The Working Group agreed to add another line into the table for 1550 kV SIL at system 735 kV System Voltage to be in accordance with Table 6 of IEEE C57.12.00 -2010.

- In response to a concern that potential additional clearances may be required to accommodate issues such as animal intrusion, the Working Group agreed to move language from the text to a note to the in the table.

- A question was raised regarding Note (a) below the proposed table 11; bushings in enclosed space require lower clearance. The request to include reference to other IEEE document that allows lower distance in enclosed space will be researched and findings will be shared with the group.

- After discussion regarding clearances between top sheds of adjacent bushings, the Working Group confirmed its decision to eliminate these clearances from the table.

- The Working Group agreed to eliminate the mm column and instead follow the convention with inches and mm in parenthesis in order to be consistent with the format in other IEEE documents.

- In response to a comment regarding "BIL is not the only dominant factor in a transformer for external clearance of phase to ground and phase to phase", David Wallace made a motion to "Add values contained in the survey to the table and to add an explanation in either the text or the table that the shown clearances are based upon BIL." The motion was seconded by Chris Steineman. The vote was ten (10) votes in favor or and one (1) vote against the motion. The motion passed. It is important to note that the negative vote was cast because the member felt that the scope of the table had become too specific rather than taking other considerations such as testing clearances into consideration.

- In response to a request to round the mm dimensions to the nearest 100 mm, the WG agreed to seek guidance from IEEE C57.144-2004 - IEEE Guide for Metric Conversion of Transformer Standards. After studying this reference, the Chair will respond with his findings and the request may be considered.

As the work associated with the tables nears completion, the Chair asked for volunteers to help with modifications to the text. Baitun Yang and Javier Arteaga volunteered.

The WG intends to complete its activity at the next IEEE Transformer Committee Meeting in San Antonio and send its findings to the Subcommittee for action.

B.3.2 WG on Dielectric Frequency Response Analysis (DFR)

The meeting was called to order by the WG Chair Ali Naderian at 3:15 PM. This was the third Working group meeting. There were a total of 75 attendees; 24 members and 51 guests and 6 requested to become members.

1. The minutes of meeting from the WG Spring 2014 meeting in Savannah could not be approved since there was no quorum. To have a quorum we needed 26 members to be present

2. There are several sections of the document that are in a position to be circulated for review. The WG Chair has circulated them once- please review and give feedback to the responsible section leader.

3. The leaders of the various task forces covering the chapters of the guide gave updates of their work:

   a) Mario Locarno updated the group about Chapter 3 – DFR measurement overview. He addressed a couple of open questions, such as when should a DFR measurement be done.

   b) Chuck Sweetser updated the attendees about Chapter 4 – Making a DFR measurement. No revision between the meeting in Savannah and Washington D.C. has been made. One comment was raised regarding the stop frequency – in Figure 4- there is not a consistent message in the document regarding the stop frequency. In some places it states 0.1 mHz and in other places 1 mHz. When is 1 mHz good enough and when is it recommended to do measurements down to 0.1 mHz. Rewording of this section is needed.

Cigre document states to measure down to 0.1 mHz stop frequency.

c) Nathan Jacob updated the group about status of Chapter 5 – Test Records. This chapter is in good condition and ready for review by the entire WG One comment came up that it meant with weight/weight in section 5.3.4. This needs a little clarification in the text.

d) Peter Werelius is working on a first draft of Chapter 6 – Measurement Analysis, Interpretation and Report-expected to complete by Thursday of this week. Once finished he will circulate it to his team members for additional inputs and modifications. Some sections of Annex A maybe able to move to Chapter 6. Peter to work with George on looking into this.

e) George Frimpong presented Annex A – DFR Theory and Validation. This chapter is in good condition and ready for review.

f) Poorvi Patel updated the group about Annex B – DFR Other Application. Her team met face to face on the 20th of October at 1.30 pm to discuss the structure and content of Annex B. The suggested title of Annex B is "Non-Moisture Related Factors influencing the DFR Measurements".
The section will begin with an introduction describing the purpose of Annex B. Cases that are suggested by the team to include are
    a) Cu2S contamination influence
    b) Carbon contamination influence
    c) High core ground resistance influence.
    d) Broken interlaminate shield influence

The section will conclude with a conclusion of other factors that could influence the dielectric frequency response – in Table form and also indicting which set-up it could influence (CHL, CH or CL or all)
If there is a request of other cases to include – talk to Poorvi, Ali or Peter.

g) Mario Locarno presented Annex C – Typical Measurement Challenges. A large portion of this chapter has been completed. Please review this section. There is an extensive section on how temperatures could influence the DFR measurements.

As we did not have quorum in this meeting, the Spring Savannah meeting notes will be sent out by the WG Chair for email approval

4. No new business was discussed

5. Meeting was adjourned at 4.00 pm

Ali Naderian, WG Chair
Poorvi Patel, Secretary
Peter Werelius, Vice WG Chair

B.3.3 Working Group for Revision of the Distribution Impulse Test Guide C57.138 Recommended Practice for Routine Impulse Test of Distribution Transformers; Arthur Molden, Chair ; Susmitha Tarlapally, Vice-Chair

Docoment #: C57.138 Current Standard Date: March 9,1998

PAR Date: 2/01/2011 PAR Expiration Date: 12/31/2015

Meeting Date -10/21/2014

Members: 10 Members Present: 6
Guests Present: 27
Total Attendance: 33 Quorum achieved Attendance recorded in AM system

Location: Presidential Theatre
Time: 11:00AM – 11:17AM

New Chair Arthur Molden was introduced. Working group and guests introduced themselves. Quorum was verified and meeting had quorum with 6 members Chair. Chair requested for a motion to approve the meeting minutes. Jeff Britton passed a motion to approve the meeting minutes, Alain Bollinger seconded the motion.

Chair asked if anyone has any comments or new questions. Chair answered the question from spring 2014 meeting that the current standard scope does not include step voltage regulators.

Some of the drawings need editorial corrections and will be corrected by spring 2015 meeting.

Analog fault detection diagram will be redrawn as a functional block diagram. Jim Mcbride is working on the block diagram.

Meeting was adjourned at 11:17 AM.

B.3.4 Working Group on Revision of Impulse Tests – Pierre Riffon, Chair; Martin Hinow, Vice-Chair

The WG met on October 21, 2014, from 4:45 pm to 6:00 pm. Thirty (30) members and forty-one (41) guests attended the meeting. Three (3) guests requested membership. The meeting was chaired by Pierre Riffon, Chair of the WG and Mr. Peter Heinzig co-chaired the meeting in replacement of the actual vice-Chair Martin Hinow who was not able to attend the meeting.

Attendance has been recorded in the AM system.

Required quorum was met, 30 members were present, and presence of at least 25members was required. The working group membership has been reviewed after the Savannah meeting and members who did not attend the last two meetings were moved as guests. The WG has 3 corresponding members and will probably be moved to guests unless they are planning to attend further meetings.

The agenda has been reviewed and on New Business, Mr. Ajith Varghese requested to add a new item of discussion regarding a possible modification to the chopping time limit given in clause 10.3.1.3 of C57.12.90.

The motion to approve the agenda, as modified, has been made by Mr. B. Poulin and seconded by Mr. Paul Jarman. The agenda was approved by all members present.

Minutes of the St-Louis meeting have been sent via Email to the WG membership for approval after the Savannah meeting. The minutes of St-Louis meeting were approved, as written, by 28 members. None disapproved nor abstained. Minutes of the Savannah meeting were approved, as written, by all members present at the meeting. The motion for approval of Savannah meeting minutes was made by Mr. D. Wallace and seconded by Mr. P. Heinzig.

The first item of business was related to a survey made via Email within WG membership on a revised proposal defining a non-mandatory order for impulse tests (clause 10.1.5.1 of IEEE C57.12.90 “Test order”). Changes introduced at the Savannah meeting from earlier proposal versions, which were positively surveyed within the WG and the Dielectric Tests SC, were mainly editorial. This revised proposal has been approved by a majority of members having responded (28 members voted affirmative as written). None disapproved nor abstained. The proposal has been already sent to Steve Antosz for inclusion in the next draft of IEEE C57.12.90 which will be balloted in the upcoming weeks.

The second item of business was related to the questionnaire circulated within the WG on front time test parameters that shall be prioritized during lightning impulse tests (front time value and/or overshoot amplitude). Even if the number of responses to the questionnaire was extremely low, a small majority of persons did prefer to have a maximum limit on the front time and did agree to have no limit or a higher limit on the overshoot value. As additional input from the answers received, a clear majority (71%) of peoples having responded did agree to have a single set of front time test parameter tolerances regardless of the transformer winding design. For the time being, the Chair proposed that the best option would be the follow the IEC wording e.g. having a firm maximum limit of 2.5 μs on the front time and having no

maximum limit on the overshoot amplitude. As stated in IEC 60076-3, the overshoot shall be corrected with the test voltage function in case that the overshoot is higher than 5%. After discussion, all members present did agree to remove the 5% limit where the test voltage function shall apply. It has been agreed upon that the test voltage function shall be applied to all impulse waves regardless of its overshoot amplitude. This motion was made by Mr. B. Poulin and was seconded by Mr. J. McBride.

All members did agree to circulate, prior to the next meeting, the modified wording for survey within the WG and within the Dielectric Tests SC. This motion was made by Mr.
J. McBride and was seconded by Mr. Vladimir Khalin.

As a new business, Mr. Ajith Varghese requested to change the requirement regarding the maximum chopping time value of 1 μs given during chopped-wave tests. His proposal was to add the following sentence for clarifying cases were the voltage collapse after chopping is not oscillatory but rather over damped "In such cases, voltage zero may be considered as 20% of impulse test levels". Since members and guests have not seen his proposal, the Chair will circulate his proposal to the WG membership together with typical oscillograms for comments prior to the next meeting.

The next meeting is planned to be held in San Antonio, Texas, on April 14, 2015.
The meeting adjourned at 6:00 pm on October 21, 2014. The adjournment motion was made by Mr. J. Puri and seconded by Mr. P. Jarman.

B.3.5 Working Group on Revision of Low Frequency Tests
Chairman: Bertrand Poulin, Secretary: Bill Griesacker

There were 67 attendees, 23 members and 44 guests present at the meeting; 2 guests requested membership. The attendance has been recorded into the Committee AM system. More than 50 % of the working group members were in attendance at the meeting, therefore a quorum was present.

The agenda for the meeting was presented and unanimously approved.

A motion was made by the chairman to approve the minutes from the Spring 2014 meeting in Savannah, Georgia. No objections or comments were made; therefore the minutes were unanimously approved.

Old business

It was previously questioned why C57.12.90, section 10.5, calls for an induced, low frequency test, with a voltage factor of 3.46. This applies to single phase transformers that have an internally grounded neutral and BIL less than 150 kV. This only applies to single phase transformers since at the time this value was assigned, in general, only single phase transformers were constructed with an internally grounded neutral. The 3.46 factor was simply based on two times the phase-to-phase voltage. This voltage condition can occur during fault conditions. It is noted that Table 4 of C57.12.00, for Class 1 transformers, does not agree with the 3.46 factor. This value should be removed from C57.12.90 since the test level should be specified in C57.12.00. A proposal will be written by the Chair with recommendations to resolve this issue.

Tap Changer Position During Induced Test
The Chair and a volunteer (Shamaun Hakim, CG Washington) will work on writing a proposal. The objective is to test all magnetic devices within the transformer, excluding CTs.

New Business

Applying internal over-pressure to a transformer during induced test in order to reduce the risk of pd. Steve Antosz asked if an over-pressure should be excluded or limited during induced voltage testing. Comments in general were in agreement that during the official acceptance test, no over-pressure should be applied to the main tank. The tank pressure may be different for sealed tank, inert gas and conservator type of oil preservation systems. Steve Antosz moved and was seconded by Raj Ahuja, made a motion to request the working group to look into this topic to see if tank pressure during induced testing should be addressed in the standards. The motion was unanimously approved.

The meeting adjourned at 2:28 p.m.

B.3.6 WG **- IEEE Guide for the Detection of and Location of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers and Reactors (C57.127)**
Chair: Detlev Gross Chairs Vice Chair: Jack Harley Secretary: David Larochelle

B.1 Meeting Attendance

The working group met at 11 AM. 41 persons were in the room and 17 members were present. Quorum requirement was met. Complete attendance record is available in the AM System.

B.2 Discussions

With reference to Don Platts' comments during the opening session concerning inappropriate influence on standard documents, Detlev Gross pointed out that it is the intention with the revision of C57.127 to concentrate on signal properties, methods, and practice, while removing any unnecessary reference to individual instrument. On the other hand, to provide the working group with the overview needed, it is intended to continue devoting 20 minutes of the upcoming meetings to have non-commercial presentations covering available technology, experience, and case studies by instrument manufacturers and users.

A technical presentation was then made by Charles Sweetser. Characteristics of acoustic waves were shown as well as the spherical solution system that leads to a localisation when considering a direct propagation path in the oil. He also introduced a concept of survey used to confirm the presence of PD prior to a complete acoustic investigation.

Nathan Jacob raised a motion to approve our agenda for the meeting, seconded by Alexander Kraetge. The group unanimously approved the minutes from the Savannah meeting.
The Title, Scope and purpose were reviewed. A comment was made stating that “Electrical Discharges” does not include mechanical noise produced by bubbling oil or vibrating elements inside the transformer.

After discussing the idea, it was agreed by the group that the guide should describe the mechanical vibrations that can be encountered but that the title of the guide should stay as proposed.
The Title, Scope and Purpose were approved by the group with 16 votes for and 1 abstention. Below is the approved wording.

Title:
IEEE Guide for the Detection, Location and Interpretation of Sources of Acoustic Emissions from Electrical Discharges in Power Transformers and Power Reactors

Scope:
This guide is applicable to the detection and location of sources of acoustic emissions from partial discharges and other sources in power transformers and power reactors. There are descriptions of acoustic instrumentation, test procedures, and interpretation of results.

Purpose:
This guide is intended to provide information that may be helpful in planning, installing, and operating acoustic measuring equipment and in meaningful interpretation of resulting data.
Hemchandra Shertukde volunteered to prepare the technical presentation of the San Antonio meeting.

Adjournment
The meeting was adjourned at 12:15 PM by Michael Franchek and Ali Naderian.

B 3.7 Working Group for PD in bushings, PTs and CTs – PC57.160
WG Secretary: Thomas Sizemore; WG Chair: Thang Hochanh

The meeting of this working group was led by Thang Hochang. Roster sheets were circulated for attendees and guests to sign in. Attendance is to be recorded in the AM system based on these roster sheets. Interested individuals could also indicate an interest in joining the working group on these forms.

A check was made to determine if a quorum was present. A total of 17 WG members were present which did fulfill the quorum requirements. This was followed by introductions.

The chairman presented comments in the format of a spreadsheet gathered from a circulation of the draft. Shibao Zhang, Reiner Krump and one other individual provided an extensive set of comments in response to the draft being circulated. These comments were discussed as detailed below.

Figure 1 c-2 was shown and discussed. The focus of this conversation was about if typical values for C1, C2 and C3 could be presented in the document. David Geibel commented that C3 was unusual and is often shielded. Detlev Gross commented on test taps and voltage taps. Both David Geibel and Shibao Zhang commented that C3 is not in existing standards so consideration needs to be given to how this should be represented for consistency sake. Several comments were made that concerned the detailed test procedures. Bertrand Poulin commented on the need to stay on topic and within the scope of the working group. It was commented that guidance may need to be added for how to deal with situations involving high capacitance.

The second comment on the draft was discussed. It was noted that voltage taps are relatively rare. Zhang mentioned situations where the signal to noise ratio would be a concern. In many cases this relates to the laboratory performing the test. This comment was also made in the email from Reiner Krump. Dirk Russwurm asked about calibration in this type of circuit. Shibao Zhang requested the calibration circuit be shown.

It was noted that for instrument transformers an example is needed showing a grounded case.
Detlev Gross next mentioned that IEC 6270 is progressing as a standard and is relevant to this guide. Pierre Riffon commented on the text requiring that the background noise is not to exceed 50% of the limit to be measured. In some cases this requirement may be too strict. This is a desirable goal but is unnecessary as a requirement. Dirk Russwurm and Detlev Gross comment that in cases where this stipulation cannot be met it may be necessary to perform calibration at a higher point. David Geibel requested clarification about the conditions present when defining the background noise. Does this include only the laboratory conditions or everything except the unit to be tested? At this point Thang Hochang moved to showing partial discharge test patterns for bushings and asking for comments from the attendees. Several patterns were discussed briefly including some due to internal voids and the power source. A few patterns for instrument transformers were shown. Most of these patterns were of void type defects. One particular pattern was noted as not being clear as to the type of issue. Detlev Gross suggested the pattern might be easier to interpret if the scale was linear instead of logarithmic.

The meeting concluded due to time constraints.

B.3 Liaison Reports

B.3.1 Voltage Test Techniques (HVTT), IEEE Standard 4 - Arthur Molden

The Working Group of High Voltage Test Techniques (HVTT) Subcommittee met in conjunction with the IEEE Power Engineering Society (PES) General Meeting at the Gaylord National Resort and Conference Center, National Harbor, Maryland on July 31st, 2014. There were 7 members and 19 guests in attendance.

At that meeting members of the subcommittee presented a Panel Session on High Voltage Test and Measurement Techniques, that included much of the same material included in a similar presentation made during our WG meeting at Milwaukee in October 2012.

The actual Working Group meeting convened at 11 AM and continued for 1 hour. During that meeting two items discussed that would be of particular interest to our members were, future meeting locations and possible future work for the HVTT Subcommittee.

The HVTT Subcommittee is sponsored by the Power System Instrumentation and Measurement Committee (PSIM) and working group meetings have historically been scheduled independently, as convenient for those WG members wishing to attend. It has been proposed that future meetings should be

paired with either the PES General Meetings and, or with meetings of the various apparatus committees, such as the Transformer Committee. Possible future scheduling of such meetings has yet to be explored.

Now that the latest revision of IEEE Standard 4 has been published (as of May 2013) possible future work for the HVTT Subcommittee is being considered. Items of interest are:

IEEE Standard for Digital Recorders for Measurement in High Voltage Impulse Tests (IEEE 1128) and, to expand the scope of that standard to include the software requirements for such measurements.

IEEE Recommended Practices for Safety in High-Voltage and High-Power Testing (IEEE 510). This was last published in 1983 and has been withdrawn but, there is an interest in producing a revised edition.

The meeting was adjourned at 12PM.

B.4 Old Business

B.4.1 Survey of Correction for dielectric Table 4 and 5

- All the 3 negative votes from previous surveys were changed to positive after editorial changes were made. Corrected table is forwarded to include in revision to C57.12.00 which will be coming up for ballot.

B.4.2 Survey for change of definition to class II

- Survey results for class II definition changes were presented during previous meeting. This change is now approved and will be part of revision to C57.12.00 which will be coming up for ballot.

No other old Business was brought for discussion

B.5 New Business

Three new items were brought up.

- Based on Low Frequency test WG discussions related to C57.12.90 Section 10.5, Bertrand Poulin brought a motion to survey within WG and DTSC the proposal to delete reference to 3.46 Voltage factor for induce test of 1 phase distribution transformer with internally grounded neutral and BIL less than 150 KV from C57.12.90. After discussions, scope was increased to include distribution SC also in survey. Amended motion was seconded by Don Platts and motion was approved unanimously.

- A motion was brought by Susmitha Tarlapally to establish a TF to investigate if limits for winding insulation power factor and insulation resistances can be established for mineral oil and alternative liquid filled transformers. After many discussion and amendments, an amended motion was passed 22 in favor and four against. Passed Motion was seconded by Phil Hopkinson and request; “Setting up a task force to review and determine if limits for, winding

insulation power factor and insulation resistance for power and distribution class transformers that includes both mineral oil and alternate liquids, can be established. “

- Phil Hopkinson presented the concern with respect to Core gassing in wound core transformer with HV close to core and need for introducing partial discharge test as design test. This proposal will be surveyed in performance characteristic subcommittee.

B.6 Adjournment

Meeting adjourned 12.20 PM.

Minutes respectfully submitted by:
Ajith M. Varghese
Secretary DTSC.

Annex C Distribution Subcommittee – Chair: Stephen Shull

October 22, 2014
Washington DC Metro Area

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 37 of the 53 members in attendance.

The agenda was reviewed and motion made by Ron Stahara, seconded by Al Traut and approved by unanimous acclamation of the members in attendance.

The Spring 2014 meeting minutes were reviewed and motion made by Gael Kennedy, seconded by Ed Smith 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 reported the working group did not meet as C57.12.36 is currently open for ballot and will close on November 5.

Jerry stated that he would be forming a ballot resolution committee and already had one agreeable volunteer with Gary Hoffman. Any comments requiring the attention of the working group will be transmitted by email and reviewed at the next meeting in San Antonio next April.

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

Craig presented the following minutes from the working group meeting on October 20, 2014 at 4:45 PM with 44 persons in attendance.

Craig opened the meeting by welcoming everyone. Craig asked the attendees to introduce themselves.

IEEE PAR approved March 27, 2014; WG C57.15/ 60076-21 established. Expires Dec 31, 2018

IEC 60076-21-RR (Review Report) issued in August 2014 to the IEC Community. WG MT60076-21 established.

CD (Committee Draft) scheduled for November 2015
CDV (Committee Draft Vote) scheduled for August 2016
FDIS (Final Draft International Standard) scheduled for August 2017
IS (International Standard) scheduled for February 2018

Scope of project: This standard describes electrical, mechanical and test requirements of liquid-filled, single- and three-phase, 50 and 60 Hz, self and forced-air cooled distribution overhead

and substation step-voltage regulators, 1000 kVA (single-phase units) or 3000 kVA (three-phase units) and smaller, 34,500 Volts and below (2400 Volts minimum) and their associated controls.

Working group started out with a day and half work session taking place Friday and Saturday before the General IEEE Transformer Committee meeting. Eight members took part in this opportunity. A summary of the work was provided on Monday afternoon to the rest of the members and guests.

Key areas discussed during the meetings were as follows:

- Differences between Voltage Regulation ranges of Type A and Type B designs during Forward and Reverse Power Flow situations.
- Differences in Temperature rise requirements between C57.15/ 60076-21 and IEC 60076-2 temperature standard
- Differences in Voltage ratings specified in tables from C57.15/ 60076-21 vs IEC General requirement standards. Addition of Highest System Voltage column being considered along with the nominal voltage rating.
- Consideration of raising ADD AMP Max. continuous current rating
    - 668 to 875 amps
- Regulator mounting configurations

Match work being done for C57.12.20 (Overhead transformers)

- Pole and Platform mounting

- Preferred Forced Air ratings
    - 333 kVA and higher
- Short Circuit withstand considerations
    - Removal of 40 times rated option.
    - Maximum withstands matched up with published LTC maximums per rated voltage applications
    - Note covering flexibility regarding distribution ratings versus substation ratings with regard to required Asymmetrical Peak value. leaving the 25 times as the standard symmetrical rating while maintaining a 2.6 factor for the asymmetrical 1st peak for substation ratings.
- Audible sound levels per power ratings and test procedures
    - NEMA Sound Level table
    - C57.12.90 and IEC 60076-10 references
- Tank Rupture Design test
    - Consider procedure from C57.12.20

  - Match up with typical fuse or breaker protection for Line and Substation applications.

- Consider Partial Discharge Test
  - 25 kV class and higher
  - Routine and Design test or just Design

- External Dielectric Clearances
  - Fold in work being done by TF

- Tap changer routine and design tests
  - IEC 60214-1reference

- Universal interface between control enclosure and apparatus
  - MIL Spec cable connections to be considered
  - Standard Pin use for specific parts of circuitry
  - IEC and IEEE acceptance

- Revision of required IEC Control Design Test standards based on latest recommendations from IEC TC 95 (Measuring relays and protection equipment). Previous standards recommended have been obsoleted

- Annexes covering "Bypass off Neutral implications" DG and Capacitor coordination, and Overload.

- Meeting is planned for San Antonio with a similar additional two day session (Friday and Saturday beforehand.

- Meeting in Europe, IEEE Web Conference meeting or in coordination with scheduled Joint Technical Committee Meeting (JTCM) meetings will be considered for January or February.

Close of Meeting: 18:05 on Monday, October 21

C.2.3 C57.12.20 – Overhead Distribution Transformers – Chuck Simmons

Chuck presented the following minutes from the working group meeting on October 20, 2014 at 11:00 AM with 53 in attendance.

Chuck Simmons asked for the introduction of members and guests.

A quorum of the WG's members was present (24 out of 33 members were present). Al welcomed new member Rich Smith.

The minutes of the Spring 2014 Savanah meeting were discussed and approved.

Al Traut provided the Chair's Report. The current PAR expires December 31, 2016. The 10-year cycle ends December 31, 2021. The working group needs to vote to send the standard to ballot by Fall of 2015.

Al Traut noted that “mineral-oil-immersed” will be replaced with “liquid-immersed” in the Scope of the C57.12.20 document.

The first order of old business was on minimum impedance values. Al Traut reviewed his proposal for a new section 4.3 on minimum impedance values for secondary voltage ratings 600 Volts and below. His calculations were based on determining the maximum thru-fault current for various kVAs and voltage combinations. Steve Shull suggested that a note similar to note (a) of Table 2 in the IEEE C57.12.34 standard be considered for this section to encourage Users to evaluate all requirements of their system before requiring any recommended minimum impedance values. Since all of the proposed impedance values were the same for the different secondary voltage ratings of each kVA size, a suggestion was made that there be just one minimum impedance value for each kVA size based on the secondary voltage being 600 Volts or less. Many in the group felt that minimum impedance values should also be included for step-down transformers that have a secondary voltage greater than 600 Volts. Rhett Chrysler volunteered to put together proposed language on minimum impedance values for transformers with secondary voltages greater than 600 Volts.

The next order of old business discussed was on transformer mounting methods. Dan Mulkey reviewed his company’s method of direct attachment of single transformers to a pole. Chuck Simmons reviewed his company’s method of mounting transformers on a platform. The general feeling of the group is that something needs to be added to the standard for mounting transformers on platforms. Interchangeability between the bases of different manufacturers was deemed as being important for users. Josh Verdell and Chuck Simmons volunteered to put together a proposal on platform mounting considerations. After a short discussion, no one felt a need for the addition of a weight limit to the standard to indicate when a transformer shouldn’t be attached to a pole, but instead be placed on a platform.

The last order of old business discussed was on the low voltage grounding connection. Currently, only single primary bushing transformers with a secondary voltage of 120/240 Volts are required to have a grounding connection to a tank ground pad. Chuck Simmons reviewed his proposed addition to section 7.5.4.3 wherein information was included on which bushing(s) should have the grounding connection or the ability to have the grounding connection. After discussion, the proposed addition was revised to the following: “The grounding connection shall be connected to the X2 bushing on transformers with a low-voltage rating of 120/240 Volts.” A motion was made (Alan Wilks and Steve Shull) to add this sentence to section 7.5.4.3. The motion carried with 24 approving and 0 dis-approving. There was discussion on possibly clarifying section 7.5.4.3 to indicate that the requirement is only for 1-phase distribution transformers that have a secondary rating of 120/240 Volts.

Steve Shull advised that he will be the Chair for a new Task Force on distribution transformer bushings. Ed Smith will be the Vice Chair for this new group.

No new business was brought up during the meeting.

The next meeting will be held April 12–16, 2015 in San Antonio, Texas. The following meeting will be held November 1-5, 2015 in Memphis, Tennessee.

Meeting was adjourned at 12:14 PM.

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

Ron presented the following minutes from the working group meeting on October 20, 2014 at 3:15 PM with 53 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 Justin Pezzin and seconded by Jerry Murphy to accept the minutes of the Spring 2014 meeting as written as well as the agenda for this meeting. The motion was passed unanimously.

The first item of business was to discuss the email survey. It was pointed out by Steve Shull that only 36% of the membership responded to the questionnaire concerning the location of the H0 bushing. He stated that to do business we must have responses from the Working Group. Ron stated that of those that responded, there was an 82% favorable response to the locations that were proposed. The Working Group covered the various designs and after some discussion, a motion was made to select the lower position as the preferred location by Gary King which was seconded by Jerry Murphy. This motion passed unanimously.

As we continued to discuss the drawings, Dwight Parkinson and Gary King pointed out that some of the drawings appeared to be mismatched in the document. After some review it was determine that these should be reviewed to verify the correct placement in the document. Steve Shull apologized for the mismatching in the document and committed to this review and correct these as they had been in the past drafts.

This led to a discussion of the application of the dimensions of the live front bushing and dead front interfaces. Alan Wilks brought out that the dead-front dimensions were based on center points of the interfaces since the interfaces measurements are specified in IEEE 386. However, the bushing dimensions are not so well defined. Therefore to provide for proper clearance, the dimension should be from the edge of the bushing. After some discussion, a motion was made by Dwight Parkinson and seconded by Gary King that stated that the dimension of the live front H0 bushing be measured from the edge of the bushing and these dimensions would be coordinated with the other live front specifications in the document. It was pointed out that this would require that the tables be modified in some way to accommodate the new dimensions. This was noted by the Chair. This passed unanimously.

As these tables were reviewed, a question was raised to why bails should be included in some of the tables. This discussion resulted in motion from Gary King to remove the bail comments and eliminate the “With Bail” line in any applicable tables. It was seconded by Carlos Gaytan. After a lot of discussion, it was not resolved as to the reason for bail use. The vote was taken and the motion was defeated with a 4 for and 21 opposed. However, this item was tabled to a future Task Force investigation.

The Chair indicated he would like to move this document to ballot and would like direction from the Working Group. A motion was made by Gail Kennedy and seconded by Cory Morgan to move this document to ballot with the corrections and changes that were covered under the previous motions as well as the editorial changes that were pointed out during the meeting. This was passed unanimously.

With this, the meeting was adjourned.

C.2.5 C57.12.28, C57.12.29, C57.12.30, C57.12.31, C57.12.32 – Enclosure Integrity – Dan Mulkey

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

- Published 9/20/2010, Revision Due: Sep 2020
- Was not discussed.

Bob presented the following minutes from the working group meeting on October 21, 2014 at 8:00 AM in with 50 in attendance.

- Quorum was established
- Dan Mulkey chaired as Bob Olen was not in attendance, and Ali Ghafourian acted as secretary.
- Ron Stahara motioned and Jerry Murphy seconded to approve the minutes of the previous meeting on April 25, 2013 in Savannah, Georgia. The motion was approved unanimously.

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

- Published September 20, 2010
- Corrigenda approved May16, 2014 to correct error in 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.

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

- Published July15, 2014

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

- Published August 8, 2014

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

- Discussed changes to the Scope:
  - Discussed difference between “enclosure” and “transformer tank” in terms of subsurface equipment as this type of equipment is installed in a separate enclosure. Based on the definition of enclosure in the present standard it was agreed to use the word “enclosure” as it was.
  - Motion by Jerry Murphy, seconded by Steve Shull: changed from “not accessible to public” to “typically not accessible to public”. Motion approved unanimously
  - Reviewed the list of equipment.

- Motion by Giuseppe Termini and seconded by Gale Kennedy to add “submersible vacuum interrupter” to the list. Motion failed.

- Motion by Giuseppe Termini and seconded by Mike Faulkenberry to add “h) submersible control box” to the list. Motion passed unanimously.

- Motion by Jerry Murphy and second by Brian Klaponski to remove “in excess of 600 volts” changing the line to “These enclosures contain energized electrical apparatus typically not acceptable to the general public, including but not limited to:”, motion passed unanimously.

- Motion by Al Traut and second by Ron Stahara to delete “carbon steel and copper bearing steel” from the scope. Motion passed unanimously.

Revised Scope reads:

Scope
This standard covers conformance tests and requirements for the integrity of submersible electrical equipment intended for installation in submerged or partially submerged environments. These enclosures contain energized electrical apparatus, typically not accessible to the general public, including but not limited to the following types of equipment:
a) Submersible distribution transformers
b) Submersible network transformers
c) Submersible network protectors
d) Submersible switchgear
e) Submersible capacitors or inductors
f) Submersible junction enclosures
g) Submersible metering equipment
h) Submersible control box

- Discussed changes to the Purpose

- Motion by Jerry Murphy and second by Gary King to add “enclosure” so that the purpose reads: “The purpose of this standard is to describe the requirements for a comprehensive enclosure integrity system for submersible equipment providing long field life with minimum maintenance.” Motion passed unanimously.

Revised Purpose reads:

Purpose
The purpose of this standard is to describe the requirements for a comprehensive enclosure integrity system for submersible equipment providing long field life with minimum maintenance.

- Title remains unchanged: “IEEE Standard for Submersible Equipment—Enclosure Integrity”

- WG leadership will apply for a PAR with the current Title, and the revised Scope & Purpose

- 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 April 2015 in San Antonio, Texas.

C.2.6 C57.12.37 – Test Data Reporting – Tom Callsen

Steve introduced Tom Callsen as the new chair with Marty Rave as the vice-chair with John Crotty not able to attend for the time being.

Tom presented the following minutes from the working group meeting on October 21, 2014 at 3:20 PM with 20 in attendance. The new chair, Thomas Callsen, replaces John Crotty who has left the industry. Martin Rave of ComEd has volunteered to become the new Vice-Chair.

The WG did not have a quorum – only five of the nineteen members were present. Several missing member were known to be at the hotel, however many were in the Core Gassing and Grounding TF session that ran concurrently.

At the Spring 2014 meeting, the Distribution SC gave approval to go to ballot, however no steps had been taken on C57.12.37 since that time. The new Chair has begun the balloting process. Members of SA should see the ballot pool opening soon.

The Chair will be tracking down the latest draft of C57.12.37 and emailing it to the meeting attendees.

While the lack of a quorum did not adversely affect the progress of C57.12.37, the new Chair will be cleaning up the roster – reaching out to WG members who have not attended a session in the past few years.

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

Mike presented the following minutes from the working group meeting on October 20, 2014 at 1:45 PM in with 52 in attendance.

Ali Ghafourian opened the working group meeting at 1:45 p.m. Twenty-seven 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 to approve the minutes from the spring 2014 meeting, it was seconded, and the motion was passed unopposed by the working group members.

Ali presented the status of the document, that being that it was published on August 21, 2014. Ali presented award certificates and plaques to those individuals who had chaired task groups during the effort or otherwise had contributed additional effort in getting the document published.

So since the document is now published, Ali asked what we should do next. As part of that, he asked Mike Faulkenberry to lead a discussion on the items remaining open that were either tabled or discussed and considered during the revision process but that we were not able to resolve and incorporate into the document. Also shown were ballot comments that were resolved by agreeing to look at them in the next revision. Those items were:

- The "small interface" terminology is no longer found in IEEE 386-2006. IEEE 386 is currently being revised and is scheduled for publication in 2015. This will be researched for the next PAR and the correct terminology incorporated into the document at that time.

- The working group will not object to considering a change to “liquid” but would like to wait until the Task Force on the Terms Normalization White Paper has been submitted or when we receive direction from the Sub-Committee.

- The document has not been revised to include verbiage to address concerns about the tank pressure requirements that contributed to the formation of the task group, and now working group, C57.12.39. It will be revised with the next PAR after the C57.12.39 working group completes their work.

- Still to be resolved is how to address low voltage bushing cantilever strength requirements.

Steve Shull mentioned that the transformer bushing task force may be able to address the bushing cantilever strength issue, and he would like the groups input on that.

Giuseppe Termini suggested that we address how to include a means for allowing temporary termination of cables in the transformer while keeping them enclosed.

Ali asked if there was any new business, and Josh Verdell suggested we needed to make sure the phase to ground clearance required for units with 125 kV BIL needs to be consistent between the padmounted transformer standard and what is stated in C57.12.00. There is a quarter inch difference between the requirements of the two documents. Steve Shull cautioned that when looking at that issue, you need to clarify whether or not it is metal to metal or something else. Ron Stahara suggested that C57.12.00 and C57.12.90 maybe should state these requirements and be referenced by the individual standards. Steve Shull stated that this might be difficult to reference back and forth between documents and that often the revision dates are different and good present a problem.

No further new business or old business was brought forward. The meeting was adjourned at 2:10 p.m.

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

The meeting was called to order at 4:45 PM. After the introductions, the names of the members were projected on the screen. By a show of hands the quorum was reached by having 21 of the 32 members present.

The minutes of the spring 2014 meeting in Savannah were presented. Ron Stahara moved to approve them as written. Chuck Simmons seconded. They were approved unanimously.

The report on the tasks from the previous meeting was presented, which were added to draft 2.3; among the changes, the source of the numerical reference for Rapid Transient Pressure definition, making reference to technical papers on the subject.

The proposal for the Informative Annex B was presented, which is intended to provide background to support how the present pressure values for tank integrity and pressure relief means operation were defined. During this review, a document part of the ASME Boiler and Pressure Vessel Code was reviewed; it provided definitions for the pressure relief valve or device, as well as definitions and specifications for concepts such as maximum allowable working pressure (MAWP) and allowable overpressure; these definitions were consistent with the current requirements for these parameters in the standards. A motion was made by Steve Shull to accept the addition of Annex B to the document. It was seconded by Ron Stahara; the motion was approved unanimously.

Then a proposal for providing a quantifiable definition for the term “negligible”, related to the amount of liquid that the pressure relief valve is allowed to emit during operation. There was a lot of discussion about concerns on this proposal, with several good comments providing ideas on how to approach this definition in a different manner in the standard. Notes of the comments were taken and the agreement was to analyze them and provide an alternative wording to be included for draft 3 of the document.

Other open items were reviewed; among them, to coordinate flow rate requirements by transformer size; proposals to address them will be incorporated on draft 3. This draft 3 will be sent to the group before Nov. 30th, requesting comments by Feb. 15th 2015; this is in order to be able to prepare and send a draft 4 of the document prior to the spring 2015 meeting.

No other new business was proposed. A motion to adjourn was made by Steve Shull, seconded by Ron Stahara. The motion was approved and the meeting was adjourned at 5:40 pm.

* Phil had a comment regarding solar farm transformer applications and how they expand and contract significantly. Phil questioned if this was being considered in this standard. Carlos responded that he would welcome any input that would fall under the working group scope.

C.3 Old Business

- Steve presented to the subcommittee the beginning of a new task force on distribution bushing transformers. A meeting will be held in San Antonio.

- Phil Hopkinson presented an update on the issue of core gassing and how it affects not just wind farm transformers, but all wound core transformers. He is intending to have this incorporated into C57.12.00 and C57.12.90.

    - Jim Harlow commented that the change is today hydrogen is measured and in the past 20 to 30 years ago it was not and when a transformer failed it was just replaced without understanding.

    - Phil Hopkinson responded that it might be true, but he is concerned that construction materials and methods are not what they were and there needs to be a change to make sure this issue is not allowed to go without further investigation and testing.

C.4 New Business

- Ron Stahara made a motion to the subcommittee to take PC57.12.34 to ballot and Gael Kennedy seconded the motion. No discussion was made and the motion carried with unanimous consent and no negatives.

C.5 Chairman's Closing Remarks and Announcements

No comments were made.

C.6 Adjournment

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

Annex D Dry Type Transformers Subcommittee

October 22, 2014
Washington, DC

Chair: **Charles Johnson**
Secretary: **Casey Ballard**

D.1 Introductions and Approval of Agenda and Minutes

The Subcommittee met on October 22, 2014 at 1:30 PM in the Ash Grove ABC Room of the Sheraton Premiere at Tysons Corner Hotel. There were 17 of 23 members present (therefore we had a quorum of 74%), and 10 guests present, 3 guests requested membership. The attendance roster will be kept in the AMS.

The agenda was approved unanimously after a motion from Sanjib Som and a second from Jeewan Puri.

The minutes of the Savannah, GA meeting were approved unanimously after a motion from Tim Holdway and a second from Jewan Puri.

D.2 Working Group/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 Great Falls Room of the Sheraton Premiere at Tysons Corner 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 10 guests present. The attendance was reported in the AMS.

The agenda was approved unanimously.

Motion: Chuck Johnson
Second: Mark Gromlovits

The minutes of the Savannah, March 24, 2014 meeting were approved unanimously.

Motion: Carl Bush
Second: Kerwin Stretch

Old business

- The Draft 7 of the document is now at REVCOM
- As previously approved the document will be opened up for revision immediately after it is published

New business

- The Chair questioned how the membership of the WG would be affected by the continuous revision process. It was suggested that the Chair contact the Chair from C57.12.00 or C57.12.90 to see what precedent they had set.
- The Chair covered the following updates in Draft 7
  - Took out definitions of "Product Standards"
  - Re-worded clause 5.10.3.5

  - Modified Tables 9, 15, and 16
  - Minor punctuation changes
- The Chair then opened up the floor for suggestions on topics for the next revision and asked that all proposals be made in writing at least 1 month prior to the next meeting in San Antonio. The Secretary will provide an Excel based tool used in other working groups for the Chair to distribute. The following topics were discussed
  - Addition of 75kV BIL for 8.3kV system class by Carl Bush
  - Change minimum BIL value of 15kV system class from 60kV to 95kV BIL by Chuck Johnson
  - PD levels proposed by Phil Hopkinson
  - QC impulse testing by Phil Hopkinson
  - Table 15 Short Circuit Final Conductor Temperatures by Rick Marek
  - Clause 7.10 Calculation of winding temperature during a short circuit by Kipp Yule
  - Proposal by Vijay Tendulkar that were postponed (example is adding 240 °C to Table 9)
  - Equation 8 and the exponent 2? Did someone confirm that it was necessary?
  - Forced Air (FA) ratings moved from C57.12.51 by Tim Holdway
  - System temperature ratings for 180/185 and 150/155 by Roger Wicks
  - Altitude correction for dielectric testing by Rick Marek

- Chuck Johnson called attention to the differences between the two types of insulation systems used in dry-type transformers – solid-cast and resin-encapsulated. He clarified that 'open ventilated', VPI, or VPE were all resin-encapsulated.

Next meeting: Spring 2015, San Antonio, TX, April 12-16, 2105.

With no further business, the meeting was adjourned at 2:51 PM.

Chairman: Tim Holdway
Vice Chairman: Casey Ballard

D.2.2 IEEE PC57.94 - WG Dry Type O&M Guide
Chair Dave Stankes

The working group met in the Ash Grove A Room of the Sheraton Tysons Hotel.

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

The meeting was convened with 14 out of 21 members (enough for a quorum) and 4 guests present with 1 requesting membership.

A motion to approve the agenda was proposed by Charles Johnson and seconded by Tim Holdway; the motion was approved by voice vote with none opposing or abstaining.

The Chair reviewed PAR revision (changes to Scope and Title) that was approved at June 2014 Revcom meeting.

The Chair showed on screen the proposed changes to current Draft 8 including addition of missing headings and modification of various units found in the standard in order to comply with current IEEE document/style requirements. The chair also presented recommendation for headings found in clause 7.3.1 through 7.3.4 not found in Draft 8. A motion to approve changes was proposed by Tim Holdway and seconded by Roger Wicks. During the discussion Roger had a question regarding use of "non-ventilated" terminology which was resolved without any further changes. The motioned was passed by unanimous vote.

A review of the sentence in Clause 6 Testing section regarding Trending test found it to be acceptable as written.

A discussion regarding the need for a more clear definition of "clean dry" air used in the document was conducted. The Chair reviewed ISO air quality standard that may be used to quantify quality of air and showed various sections for clean dry air was referenced. Mark Gromlovits raised the concern that reference use of (clean dry) compressed air may lead to misuse and possible damage, but agreed to leave this in since document stated that "low pressure not over 1.7 bar" be used. Final Conclusion: The group agreed that it should left to users to interpret "clean and dry".

Roger Wicks mentioned three standards mentioned in Purpose clause (C57.12.50, 51 and 52) that were listed in the Bibliography but not in normative reference, and questioned whether or not this was the proper place. It was decided to request comment by editorial board, and Chair will ask Erin Spiewak where standards only listed in Purpose should reside or whether purpose to be modified to drop reference to C57.12.50, 51, and 52. Roger also volunteered to forward various typo error he uncovered in the document.

In clause 4.7 reference to C57.12.55 has reference to IEEE, and this will be removed.

There are several references to safety and protection. It was decided to retain these and allow editorial board to comment.

Then came the question whether this should be sent to ballot. Chuck Johnson proposed to send this to sub-committee this was seconded by Casey Ballard. During discussion, Roger asked for confirmation that the Draft that would be submitted would include: 1) finished abstract and introduction, 2) corrections to various typo errors, 3) Clause Headings as proposed and approved at WG meeting and 4) unit corrections as proposed and approved at WG meeting, 5) correction to C57.12.55 Reference The chair confirmed, and Tim Holdway clarified that new draft incorporating these would be new Draft 9. The motion was carried by all 14 members present voting yes . Chuck Johnson stated that Chair needs to mention during his report that this is new business requested.

The motion to adjourn was proposed by Tim and seconded by Kerwin Stretch.

Submitted 10/22/14
D. Stankes

D.2.3 IEEE C57.12.91 - Dry Type Test Standard
Chair Derek Foster

The working group met in the Ash Grove A meeting room of the Sheraton at Tysons Corner Hotel.

The meeting was called to order at 3:15 PM by Chairman Derek Foster

The meeting was convened with 7 members and 11 guests present with 4 requesting membership. The attendance was reported in the AMS.

The agenda for meeting was approved unanimously.
Motion: Carl Bush
Second: Casey Ballard

The minutes of the March 25, 2014 Savannah meeting were approved unanimously.
Motion: Mark Gromlovits
Second: Tim Holdway

Old 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's proposal is complete. Derek with share it with the group by e-mail.
  - QC impulse test method to insert into 12.01 Table 16
    - Kerwin Stretch and Tim Holdway agreed to make a proposal on a name for this procedure – QC impulse, routine impulse, and production impulse have all been suggested.
    - Chuck Johnson proposed to describe this test in C57.12.01 as a regular impulse test minus the chopped waves.
    - Vijay and Mark G. both stated their opposition to including the QC impulse as a routine test.
    - Chuck Johnson made a motion to not include QC impulse in C57.12.91. The motion was seconded by Mark G. A vote was taken with 6 voting for and 2 against. Motion PASSED and QC impulse will not be included in C57.12.91.
  - Moving the PD Test method from 12.01 into 12.91 Section 10
    - There was general agreement that as this was recently covered in 12.01 it would not be considered in 12.91 for this revision cycle.
    - Vijay mentioned that guidance on how to perform the PD test is missing. Per the group the test procedure is defined in C57.124.
    - C57.124 in mentioned in the normative reference but is not mentioned anywhere else in C57.12.91. This will be corrected.
  - 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 for the group
  - Sound level measurement in Section 13
    - Casey Ballard with 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 lead this effort but no longer has access to a drafting department to make the drawings. It is estimated that approximately 30 drawings will need updated. Mark G., Kerwin S., and Chuck Johnson. each agreed to take 10 drawings and have them updated by drafters at their companies.
    - Casey will check on the best formats, templates, etc. to have the drawings produced in.
  - Inclusion of environmental testing from IEC 60076-11 for E0/E1/E2
    - Martin Navarro agreed to make a formal proposal and check on what is necessary to incorporate the appropriate portions of IEC into C57.12.91
    - Mark G asked that everyone carefully review the IEC standard and understand what these tests entail prior to our next meeting.
  - Inclusion of thermal shock testing from IEC 60076-11 for C0/C1/C2
    - Martin Navarro agreed to make a formal proposal and check on what is necessary to incorporate the appropriate portions of IEC into C57.12.91
    - Mark G asked that everyone carefully review the IEC standard and understand what these tests entail prior to our next meeting.
  - Inclusion of calibration requirements
    - In the previous meeting Don Kline suggested that this should be added and will be voted on by the TF and SC. Casey mentioned that Don seems to have been referencing an expired standard. ISO 17025 seems to be the correct standard.
    - The question was raised as to how calibration is handled in C57.12.90.
  - 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 explained some of the history and technical differences of positive versus negative impulse wave shapes.
- There was discussion regarding the whether or not to change to negative impulse to align with IEC. General consensus of the group was that we would continue with the positive wave as standard but should reference negative waves and the differences between the two in an informative annex.

New business

- Kerwin Stretch will serve as Secretary for the working group
- Discussion on heat run test method
  - Jagdish Burde questioned why the two part temperature rise test method (no-load plus load loss) was used for dry type transformers as opposed to the total loss method commonly applied to oil filled transformers.
  - Chuck Johnson gave a detailed explanation of the various types of temperature tests that are allowed under the current standard and stated that in general the two part method is "conservative"
  - Prior to the next meeting, Jagdish will put together a comparison of the temperature test methods in C57.12.90 and C57.12.91.
  - Casey Ballard asked if the intention was to limit the scope of the PAR to specific topics or open the entire standard. This will be an agenda item \ discussion point for the spring meeting.
- Tim Holdway reminded everyone to send any additional topics for voting and discussion to the Chairmen ASAP.

Next meeting: Spring 2015, San Antonio, TX, April 12-16, 2105.

With no further business, a motion was made by Mark Gromlovits to adjourn with a second by Tim Holdway. With no objections, the meeting was adjourned at 4:15 PM.

Chairman: Derek Foster
Secretary: Kerwin Stretch

D.2.4 IEEE PC57.12.51 - Dry Type Product Standard "> 500kVA Ventilated" Chair Sanjib Som

The working group met in the Ash Grove A Room of the Sheraton Tysons Hotel. This was the initial meeting of the working group.

The meeting was called to order at 1:45 PM by Chairman Sanjib Som

The Chairman asked Tim Holdway if he would serve as the Vice Chairman / Secretary of the WG and Tim agreed.

The meeting was convened with 24 attendees. Since this was the initial meeting, those who wanted to be, would automatically become members. 17 requested membership and 7 requested to be guests.

Old business

- Since this was the initial meeting, there was no old business

New business

- The Chair stated we have a PAR and it has been approved
- Casey Ballard stated we will need to review the document for the word "safety" and remove
- Chuck Johnson stated the new C57.12.01 standard that is at RevCom now includes up thru 69 kV where this document only goes thru 34.5 kV.

- Both Rick Marek and Casey Ballard commented that this document closely mirrors C57.12.01 and may not even need to be re-published. A TF of Shankar Nambi, Chuck Johnson, Tim Holdway, and Mark Gromlovits agreed to review and compare both C57.12.01 and C57.12.51. This TF will recommend to our WG one of three options:
    - The document is so close to C57.12.01 that we should just let it expire and not re-publish
    - Make major changes where the only items in this document are those that are not in C57.12.01 and should not be included
    - This document needs to be viable and therefore review and update and have re-published
- Casey Ballard requested the Chair send out the latest revision of C57.12.51 to the WG members. The Chair agreed to do so
- Jerry Murphy stated that we may also want to review C57.12.50 and see if we need to combine it with our document, C57.12.51. Jerry said that he would review both documents. At this time, a discussion was held about the TF and Jerry reviewing all three documents and making one recommendation. Jerry agreed that he would work on the TF and the other members of the TF agreed to review all three documents.
- Chuck Johnson said that he would get a pdf file of C57.12.50 and send out to the TF members
- A discussion was also held on the Title of the standard and whether the word "Power" should be included or changed to "Distribution". Again, the TF will take a look at that as well.

With no further business, the meeting was adjourned at 12:01 PM.
Motion: Chuck Johnson
Second: Casey Ballard

Next meeting: Spring 201, San Antonio, TX April 12-16, 2015.

Chairman: Sanjib Som
Vice Chairman: Tim Holdway

D.3 Old Business

There was no old business.

D.4 New Business

D.4.1 C57.94 Ballot

Dave Stankes made a motion that the draft of C57.94 that was approved by the WG with a super majority be approved by the SC to progress toward balloting. Tim Holdway seconded and the motion carried unanimously.

D.4.2 C57.12.58 Transient Analysis

Roger Wicks agreed to be the chair for the revision of this document.

D.4.3 C57.12.60 Thermal Aging

Casey Ballard agreed to be the chair for the revision of this document.

D.4.4 C57.124 Partial Discharge Guide

Kerwin Stretch agreed to be the chair for the revision of this document.

D.4.5 Chair's Comments

- The PES Technical Council is interested in new products/technologies in order to prepare for them more quickly
- IEEE's documents need to focus more on performance and function instead of on design types
- All minutes from the TFs and WGs are due to the SC Chair by the end of 10/22/14.
- There will be a new public review policy where anyone can comment without IEEE, PES, or SA membership.
    - This concerned the attendees and further details are needed.
- A succession plan is required for all the TF/WG/SC Chairs. Please submit yours in writing to Chuck before the next meeting

D.5 Adjournment

Being no further business, the meeting adjourned at 2:35 PM upon the motion from Sanjib Som and a second from Vijay Tendulkar.

Chairman: Charles Johnson
Secretary: Robert Casey Ballard

Annex E HVDC Converter Transformers and Reactors Subcommittee

October 20, 2014
Washington, DC

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

E.1 Introduction / Attendance

Introductions were made and the attendance list circulated.

There were 11 members, one corresponding member and 19 guests present. Six of the guests requested membership

The total membership of the SC (not including corresponding members) is 16. We needed at least a total of 9 members (minimum 50% of 17, 16 members plus 1 corresponding member) 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 March 24, 2014 meeting in Savannah, Georgia

E.3 Approval of Last Meeting Minutes of Spring 2014

The minutes from the Savannah meeting (Spring 2014) were approved due to a motion by Pierre Riffon, which was seconded by Klaus Pointner.

E.4 Brief report on the meeting of the Administrative SC

Presently, there are some corresponding members in many SCs and WGs, including this SC. That state of membership will be removed. Corresponding members must decide if they will be ordinary members and then also attend most of the meetings or if they will be guests.

The Administrative SC has given approval to apply for a PAR and to start a WG for a dual logo standard (together with IEC) for converter transformers. The only comment was that we should limit as much as possible the amount of dual references. Ulf Radbrandt will be chair of this WG.

A request for a PAR (according to above) was submitted today (October 20).

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.5 Presentation from the Joint IEC/IEEE meeting, regarding a possible dual logo standard for converter transformers, in Stockholm May 14-15, 2014

Ulf Radbrandt gave a presentation regarding the Stockholm meeting:

- The participants. Ulf provided details regarding the size and membership of the task team.
- The process of the work. The work started with an Excel file, with comparison between the IEEE and IEC standards, which was created by an IEEE group before the previous IEEE meeting in St Louis. The “Comparison” sheet of that Excel file was extended in the London meeting (Feb 2014)

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".

- Prior to the Stockholm meeting, Anders Lindroth (convener of IEC MT 61378-2) had created a draft merged document, which contained all IEC text in black together with the corresponding IEEE text (clause by clause) in blue.
- During the Stockholm meeting, the participants worked through the merged draft document (clause by clause) and decided what information should be selected for each clause and updated the draft accordingly. About 26 of 72 pages were completed.
- The Agreements and actions from the Stockholm meeting were the following:
    - We discussed a proposal from Ugo Piovan, to set a voltage limit in the scope, but decided not to do this as it might exclude some low voltage back-to-back transformers. The exclusions of converter transformers for industrial and traction applications was regarded as sufficient.
    - We did not discuss the list of letter symbols, but transferred them to an Excel-file and Ulf Radbrandt undertook to make a proposal for a common list of symbols.
    - Our goal is to agree on one method to measure the load losses including the harmonics. To be able to make a comparison of the two present methods, Mats Berglund, Frank Trautmann and Sheila Batey will collect data on comparison measurements made with both methods, if any available, and make comparison measurements on converter transformers to be tested before the next meeting.
      As a backup solution (if we fail to agree on one method), we can have one IEEE method and one IEC method
    - We did not reach a final agreement on the definition of rated current. Should it include harmonics per IEEE or be without harmonics per IEC? All members agreed to prepare for a discussion and agreement at the Washington joint meeting.
- The reference to different standards.
  The IEEE standard refers to many other IEEE standards and the IEC standard refers to many IEC standards. This is proposed to be handled with the following text (from the draft):

  Use of normative references.
  This standard can be used with either the IEC or IEEE normative references but, other than for IEC/IEEE dual-logo document references, the references shall not be mixed. The purchaser shall include in the enquiry and order which normative references are to be used. If the choice of normative references is not specified, then IEC standards shall be used except for HVDC converter transformers intended for installation in North America where IEEE standards shall be used

E.6 Open discussion regarding the work for a dual logo standard for converter transform

Thursday and Friday this week (October 23-24), there will be a joint IEC/IEEE meeting, which will continue the work from the Stockholm meeting. Discussions here will be input to the joint meeting.

1) The different methods for IEC and IEEE for measurement of losses

   Pierre Riffon has sent (29 March 2014) reference to loss measurements with both (IEC and IEEE) methods of loss measurement. Normally IEEE measurements gives slightly lower losses according to those measurements. That will be considered during the joint meeting.

   During the work for a dual logo standard for transformers for wind turbine applications, there were a lot of discussions regarding dual references.

   We should try to agree upon one method for loss calculation.

Peter Heinzig made a presentation regarding the loss measurement comparison several years ago, but at present he doesn't have access to that presentation. A further search will be conducted to try to find this information.

2) Definition of rated current

Rated current includes harmonics in the IEEE standard but does not in the IEC standard. We must agree upon one definition.

Rated current and rated power (which follows rated current) are essentially only values that are provided on drawings and on the nameplate for reference. These values do not affect the design. The thermal design and the temperature rise test does anyway take the whole current spectra into account. It is important though to clearly define the impedance in percent. Independent on definition of rated current, the short circuit impedance in percent must be defined correctly in order to give the correct impedance in ohm. The standard should clearly define rated current, voltage, power and impedance.

A motion was put forward by Les Recksiedler and seconded by Pierre Riffon to vote for the preferred definition of rated current. The vote result was that 1 person preferred that rated current should only be based on fundamental frequency current and 8 persons preferred that rated current also includes harmonics.

3) Coming joint work meetings

No further joint meetings (after the Thursday and Friday meetings) are planned now but they will be needed in order to produce a draft that can be distributed for comments.

Minutes from joint working group meetings will be distributed within the SC.

E.7 Old Business

None.

E.8 New Business

None.

The meeting was adjourned at 4.09 pm.

Annex F Instrument Transformers Subcommittee - Ross McTaggart

F.1 Introductions

The attendees introduced themselves and reported affiliations.

F.2 Quorum

18 of 24 members were present - quorum attained

F.3 Approval of minutes – Savannah, Georgia meeting

Motion by David Wallace & seconded by Vladimir Khalin

F.4 Approval of Agenda

F.5 Working Group Reports

F.5.1 Working Group on Current Transformers with mA range (WG C57.13.7) - Chair: Henry Alton, Vice-Chair: Adnan Rashid

Introductions

Acceptance of the Agenda

9 members and 8 guests attended this meeting

Mr. Rashid announced to the group that he would be conducting the meeting as the chair would not be available to participate in the meeting. Quorum for the meeting was met with nine out of thirteen members in attendance. This needs to be confirmed by Mr. Alton.

An agenda was forwarded by Henry Alton a few days prior to the meeting and this was presented to the group for review. It was agreed to add New Business to the agenda. The agenda was accepted with the addition.

Old Business (House Keeping)

The minutes of the Savannah meeting were accepted by the group.

Draft Review

A new draft of C57.13.7 was presented which included updates provided by Dr. Eddy So. Dr. So described the updates. Vladimir Khalin suggested that reference to the standard ANSI/NCSL Z540-1-1994 should be updated to the more recent ANSI/NCSL Z540-3-2006. This was agreed to by the group.

Action: Update references to ANSI/NCSL Z540-1-1994 to ANSI/NCSL Z540-3-2006

It was pointed out that figure 2 requires correction. The scale along the x-axis should be: -20, -10, 0, 10, 20 rather than the current: -10, -5, 0, 5, 10.

Action: Update figure 2 x-axis scale to -20, -10, 0, 10, 20

A suggestion was made that section 6.4 should be moved to an informative annex. This suggestion was not accepted by the group.

New Business

Vladimir Khalin suggested that the Burden tables 3 & 4, should be reviewed. He stated that that power factor 0.9 should be power factor 1.0 or consideration should also be given to capacitive power factor. He also suggested that there should be only one set of burdens for all CT's up to 250ma rather than the two sets identified. It was noted that the burden tables have been discussed in the past and the workgroup has previously agreed on this part of the document. It was suggested that Vladimir should table his suggestions as a formal proposal for any future consideration.

F.5.2 TF on Station Service Voltage Transformers - D Wallace

A total of 25 people were in attendance with 16 out of 20 members present. A quorum was met.

The minutes from the Savannah meeting were reviewed. John Herron made a motion for approval and it was seconded by Vladimir Khalin. The minutes were approved.

A request had been made at the Savannah meeting to review the draft of C57.13.8 and return comments on the supplied spreadsheet. Several of the committee members provided comments on various sections of the standard. These comments were compiled into on spreadsheet and distributed to the committee for review.

During the meeting, 29 of the 102 comments were reviewed and either accepted as presented, accepted with further comment or rejected. The comments that were accepted will be inserted into the current draft of the standard. The ones that require further comment will be modified and reviewed at the next meeting.

It was decided that the remaining 73 comments will be sent out to the committee to review and either be accepted, accepted with comment or reject. Before the next meeting, the updated comments will be compiled and prepared for review at the next meeting in San Antonio.

F.5.3 Working Group for Revision of IEEE C57.13 Instrument Transformers - R. McTaggart

F5.3.1 Introductions

F5.3.2 Quorum

19 members + 12 Guests – quorum attained

F5.3.3 Approval of minutes from Savannah meeting (motion by David Wallace -seconded by Vladimir Khalin)

F5.3.4 Discussion

A review of the schedule and progress was presented.

A slide was presented detailing the membership and participation in this working group. At this time we have 14 producers, 5 users, 5 consultants/others and 2 corresponding members. It was mentioned that because of recent changes corresponding members may be handled differently in the future.

The status of the revision was discussed briefly with emphasis on the June meeting of the working group in Charlotte, the circulation of draft 5 and it was mentioned that a PAR extension had been requested. The attendance of the Charlotte meeting was mentioned as well as the larger items that were settled at this meeting.

The next steps for moving to a sponsor ballot were discussed. Some discussion took place regarding if the WG should proceed with a vote at this meeting with the attendees of if this should be done by an email survey to include those not in attendance. Pierre Riffon motioned to vote in the meeting and Vladimir Khalin seconded this motion. It was decided that the working group present should vote to determine if the attendees should vote to move towards a sponsor ballot or if a survey should be conducted. Prior to voting the attendees were polled to determine the number of working group members and as a couple members had arrived after the initial check for quorum the number of working group attendees was now 18. A total of 17 of the 18 members present voted to proceed towards moving to a sponsor ballot.

Two items of new business were discussed. Eddy So had provided two comments that may be handled in the ballot resolution process. The first item related to uncertainty limits and was not controversial. It was mentioned that one reference had to be updated. The second comment from Eddy So was presented by Ross McTaggart and concerned if a ground shield check should be done similar to C57.13.5. Some conversation took place regarding this comment from Eddy So without a strong consensus of how to best proceed. A resolution committee will need to review and resolve this comment.

F5.3.5 Adjournment

No other new business was presented and a motion to adjourn was made by David Wallace and seconded by Chris Steineman

F.5.4 WG PD in Bushings & PTs/CTs PC57.160 - Thang Hochanh

A quorum was not reached in this meeting.

Discussion focused on bushing test procedures. Calibration techniques and the definition of background noise were discussed extensively. A discussion took place regarding how to best perform testing in high background noise environments. Finally the chair displayed several partial discharge patterns and encouraged comments from the assembled group. Multiple individuals indicated that they would provide more patterns for review and possible inclusion in this document.

F.6 New Business

Ross McTaggart went over the next steps for C57.13 draft 5 explaining the procedures to be taken. Pierre Riffon motioned to vote within the subcommittee. Rudy Ogajanov seconded this motion. A vote was taken with 18 members voting in favor of proceeding to a sponsor ballot.

The status of the Standards that this SC is responsible for was reviewed. None require a WG for revision immediately. However, Ross McTaggart expressed an interest in starting to review these standards in future meetings so that the scale of each revision could be gauged and areas of concern listed.

Randy Mullikin asked what to do with C57.13.6 once the new version of C57.13 is published, as the contents of C57.13.6 are included within the draft. It was not determined if C57.13.6 would be allowed to simply expire or if it needed to be withdrawn. Vladimir Khalin indicated that work to revise C57.13.2 would need to begin once the main standard is in effect.

Pierre Riffon indicated that changes would need to be made to the internal arc test procedures in C57.13.5 for gas filled instrument transformers.

F.7 ITSC Adjournment

Annex G Insulating Fluids Subcommittee

October 22, 2014
Washington DC Metro Area

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: David Wallach advised that the data base confidentiality and access means policy is coming soon. He reminded the attendees that the standards work must not stifle competition.

G.1.2 Roll Call of SC members. >23 Quorum was achieved.

There were 31 SC members and 58 guests in attendance at the meeting. A quorum was achieved. Three new SCIF members were welcomed:

John John, Zan Kiparizoski, Shawn Galbraith

The following guests requested membership in the IFSC:

Julio Caldeira, Josh Herz, Scott Reed

G.1.3 Agenda Approval

SC Vote Outcome: Passed unanimously

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

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

The report of the WG was presented at the SCIF meeting by Susan McNelly.

The PAR for the WG was extended for 2 more years.

The Minutes (unapproved) of C57.104 WG Meeting as Submitted:

Tuesday, March 25, 2014

The meeting was called to order at 4:52pm by Vice Chair Claude Beauchemin. Secretary Susan McNelly (writer of Minutes) was also present.
There were 52 of 87 members present. There were 48 guests, and 7 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 (4 of the 7) will be added as WG members):

Hugo Flores Garcia*
Roger Hayes*
Scott Reed*
Rogerio Herdolin*
Kevin Sullivan
Kumar Mani
Javier Arteaga

Agenda

1. Welcome & Introductions
2. Quorum Check
3. Approval of Minutes from Spring 2014 Meeting
4. Vice Chair's Remarks
5. Task Force Chair Reports
    a. Framework – Claud Beauchemin
    b. IEEE Data Protocol – Tom Prevost/Sue McNelly
    c. On-line Monitoring Trends – Jesse Inkpen
6. Adjourn

Introductions of the 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 Spring 2014 Savannah, Georgia meeting minutes was made by Tom Prevost and seconded by Don Cherry. The motion was unanimously approved.

There was an addition to the agenda for a presentation by Jesse Inkpen. Don Cherry made motion to approve the Agenda as written and was seconded by Bob Thompson. The motion was unanimously approved.

The Data Protocol is still being worked on and there are no new items to report.

Vice Chair's Remarks:

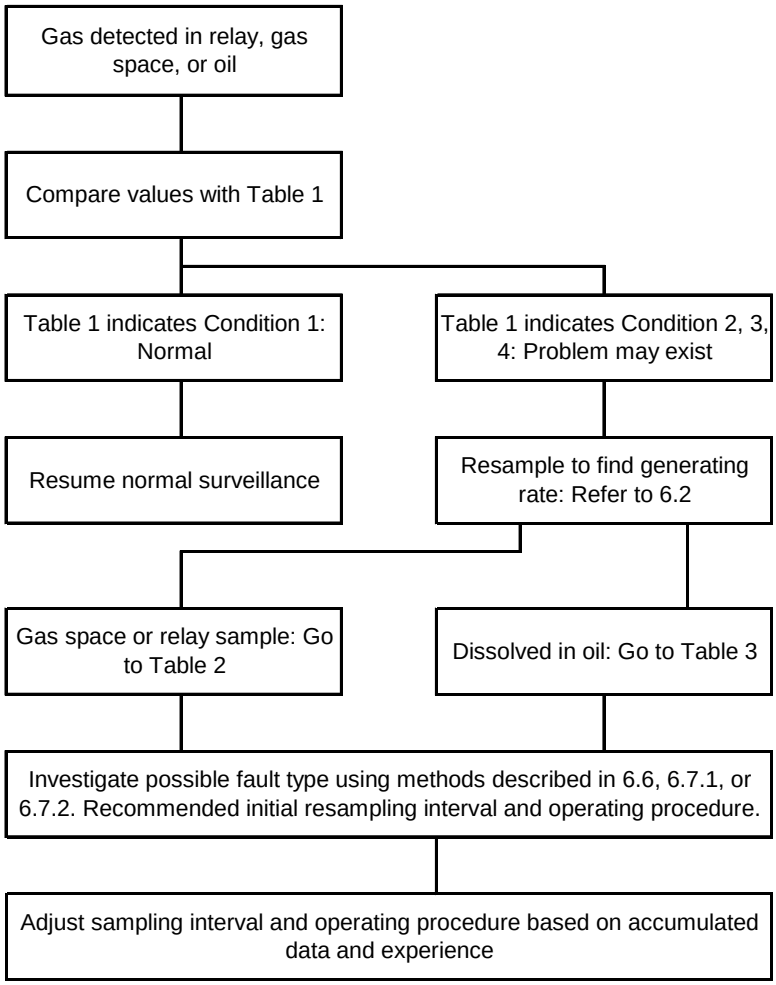
- **Framework**

The Guide will be revised to have only 3 conditions rather than the present 4 conditions. The two main types of transformers that will be identified, oil preservation system (sealed or breather) and the second will be the age of the transformer. These showed the largest variation in the population studied.

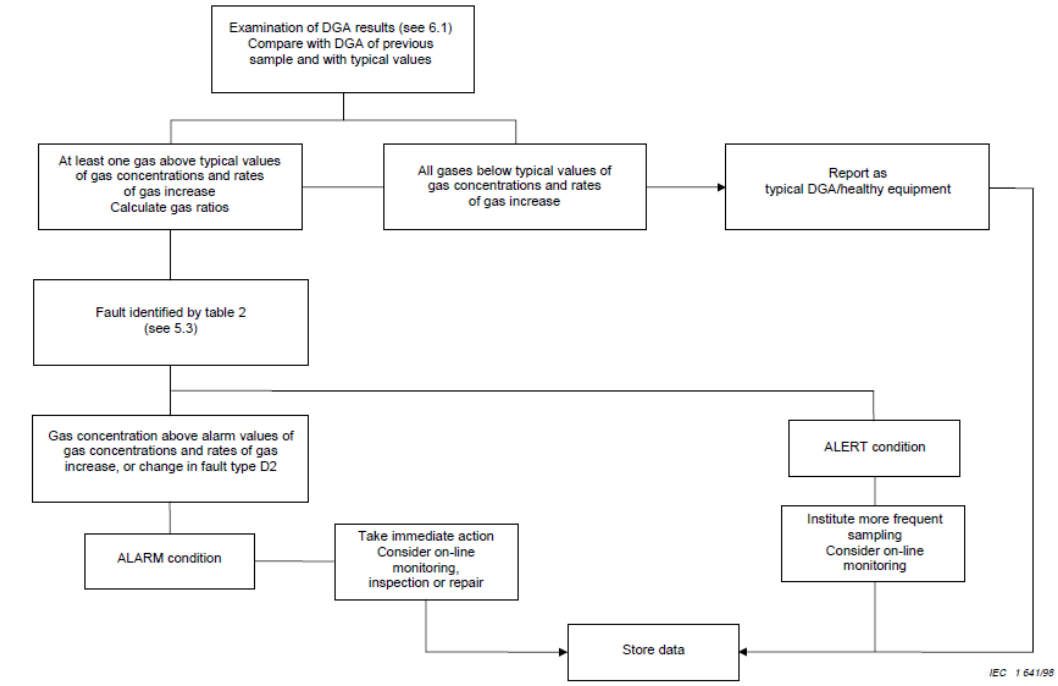
The change between two samples over various timeframes was found to be more telling than the rate of change previously used.

It will be necessary to have multiple samples to diagnose actions that should be taken.

C57.104
Figure 2: Actual



IEC 60599



Proposed for C57.104 Guide:

Fig 2 proposed

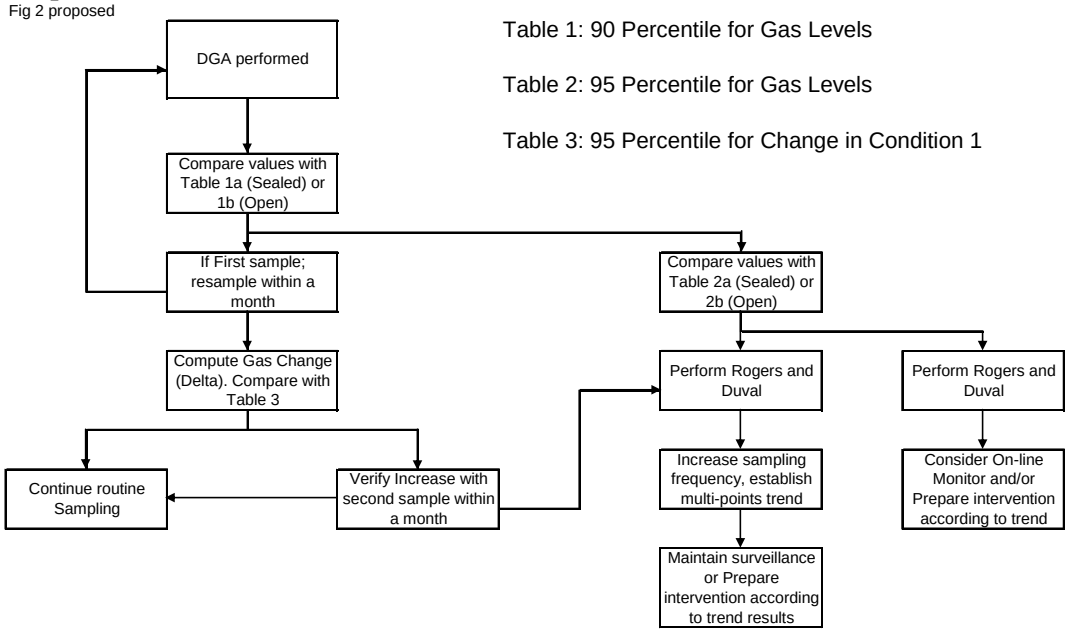


Table 1: 90 Percentile for Gas Levels

Table 2: 95 Percentile for Gas Levels

Table 3: 95 Percentile for Change in Condition 1

Claude explained that the reason for recommending on-line monitoring since a unit that is gassing and increasing in gassing, could be considered dangerous.

Preliminary Table 1a and 1b (90%)

Age	< 1	2 - 6	6 - 15	15 - 30	> 30
Table 1a: Sealed (< 10% O2)					
H2	70			200	
CH4	25	35	80	120	150
C2H2	0		1		2
C2H4	10		30	50	70
C2H6	20	30	90	160	200
CO	250	600	750		900
CO2	1500	3500	5000	7000	8000
TDCG	500	750	1000		1300
Table 1b: Open (> 10% O2)					
H2	40	65	40	60	100
CH4	15	60	30	20	
C2H2	2	3		4	
C2H4	10	100			65
C2H6	5	20		15	
CO	250	600	700		600
CO2	1200	3000	6000		
TDCG	450	900			800

The percentage of O2 will give an easy and quick way to determine which category a transformer falls within. The numbers were rounded off for simplicity and to provide some margin.

Preliminary Table 3 (%95 Delta)

Table 3 for Condition 1

Maximum Delta PPM between samples in Condition 1				
Interval:	< 1 month	1 Month - 1.5 Year	1.5 - 2.5 Years	>= 2.5 Years
H_2	10	15		20
CH_4	10	20		25
C_2H_4	5	10		
C_2H_2	0	0		
C_2H_6	5	10		15
CO	60	80	120	180
CO_2	400	600	800	1000
TDCG	50	150	200	300

7. Fredi Jacob indicated that he liked Table 1 because it urges you to take additional samples. He indicated he would like to see a maximum time interval be indicated when you progress beyond Condition 1.
8. Fredi indicated that he and Jim Dukarm have written a paper on Normal Energy Index. The intent is to get rid of the TDCG.
9. James Garner raised a question regarding does the age of the oil get taken into account or only the age of the TR. Claude indicated that it is only the nameplate age of the TR.
10. On-line DGA Data Presentation – Jesse Inkpen
11. Presently only off line DGA information has been used by C57.104. This presentation shows the gassing characteristics of TR faults with online DGA.
12. Off line data has useful information about a large number of transformers.
13. Determination of
14. Step changes
15. Impending failures
16. Change of state
17. Time of state Change – Cause of change
18. Fault type
19. Correlation of gassing rate to:
20. Load
21. Temperature

22. Start-up conditions
23. Jesse presented a simple online case study with a 10ppm change in Ethylene within a 2 day period. Rate of change is a function of data sampling.
24. The TDCG rate of change was very flat leading up to the failure. The transformer was repaired and put back in service. Initially the gases stabilized and then progressed through condition 2, 3, and 4 within only a few months. An analysis of the data from this unit will be done using the new proposed Tables to see how this particular example would have fared.
25. Jesse indicated that the rate of change can identify the approximate date of a state change (no fault to active fault state).
26. The transformer was again repaired and degassed and put back online. Over a 4 month period, there was again a steady ramp up of TDCG.
27. A second case study was presented with a transformer showing acetylene. Methane and ethane were also increasing. Looking at ethylene, they changed loading and looked at temperature trying to determine if the fault was at the top or the bottom of the transformer.
28. Fredi Jacob asked if Jesse knew how long on average it took for the residual gas to come out of the paper insulation. Jesse indicated a month or two, but that for CO and CO2 it is usually longer. Claude indicated that he has seen cases that take 3 months to level off and stabilize after degassing. It will be dependent on the type of transformer, amount of paper, and circulation of the oil.
29. The meeting was adjourned at 6:00 pm. Don Cherry made a motion for adjournment and Rainer Frotscher seconded. The motion was unanimously approved.

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:

Monday, October 20th, 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 58 attendees. Four of the eight individuals that requested membership in Savannah (Spring 2014) did not attend therefore will not become members until they attend two consecutive meetings. The four new members are Oleg Roizman, Paul Boman, Don Dorris, and Arturo Nunez. Quorum was reached as 22 of the 41 members were present.

Attendees requesting membership were:

1. Scott Reed
2. Dinesh Chhajer
3. Leon White
4. Kumar Mani
5. Rainer Frotscher
6. Kevin Sullivan
7. Jose Lzquierdo
8. Pat Rock

Those above will become members when they attend the next conference meeting or participate on the teleconferences.

Agenda for the meeting was reviewed. The WG looked at the document structure based on good comments. It has been restructured and revised and sent with a straw ballot to the working group members two weeks prior to the conference.

The draft is revision 2 and section 4 has been restructured the most. Additionally, the circuit breaker section was removed and handed over to the Breaker Committee.

Discussion following regarding the document:

- Table 1 is new oil as delivered, so it has ASTM values for new oil.
- Dielectric D877 was removed from Table 1 because ASTM has removed that test method for new oil specification.
- ASTM revised the corrosive sulfur test method ASTM 1275 A & B. It is now just ASTM 1275B. It was recommended to put a footnote in Table 1 saying ASTM 1275 has formally replaced A.
- Don Cherry asked if we should combine Tables 2 and 3 since they are both for new oil before energization, but just different voltage classes. Don Platts asked if the titles are different. Table 2 is for new oil received in new equipment, whereas Table 3 is new oil processed in new equipment. Possible reasoning – smaller transformers may be shipped with oil and larger ones will be filled onsite during installation. Both tables are prior to energization.
- It was noted that the values for the 230 kV and 345 kV were not much different. Mostly the dielectric D1816 and the color. Also, oxidation inhibitor is not in Table 3 (>230 kV).
- Comment followed asking if the colored corrosive sulfur chart should be added to the document to help further explain. Claude B. said that the method is covered in ASTM and if it was elaborated, then we may also need to elaborate all the other test methods in C57.106.
- Rainer F. commented that the ASTM (copper strip) method is not sufficient for certain types of tap changers. Specifically DIN 51353 (1985) (silver strip method).

It was asked if ASTM has a silver strip method. Don and Claude agreed that ASTM has not adopted a silver strip method, so it may be difficult to add to Table 1. Maybe a note could be added saying other tests exist and also elaborate more on the other methods in Table 6 and in Section 5.3.3. Jim Thompson asked that the comment be submitted with the straw ballot.

- Bob R. asked if the draft needs more elaboration on what to do if corrosive sulfur is found. Clair said Table 1 rejects it, so no elaboration needed there. However, the comment was made that this document addresses in-service oil (Table 4) as well. Table 4 does not list CS – should it be included? Jim T. said the structure of the guide may need to be changed to add CS. It was also stated that new oil can come with CS, so an explanation is valid. Don C. questioned if we should address how it is dealt with. Claude B. said we would need to do that for all tests. He elaborated that it applies to in-service oil because testing has changed much since oil may have been installed. Another comment followed that the guide is called Acceptance and Maintenance of Mineral Oil, so it is valid should we decide to elaborate. Bob R. read the scope - includes in-service oil. Jim T. asked that the comments be put in the straw ballot.

- If in-service oil is positive for CS, there is no guidance for help in C57.106. Should we add it? If additives are available, it that a marketing issue? Not if it is kept general. Oxidation inhibitor is discussed. If CS passivator is added to document, leave it general – no brand names.

- Why would C57.106 mention remedy for CS and not mention solutions for other oil qualities?

- New paragraph was added to document regarding oxidation inhibitor. Then document goes into the three classes of oil. Bob R. stated that C57.637 (Reclamation Guide) then takes over. Discussion followed on term consistency (i.e. Class, Group, and Condition). 106 uses Class. 637 uses Group. Maybe the term Condition 1, 2, 3 should replace Class 1, 2, 3. A comment was made suggesting Classes be pulled from 106 and refer to 637. Bob R. asks if we should refer to C57.637 Table 2 footnote? There are a couple options and it is easier to change 106 because 637 is in ballot. Consistency will help with clarity for those that use the guide.

- Table 5 (after reclaiming, prior to energization) is new. It picks up where 637 finishes.

- Discussion followed on how we know if a transformer was reclaimed in past. It will not matter as long as it passes the in-service table. After transformer is energized, it becomes in-service oil.

- Annex B on moisture was shown. This was previously section 4.5.

Again - Straw ballot was sent out. Comments due by the end of November. By San Antonio (Spring 2014), plan is to vote to go to ballot. If we don't think we will make it prior to PAR expiring, we can file for extension in October 2015.

Motion was made to adjourn by Don Cherry; seconded by Don Platts. Meeting was adjourned.

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 Patrick McShane

Patrick stated that no meeting was held, and that at the Spring 14 WG meeting it was decided that the WG will be disbanded.

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 Jim Thompson

Quorum achieved. A ballot resolution TF has been formed. Two negative votes were discussed. The first regarded resolving a conflict due to a difference in detection limits between IEC and ASTM DGA methods. The second involved recommendation to narrow the scope of the Guide to ≥10 MVA and ≥69kV.

The Minutes (unapproved) of C57.130 WG Meeting as Submitted:
October 21, 2014

Unapproved Minutes Working Group Meeting for IEEE PC57.130
IEEE "Guide for the Use of Dissolved Gas Analysis Applied to Factory Temperature Rise Tests for the Evaluation of Mineral Oil-Immersed Transformers and Reactors"

The working group meeting was conducted on October 21, 2014 at Tysons Corner, Virginia with 70 people in attendance, including 7 of the 12 current working group members. There was a quorum.

The previous minutes from S14 (Spring 2014) were presented for approval. The F12 minutes approval motion was done by Ms. Sue McNelly and seconded by Mr. Scott Digby, was followed by unanimous approval.

It was informed by the Chair that the balloting process was concluded with more than 90% of approval rate, and 100 comments most of them editorial. The officers of this working group: Mr. Jim Thompson, Mr. Tom Prevost, and Mr. Juan Castellanos will form the ballot resolution group.

Two of the negatives were discussed. Mr. Don Cherry stated that the use of gas detection limits from IEC standard 61181 is not appropriate, since the standard makes reference to the DGA method per ASTM D3612, and this ASTM standard has its own detection limits. It was agreed that a sentence is to be included making an exception to the detection limits of ASTM D3612 and referring to table 1.

The second negative discussed was related to a change to the scope including the higher than 10 MVA and higher than 69 kV limited application. It was suggested that the PAR should be changed since the scope was to be modified. Ms. Erin Spiewak from IEEE mentioned such a change to the PAR is not necessary since the revised scope would be for a narrowing application. It was agreed to modify the scope, and continue with the ballot resolution, but without modifying the PAR.

There was a motion to adjourn the meeting by Mr. Don Cherry, seconded by Mr. Krishnamurjthy Vijayan. All were in favor and the meeting was adjourned at 2:30 PM

Respectfully submitted,
Chair Jim Thompson
Vice-chair Tom Prevost
Secretary Juan Castellanos

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

Chair: David Wallach, Vice-Chair: Mark Cheatham, Secretary: Susan McNelly

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

Most of the WG meeting was discussing the results of the straw ballot. The ballot produced 104 comments, and the key ones were reviewed. The Chair expressed hope that the SC will approve the go to ballot.

The Minutes (unapproved) of C57.139 WG Meeting as Submitted:

Tuesday, Chair Dave Wallach called the WG meeting to order at 11:04 am. Vice-Chair Mark Cheatham and Secretary Susan McNelly (minutes written by) were also present. There were 39 of 68 members present (Quorum requirement was met). There were 68 guests present with 9 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 late point in the document will be considered (*).

Almkvist, Marten
Ansari, Tauhid Haque
Arteaga, Javier
Caldeira, Julio
Dorris, Don
Joshi, Arvin
Luo, Shawn
Pruente, John *
Sullivan, Kevin

Agenda:

Introductory Remarks
Rosters
Introductions/Member Roll Call
Approval of Minutes from Spring 2014 Meeting
PAR and Schedule Review
Milestones
Draft Document Status/Discussion
Old Business
New Business
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 introduce themselves and their affiliations at that point.

No changes or additions were made to the existing minutes. Motion to approve the Spring 2014 Savannah Georgia, Missouri meeting minutes was made by George Forrest and seconded by Rainer Frotscher. The motion was unanimously approved.

Milestones

Straw Ballot between meetings – Completed and comments received

Begin Ballot process – Request approval to go to ballot by Spring 2015 meeting

PAR Expiration December 31, 2015

Submit Balloted document to REVCOM by October 2015

Document Status/Discussion

Draft 4 Circulated for Straw Ballot, Draft 5 sent for review

A total of 104 comments were received. The remaining open comments from Straw Ballot were reviewed at the meeting. Detail and discussion is provided below.

Discussion about N2/O2 ratio. Comment was received that the minimum possible value in air-saturated mineral oil should be changed to >1.8, rather than >1.9. Claude Beauchemin commented that it should not matter whether this is 1.8 or 1.9. Dave will verify what the original wording was and make a decision on which will be used.

Section 4.1: Comment was that acetylene is always present in the oil of operating non – vacuum LTC. Guide presently indicates “usually” present. The word “operating” was added before “vacuum interrupting type” portion of this sentence. Don Dorris indicated that they have a lot of vacuum interrupting type LTCs with acetylene. Some have no acetylene and some have more. He indicated you may put something about small quantities of acetylene. Dave Wallach indicated that the user develops its own guidelines based on the LTC type. Rainer Frotscher indicated it is population and application specific, so there is no specific guideline as to what is an acceptable limit and that for this reason it needs to be kept as general as possible and that it cannot be quantified. He also recommended removing the word “interrupting” and just indicate “vacuum type” LTC. Fredi Jacob indicated we should indicate that users are advised to establish their own limits in the way the guide recommends. Paul Boman indicated that this is very model specific. Dave indicated that this is the premise of the whole document, that users need to develop their own type specific limits.

Section 4.2.3: Comment to add ethylene/ethane and remove ethane to ethylene ratio to the second paragraph. This would mean that if an increasing ratio is seen it will indicate an issue, rather than having mixed increasing and decreasing ratios.

Section 5.3.3: Suggested change to text to include a reference to the temperature rise requirements of C57.131. Rainer indicated it should be referred to reactive and resistor type rather than using transition resistor terminology in this section. He indicated the title of the section should be resistive type tap changers and to change transition resistors to

resistance type. Some other minor rewording for grammar was also suggested and made. Dave will incorporate Rainer's comments into the final draft before sending out.

Section 1.3: Meaning of sentence is unclear: "The nature of the interpretation also depends upon the context or application of the DGA." This sentence will be removed as the intent is covered by the information above it in the paragraph.

Annex C, Section C.2: Possible improvement suggested. The section is a case history. The user was asking if a type designation could be included in the document. Rainer indicated that there can be more than one type associated if the exact type of LTC in the examples are not known. If it is known, this can be done.

Annex D, D.4: Exceptional LTC Types: The N-zones are model specific according to Jim Dukarm. Rainer will work with Michel Duval to determine types that can be referenced.

Section 3.3, Heating Gases: Were defined as methane, ethane and ethylene for the first time in this section but is also mentioned in a later section. Does this need to be identified each time the term "heating gases" is brought up. It will be defined at the first use and a search of the document will be done to remove additional points where this is again defined. Similar with arcing gases. A suggestion was made that these should be defined in the definition section rather than hidden in a section at the first point of use. There was general agreement that this made sense.

Annex D – Triangles: Question was asked if subscripts could be used. This can't be done with program generating the graphics. Michel Duval, Dave Wallach and Sue McNelly will work to improve the graphics.

Suggestion that the ratio of CO/CO2 should also be considered for LTC Diagnostic Gas Analysis. Dave Wallach indicated his personal opinion was that it doesn't belong in the guide. The question was asked if it is rare enough to not be added for consideration? Rainer indicated that there are references that could be mentioned to this issue. Language to the main body of text could be added including a reference

Old Business

No old business was discussed.

New Business

No new business was raised for discussion.

The meeting was adjourned at 12:15 pm.

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:

There is significant interest in this WG. The meeting had 74 attendees, including 80% of the WG members. The WG has 3 corresponding members, and they will be contacted regarding the new policy.

Key discussion included: 1. Eliminate the current special dielectric strength and maximum moisture limits for drummed natural ester. 2. Combing two tables into one for continuous use limits. 3. Continue the minimum 300 C fire point for continuous service with a note for possible exceptions for mineral oil filled units retrofill with natural ester.

Two new task forces were formed for the review of the results of the upcoming straw vote on the modified draft. Their reports will be reviewed at the S15 meeting.

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

Call to Order was made at 3:15 PM.

Introductions/Membership Attendance/Quorum Check
Attendance
24 of 31 members present, quorum was achieved
3 corresponding members
47 guests
Total attendance = 74
2 guests requested membership

A motion to approve the agenda was made by Don Cherry, seconded by Deanna Woods. There were no changes or objections to the proposed agenda, and the motion passed.

A motion to approve the Spring 2014 meeting minutes was made by Don Cherry, seconded by Deanna Woods. There were no changes or objections to the minutes, and the motion passed.

Chair's Remarks, Patrick McShane:

Discussion of C57.147 Draft 1.01. Issues which need to be addressed included

Dielectric strength of natural ester insulating liquids stored in drums/totes vs. bulk storage

Extreme non-uniform fields (may pertain to LTC applications)

Fire point requirements of retrofilled transformers vs. new transformers

Old Business

John Luksich proposed the water content for NE insulating liquids stored in drums/totes be the same as NE insulating liquids in bulk storage, and use ASTM values. Several attendees supported the change as it is normal procedure to process all insulating liquids received in drums and totes.

John Luksich proposed the dielectric for NE insulating liquids stored in drums/totes be the same as for NE insulating liquids in bulk storage – 20kV for a 1 mm gap, and 35kV for a 2 mm gap. Several attendees supported the change as it is normal procedure to process all insulating liquids received in drums and totes.

It was proposed that Table 3 (test limits for new NE liquids received with new equipment < 230 kV) be combined with Table 4 (new NE liquids received with new equipment > 230 kV); provisional designation for Table 4 should be removed. There were no objections.

Rainer Frotscher briefly discussed his draft for a proposed informative annex on load tap changer applications and esters.

Discussion was held on a TF recommendation to drop fire point lower limit (300ºC) for continuous service as not all installations require less-flammable classification.

New Business

Draft 1.02 will incorporate changes agreed to at the meeting and be sent out to the post F14 revised roster members and interested parties for a straw vote before end of this year.

An editorial and technical task forces were established to review and resolve any straw vote Draft 1.02 of the guide.

Editorial Task Force: Sue McNelly, Patrick McShane, Clair Claiborne, Jim Graham

Technical Task force: Don Cherry, John Luksich, Larry Christodoulou, Nick Perjanik, Scott Reed, Paul Boman, Dave Hanson

The meeting was adjourned by acclamation at 4:30 pm.

Respectively submitted,
Jim Graham, Secretary

IEEE C57.155 Guide for Interpretation of Gases Generated in Natural and Synthetic Ester-Immersed Transformers.

WG Chair: Paul Boman, Secretary: John Luksich

The WG Report at the Sub-Committee Meeting: Presented by Paul Boman:
There was no WG meeting at F14. The draft was approved by REVCOM, but then a patent issue developed. The issue was resolved and it is expected that the new Guide is expected to be sent to publication very soon.

G.1.5.7 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 Jim Thompson

The PAR was issued an extension, valid through the end of 2015. The meeting discussion focus on negatives received. A test for sulfur was added.

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

October 21, 2014

Washington DC Metro Area October 21, 2014

The working group meeting was conducted at 8 am on October 21, 2014 at Tysons, Virginia with 24 people in attendance and with 9 of the 15 current working group members present. There was a request for membership by Scott Reed. A PAR extension request was approved this summer until December of 2015. Working Group member Jim Thompson (chair) conducted the meeting.

The minutes for the S14 (spring 2014) meeting were reviewed. With quorum present, a motion was entertained by the Chair for approval of the PC57.637 working group S14 minutes. A motion was made by Don Cherry and a second by Claude Beauchemin and this was then followed by unanimous approval.

The Chair said the first balloting process was concluded with an 84 % of approval rate, and over 200 comments, and with most of them editorial comments. The officers of this working group are the current ballot resolution group.

There was discussion of negatives of the ballot. Rainer Frotscher, a working group guest speaking regarding Dieter Dohnel's negatives, talked about concerns of used LTC oil not being fit for use in reclaimed oil. There was discussion about adding ASTM D4059 (PCBs in Mineral Oil Test) to table 2 "Suggested Property Limits For Reclaimed Oil" and also adding ASTM D 1275 (Corrosive Sulfur Test). There was also discussion on removing the asterisks below Table 2 and as a substitute using a "Note" text format.

Don Cherry and Claude Beauchemin talked about placing a notation that the method ASTM D 1275 was formerly ASTM D 1275 method B. And lastly Ed TeNyenhuis asked about the timing of the ballot resolution prior to the next meeting. The goal is to conclude the ballot resolution prior to the next Transformer Committee S15 meeting.

The meeting adjourned at 9:10 am.

Respectfully submitted,

Chair Jim Thompson

G.1.5.8 TF on Consolidation of Insulating Liquid (Fluid) Guides

Chair: Tom Prevost

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

Meeting time: Monday October 20th, 2015 @ 0930

The purpose of the TF was reviewed, which is the desire to combine all the insulating liquids guides into one master guide. Except for silicones, the other types were represented.

John Luksich did a lot of work on creating a table with all the current property limits for acceptance of new insulating liquids using existing insulating liquid guides. John also took a stab at suggesting what key properties should be considered for the additional limits for insulating liquids from new equipment and limits for continued service.

Discussion was held on whether or not synthetic ester be included in the proposed consolidation guide. Don Cherry reminded the attendees that ASTM is planning to develop a standard specification for synthetic esters used in Electrical Apparatus.

The Minutes (unapproved) of TF Meeting as Submitted:

(No minutes have been submitted as of 2/12/2015)

G.1.5.9 TF on Particle Count Limits in Mineral Oil

Chair: Mark Scarborough, Secretary: Paul Boman

A meeting of this TF was not held. David Wallach stated that Paul has agreed to provide a report of the activities and discussion of the TF past meetings.

G.2 Old Business

The status of the TF of the Standards Sub-Committee assigned to issue a white paper one Insulating Liquids Terms Normalization was reported by the TF Chair, Patrick McShane. He advised that the TF completed their work, and the white paper has been forwarded to the StdsSC for their consideration. It is most probable that the final draft will be posted soon on the IEEE TC web site section on Standards. He encourage those involved with developing or revising existing standards to review the white paper to determine the proper use of terms and inclusions regarding insulating liquids.

G.3 New Business

Discussion was initiated regarding C57.637, Oil Reclamation Guide.

Jimmy Rasco with Ergon, and member of ASTM and Chairman of ASTM WG D27.01, stated that ASTM is looking to set acceptable criteria for reused insulating mineral oil and sees this impacting C57.637. The AST activity is focused on mineral oil in storage, not for guidance of the mineral oil in situ in equipment.

Jos Veens with Smit Transformers, on behalf of Sanjay Patel, suggested the need to address DGA levels for overload heat run tests as this is becoming a common request form the user community. Tom Prevost and Jim Thompson both commented that C57.130 is ready to go to ballot. Tom made a motion to form a task force for a recommendation on appropriate action to the subcommittee for DGA testing for overload heat runs. The motion carried unanimously.

G.4 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

October 22, 2014
Washington DC Metro Area

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

The Insulation Life Subcommittee met in Washington, DC on October 22, 2014 at 8:00 AM.

A hand count of the members at the beginning of the meeting revealed that 54 of 91 members and 0 of 7 corresponding members were present. A quorum was present.

P. McClure made a motion to approve the Savannah, GA Meeting minutes as written. K. Miller seconded the motion. There was no discussion on the minutes. It was unanimously approved.

The agenda was reviewed. There was no discussion on the agenda. It was unanimously approved.

The attendance rosters show that the meeting was attended by 170 people, 61 of 91 members and 109 guests. 12 guests requested membership. 8 of these guests meet the membership requirements. The complete attendance is recorded in AMS.

H.1 Chair's Report

The Chair, Bruce Forsyth, was not able to attend this meeting. The Vice-Chair, Barry Beaster, ran the meeting.

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

The Spring 2015 IEEE Transformers Committee Meeting will be held April 12, 2015 through April 16, 2015 in San Antonio, TX. The Fall 2015 Meeting will be held November 1, 2015 through November 5, 2015 in Memphis, TN.

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 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 November 19, 2014

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

Tauhid Haque Ansari	Steve Brinkman	Julio Caldeira
Jonathan Cheatham	Martin Hinnow	Rodrigo Ronchi
Subhas Sarkar	Kevin Sullivan	Roger Verdolin
David Wood		

H.1.1 Project Status Reports

H.1.1.1 C57.91 IEEE Guide for Loading Mineral-Oil-Immersed Transformers

C57.91 is valid until 2021.

H.1.1.2 C57.100 IEEE Standard Test Procedure for Thermal Evaluation of Liquid-Immersed Distribution Transformers

This standard is valid until 2021.

H.1.1.3 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.1.1.4 C57.154 Design, Testing and Application of Liquid-Immersed Transformers with High-Temperature Insulation

C57.154 is valid until 2022.

H.1.1.5 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.1.1.6 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.1.1.7 1538 IEEE Guide for Determination of Maximum Winding Temperature Rise in Liquid-Filled Transformer

1538 is valid until 2021.

H.1.2 Working Group and Task Force Reports

H.1.2.1 Task Force on Winding Temperature Indicators - Phil McClure

Monday, 10/20/2014
Chair: Phil McClure
Vice Chair: Robert Thompson

The meeting was called to order at 9:30am.

The meeting began with the members and guests introducing themselves. There were 8 members and 16 guests in attendance. There are 11 members in the Task Force and a quorum was achieved. One guest - Jeff Golarz - requested membership.

The minutes of the Spring 2014 meeting in Savannah were sent to the members prior to the meeting and after asking if there were any questions or discussion, a motion to approve the minutes was requested by the Chair. A motion to approve the minutes was made by Josh Herz and seconded by Dave Wallach followed by unanimous approval.

Old Business:

The Task Force had two projects in process from the last meeting; the experimental investigation of WTI response time and the technical paper which describes heated thermowell simulating WTI's, summarizes the results of the experiment and suggests alternate WTI systems.

The report on the experiment had been discussed, revised and balloted at the Spring 2014 meeting. After the changes were made, the document was balloted and 8 of 9 members approved. There was one abstention. In the interim between meetings, the authorized changes were made and two further changes were discovered that were discussed in previous meetings but not captured in the document. These changes were shown in a red-lined document that was circulated to the members prior to the meeting. The intent was to re-ballot the document at this meeting. Tim Rinks made a motion to accept the changes and ballot the document. Jorge Gonzalez de la Vega seconded the motion. The motion passed unanimously 7-0. One member arrived late to the meeting and did not participate in the vote. The experiment report as approved will be made available to Sue McNelly for placement on the appropriate page of the IEEE Transformer Committee's website

The technical paper's version was draft 13 coming into the meeting. The sections that were discussed at the Spring 2014 meeting were edited by members in the interval between meetings and the full red-lined paper was distributed to the members prior to the meeting. Each section was again discussed and consensus on changes that need to be made was achieved. Several members agreed and/or volunteered to edit the sections. The changes are planned to be made and circulated prior to the next meeting, with the intent to ballot the document at the next meeting.

At 10:45am, having run out of time, a motion to adjourn was made by Gary Hoffman, seconded by Josh Herz and carried unanimously.

Respectfully,
Phil McClure, Chair

H.1.2.2 Working Group on 1538 - IEEE Guide for Determination of Maximum Winding Temperature Rise in Liquid-Filled Transformers – Rick Marek

Washington, DC USA
Sheraton Premiere at Tysons Corner
Tuesday October 21, 2014

The working group had a short meeting in the Washington Boardroom 11:00 AM on Tuesday. This was the first meeting of the WG and it was convened with 4 of the 5 WG members in an off schedule time slot. All four attendees requested membership and a quorum was achieved. The full attendance record is available in the AM System. Tom Prevost has agreed to serve as Secretary to the WG, but was not present due to a conflict. There were no previous minutes to approve since it was the first WG meeting. The draft had been reviewed by the members and a number of changes were suggested and agreed to. The WG unanimously agreed to submit the document for ballot and to request Subcommittee approval.

With no further business, the meeting was adjourned at 11:35 AM.

Subsequent to the meeting, a formal email motion was made by Don Platts to accept the draft wording, and proceed to sponsor ballot. This motion was seconded by Tom Prevost and followed by a WG vote. All five members voted yes to the motion.

Respectively submitted
Richard P. Marek, WG Chair

H.1.2.3 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	44 out of 74
	Guest	29
	Guests Requesting Membership	6

Meeting Minutes

Tom Prevost, chair, introduced himself, Valery Davydov, vice chair, and Deanna Woods, secretary, of the working group and then members and guests introductions.

A quorum of the working group members were present 44 out of 74.

Minor correction was made in number of Task Force numbers in the minutes.

The meeting minutes were approved with Don Cherry making a motion and Claude Beauchemin seconding the motion.

Tom Prevost presented the Par and explained the agenda. For this meeting he wanted to break into individual task forces to have each meet.

Tom Prevost ask for approval of the agenda, Don Cherry making a motion and Claude Beauchemin seconding the motion for the agenda. Approved.

Tom Prevost went over the PAR and then described each task force.

The task force then broke into individual groups and finished the meeting time in their respective groups.

Tom Prevost explained that individuals would need to pick a task force to participate in which is the unfortunate with breaking into groups.

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. This is the list of members so far;

1. Alex Macias
2. Shawn Luo
3. Oleg Roizman
4. Valery Davydov

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. Task members are:

- Tom Prevost
- Gary Hoffman
- Tom Melle
- Bob Kinner
- Deanna Woods

We reviewed the charter for the TF and detailed our goals

TF Goal:

> Investigate and detail the methodology, application, and limitations, of using the dew point measurements from a gas filled power transformer as means to the extrapolate moisture content of the solid insulation contained therein.

The group discussed alternative methods of obtaining the dew point measurement, Bob Kinner suggested a “sweep gas measurement”.

Action Items:

Deanna Woods will provide a word version for C57.93

Rich Simonelli will distribute data and details of previous dew point studies conducted in 2009 to the TF for review

Our task force will communicate via email and schedule a conference call to discuss next steps

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

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

TF3 had about 12 participants. Half of them are requiring membership. I did a presentation of what is KF and what is capacitive sensor with an outline of what we are looking for in building this chapter. We did not set a date for a conference call.

Task Force 4 Measurement of moisture in solid insulation
Task Force Leader - Paul Griffin pgriffin@doble.com/ Ronald Hernandez

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.

The task force 4 on measurement of moisture in solid insulation met on Monday October 20, 2014 at 11:30 AM. The meeting was chaired by Ronald Hernández. Attendees of the meeting were the following:

- Clair Claiborne
- Solomon Chiang
- Luiz Cheim
- Byoung “Sam” Kang
- Mohamed Diaby
- Ronald Hernández

Tom Prevost asked to be included in this task force. Paul Griffin could not attend the meeting but he is also a member (chair) of this task force.

Discussion:

1. It was suggested to remove from the original title of this task force the last two words “using balance” to avoid any confusion since Karl Fischer titration methods are also covered in this task. Thus the new title of the task force is: **Measurement of Moisture in Solid Insulation**.
2. The task force reviewed the scope and agreed to define it as follows:
   Scope: This section describes the existing methods of measurement of moisture in solid insulation using balance for non-oil-impregnated insulation and a Karl Fischer titration using solvent extraction or vapor extraction for oil-impregnated insulation.

3. The task force agreed to include the following items for the description of the methods of measurement:
   - Sampling and retaining of samples for moisture measurement
   - Methodology of measurement and specific details if outside of standard methods:
     - Range of % moisture the method is able to measure
     - Recommended range of paper/pressboard/composite insulation thickness
     - Accuracy of the balance
     - Calculation of the reported results
     - Extraction time and temperature ranges when using vapor extraction
   - Repeatability and accuracy of measurements.

Next Course of Action:

The task force members volunteered to develop the following sections:

- Measurement of moisture in solid insulation using balance methods for non-oil-impregnated insulation: Solomon Chiang and Byoung "Sam" Kang.
- Measurement of moisture in solid insulation using Karl Fischer titration – solvent extraction for oil-impregnated samples: Mohamed and Tom Prevost.
- Measurement of moisture in solid insulation using Karl Fischer titration – vapor extraction for oil impregnated samples: Ronald Hernández and Paul Griffin.
- Repeatability and accuracy of measurements: Clair Claiborne.
- Interpretation of the procedure and results: Luiz Cheim.

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

Members: Mario Locarno (mlocarno@doble.com), Peter Werelius (peter.werelius@megger.com), Kathleen McHugh (Kathleen.mchugh@sabic-ip.com), Dinesh Chhager (dinesh.chhager@megger.com), Josh Herz (jherz@qualitrolcorp.com), Jermaine Clounts (Jermaine.clounts@powerpartners.com), Lorne Gara (lgara@orbisengineering.net), Yukiyasu Shirasaka (yukiyasu.shirasaka@hitachi.com), Mohamed Diaby (mohamed.diaby@efacec.com), Diego Robalina (diego.robalina@megger.com), Ebrahim Cham,

There were two items about the scope from the Savanah meeting that had to be decided by the task force: 1) to consider only the frequency domain measurements (DFR and power frequency power factor) 2) to consider moisture and temperature distribution.

There was discussion that in the field, there is typically access to just temperature gauge measurements of the winding and top oil. It is not feasible to measure temperature distribution in the winding without preinstalled temperature probes. In addition, since these measurements are by design bulk moisture measurements, it is not feasible to measure the distribution of moisture in the windings. Consequently, these provisions will be dropped from the scope.

There are standards and/or guides available or under development for DFR and power frequency power factor, whereas there are currently no IEEE documents that would help a user in the use of other dielectric response methods. The scope will therefore be limited to DFR and power frequency power factor measurements.

There were discussions about including:

- a correlation between moisture estimation via 60 Hz power factor and moisture estimation via

DFR

- information on power factor (dissipation factor) as a function of moisture
- limitation for moisture estimation using these methods
- making a note that currently DFR moisture estimation is applicable to mineral oil insulated transformers and that more investigations may be needed for application to ester filled transformers

George presented some measurements made in the ABB St. Louis factory. The measurements were for DFR, power factor and moisture in oil sample right after shut down from the ONAF heat run tests and after cool-down of the transformer. The goal of these measurements is to see the effect of rapid decline in temperature (e.g. right after de-energization of loaded transformer) on moisture estimation and to provide some guidance to users on when to make measurements after de-energizing a transformer. It was agreed that the lessons learned from such tests may be more suited for inclusion in the DFR Guide (PC57.162) than in this guide.

The TF then reviewed the scope and agreed to make this task no more complicated than defined as follows:

Scope: This section describes the methods of measurement of moisture in solid insulation using dielectric response. Consideration will be given to those methods that analyze the results in the frequency domain (DFR and power frequency power factor) and to changes in temperature during the measurement.

The chair decided to confirm his understanding of the requirements of the scope with the WG Chair and then set up a TF meeting to prepare a draft of the section.

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

The separate task forces split. This TF met in the Washington Room. Introductions were skipped since they were done in the WG prior. There were 18 attendees listed in the roster, including Chair Valery Davydov.

It was noted that 4 existing members were present. Two other existing members, Paul Boman and Claude Beauchemin, were not in attendance. 6 new attendees have requested membership.

Members and attendees requesting membership were:

1. Valery Davydov (Chair)
2. Hali Moleski (Secretary)
3. Oleg Roizman
4. Jeff Golarz
5. Emilio Morales Cruz
6. Dave Hanson
7. Stephanie Denzer
8. Tom Golner
9. Peter Heinzig
10. Egou Kirdenmayv.

Valery (Chair) had prepared a presentation. The presentation began by giving parameters that may affect inferring moisture in solid insulation.

The main points of the presentation were:

A. The solution to the issue of "Moisture Exchange vs. Moisture Diffusion" would lay in measuring or evaluating the two parameters:
    1. Water content of surface of solid insulation
    2. Maximum water content of inner layers of solid insulation
B. Additional moisture-in-insulation parameters to consider:
    1. Variations of the two above parameters with the position of solid insulation in the unit due to the non-uniform temperature
    2. Water content of solid insulation in the hottest spot
    3. Water content of solid insulation in the wettest spot
    4. Water content of solid insulation evaluated by DFR
    5. Other?
C. List of moisture equilibrium charts suggested for TF6 chapter:
    1. WCP vs T and P (e.g.: copy from IEEE C57.93)
    2. WCP vs T and RH for new kraft ppr
    3. WCP vs T and RH for aged kraft ppr (???)
    4. WCP vs T and RH for other types of new ppr
    5. WCP vs T and WCO for:
        i. New MO
        ii. Moderately deteriorated MO
        iii. Badly deteriorated MO
    6. WCP vs T and WCO for:
        i. New SE
        ii. New NE1
        iii. New NE2
    7. Color chart
D. Terms to define for TF6 (suggestions):
    1. Layer of solid insulation
    2. Surface layer of solid insulation
    3. Inner layer of solid insulation
    4. Water content of the surface of solid insulation
    5. Water content of an inner layer of solid insulation
    6. Maximum water content of inner layers of solid insulation
    7. Moisture exchange between the surface of solid insulation and surrounding gaseous or liquid medium
    8. Moisture diffusion within solid insulation
    9. Establishing baselines of moisture in solid insulation:
        i. For new units and/or workshop repaired units
        ii. For units operating in the field with no baseline established earlier
    10. Tracking and interpreting of changes against the baselines throughout the life of the transformer or reactor.

Dave H. commented that paper type may also be important. How are inner and outer layers defined? Perhaps manufacturers should help us better define types of paper - this would be a good 1st step.

Oleg commented diffusion is much slower than absorption / desorption.

Valery commented that inner and outer layers must be defined and we want to keep it general.

Definitions will be gone over and reviewed by the group.

A list of 15 or so of term definitions has been already done by Oleg.

A comment was made that we should look more at dynamics of fluid movement of moisture.

Valery stated that we need to remember both gas and liquid movement.

Oleg suggested adding an introduction section to the guide.

Dave suggested we discuss this suggestion with Tom P (WG Chair), as it could be addressed by the main WG.

Oleg asked who is doing the work and how we will communicate. Valery said we will go through a general approach outlined in his 2012 paper; it was published and is on website. If agreed, then we can decide how we will operate. This new guide will be a reference document for other guides.

It was asked if IEC or CIGRE have documents like this that we could start with reading.

Valery could not think of just one, but we all will look at it.

Valery stated that the outline of the guide content is already done in the paper, and Section 4.3 of his document is what is to be covered by this TF. We can use this as a starting point.

Valery asked for comments and ideas if we start with this structure.

For the next correspondence, we will email. We want to address terms at the next meeting and comments on Section 4.3 as a starting point.

We know we need to address the other guides. Do we want to know water content in hottest spot and wettest paper in transformer overall – e.g. for bubble evolution?

If modelling for a surface of insulation is created, can we assign porosity, etc?

Discussion of DFR and how it is covered in the other TF has followed. Valery stated our TF infers moisture in insulation based on the other TFs input. What we do with DFR information is up to us.

Meeting ended 12:20 PM.

The initial notes for the minutes were taken by the TF Secretary, Hali Maleski. These notes were modified by the TF Chair, Valery Davydov

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.

Task force started out with solicitation of volunteers for this task force. Here is the list of volunteers:

Name	Company	Email	Papers
Donald Cherry	ABB	don.cherry@us.abb.com	1-13
Oscar Pinon Garcia	WEG	opinon@weg.net	14-26
Thomas Holifield	Howard Industries	tholif@howard-ind.com	27-39
Sasha Levin	Weidmann Electrical Technology	aleksandr.levin@wicor.com	40-52
Jeewan Puri	Transformer Solutions, Inc.	jpuri@carolina.rr.com	53-65
Michael Shannon	Rea Magnet Wire	mshannon@reawire.com	66-78
Sam Sharpless	Rimkus	slsharpless@rimkus.com	79-91
Dave Stankes	3M IPT	dsstankes@mmm.com	92-104
Kiran Vedante	ABB	kiran.b.vedante@us.abb.com	105-117
Roger Wicks	DuPont	roger.c.wicks@usa.dupont.com	118-139

We next reviewed the previously developed scope for this task force:

This section describes approaches for evaluation of parameters of end of life of solid insulation affected by moisture. Consideration of the affects of moisture, oxygen and aging byproducts in transformer aging tests.

We then discussed our objectives for what we want to accomplish prior to the next meeting in San Antonio.

1. Solicit the Task Force to identify deliverables for this section
2. Define the "systems" which this work will cover
3. Using cellulose mineral oil, we will start with the CIGRE 323 report (Ageing of Cellulose in Mineral-Oil Insulated Transformers) and identify which of the documents in the extensive bibliography are of interest to our document (as well as which portions of the document can be used as a guide for our work. May also be other such documents in IEEE C57.91 Annex, etc.
4. Circulate a request for meeting times in the first two weeks of December, and then have a conference call at the best time.

CIGRE 323 Report – 139 papers in the bibiliography – the papers to review from the CIGRE document are listed in the table above….

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

Attendees at this meeting was

- Zan Kiparizoski
- Juliano Montanha
- Shane Smith

Annex H

The members of this Task Force is

- Zan Kiparizoski
- Juliano Montanha
- Shane Smith
- Bruce Forsyth
- Tauhid Ansari

The task for this task force is to describe methods to establish baseline moisture content in the solid insulation. We have discussed to include following methods for moisture estimation in the factory environment

1) Dew Point- Especially prior to shipping
2) Sample Block Method+ KF- which is not described in any of the IEEE documents as we know
3) Water Extraction Rate- method
4) Relative Saturation in Oil-method
5) Power Factor during the acceptance test – refer to stand IEEE standard for this test.

We have also divided the work for these chapters

1) Dew Point- Especially prior to shipping--- Bruce and Tauhid
2) Sample Block Method+ KF- which is not described in any of the IEEE documents as we know- Zan
3) DFR- Poorvi
4) Water Extraction Rate- method- Bruce and Zan
5) Relative Saturation in Oil-method- Shane
6) Power Factor during the acceptance test – refer to stand IEEE standard for this test.- Poorv

Juliano to come back to Poorvi to let her know what section he would like to contribute to

Follow up Conference call for the sections would be December 15th at 11-12 Central time.

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

Members

Jim Thompson	T & R Service	serve1@svtv.com
Enrique Betancourt	Prolect GE	ebetanco@ieee.org
David Wallach	Duke Energy	david.wallach@ieee.org
Hugo Flores	EFACEC	hugo.flores@efacec.com
Waldemar Ziomek	CG Power Systems	waldemar.ziomek@cgglobal.com
Sergio Coreno	Siemens	sergio.coreno@siemens.com
Paul Boman	HSB	paul.boman@hsb.com
Peter Zhao	Hydro One	peter.zhao@hydroone.com
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Julio Caldeira	M & I Materials	juliocaldeira@mimaterials.com
Bob Rasor	SD Myers	bob.rsor@sdmyers.com

October 20, 2014

The Task Force Chair began the meeting with introductions of the 11 members. Following that there was a review of the current knowledge of moisture in transformers. Since moisture in an operating transformer is a dynamic and distributed parameter that varies with temperature, location, and time--then the Chair discussed searching the IEEE digital library for the last ten years for papers published with a search description of "field application of knowledge of moisture in transformers." There were 1,119 documents reported but a search of the documents indicated that none addressed moisture in oil correlation to moisture in paper. Then the Chair discussed searching the IEEE digital library for the last ten years for papers published with a search description of "field application of knowledge of moisture in transformers based on oil moisture content." Again a search of the documents indicates that none addressed moisture in oil correlation to moisture in paper. Then there was a brief mention that the Field Application of Knowledge of Moisture should be based on the underlying mechanism and physical chemistry involved so that the Field Application of Knowledge of Moisture results can be reviewed using basic scientific methodology.

The chair then mentioned the recent article in the March/April 2014 issue in IEEE Electrical Insulation Magazine titled "Equilibrium Charts for moisture in Paper and Pressboard Insulation in Mineral and Natural Ester transformer Oils" by Vasovic et al., PP 10-16. This recent article supports the general understanding that an operating transformer does so in non-equilibrium conditions. Several of the references in the document are past IEEE presentations on moisture dynamics by J. Thompson and TV Oommen that were presented during the development of the IEEE C57.106-2006 guide.

The Chair requested any papers or references to peer reviewed articles "Field Application of Knowledge of Moisture" to be sent via email to the task force Chair.

Then the members of the task force were each asked to provide their experiences with Field Application of Knowledge of Moisture. These then included general discussion of methods referenced in Cigre meetings or papers, internal company methods, and commercial methods.

Future data submission is the goal of this group so that it can be reviewed and summarized for the guide using a good scientific methodology.

Prior to the end of the meeting, email addresses were collected and the Chair will send out a brief summary of the meeting discussion.

During the Insulation Life Subcommittee Meeting, R. Marek made the following motion:

Approve the WG going to ballot with the amendment.

D. Platts seconded the motion. There was no discussion. The motion was approved unanimously.

H.1.2.4 Working Group for Application of High-Temperature Materials IEEE P-1276 – Mike Franchek

Sheraton Tyson Corners – Washington DC Metro
Room – Ash Grove BC
October 21, 2014 – 3:15pm – 4:30pm

A. Welcome & Chairman's Remarks — M. Franchek

Mike opened the meeting at 3:16pm and provided some feedback from the Adcom meeting related to how to operate within the working group environment.

B. Circulation of Attendance Rosters — R. Wicks

Circulated

C. Attendance for Quorum — R. Wicks

17 members in attendance so we have a quorum. From the rosters at the end of the meeting there ended up being a total of 19 members in attendance and 43 guests. Of these 43 guests, 6 requested membership. Two of these guests will be added to the membership list and four were attending their first meetings so they will be informed of the requirements for future membership (attend three meetings in their first five opportunities). This brings us to a total of 31 members (including two corresponding). The co-chair will send an email to these two corresponding members to ask them to choose between membership and guest going forward.

D. Approval of Spring 2014 Meeting Minutes – Savannah, GA — R. Wicks

No comments related to the minutes, so they are approved.

E. Approval of Meeting Agenda — M. Franchek

John Luksich motion, Dave Stankes second – passed unanimously.

F. Review of IEEE 1276 D1 Table of Contents/Changes — All

Mike provided an update of the timing of the work of the working group. His target is to meet the completion by the end of 2016. Objective is to have a draft by fall of 2015. We need first to complete the outline (draft new table of contents by Dec. 2014).

1. Most sections will need rewritten and update - gray

2. Format according to new document style - Done
3. Assignment of tasks

Introduction – agreed at last meeting that we still need an introduction, but that it needs to be updated from what was put in the past document. Volunteers – Dave Stankes, Patrick McShane, Mike Franchek, Javier Arteaga.

Section 4 - Merits of high temperature operation. Discussion regarding this section. John Luksich thought it would be useful to add wind transformers. Volunteers – Kurt Kaineder, Marion Jaroszewski, John Luksich and Tom Golner.

Section 5 – Insulation system ratings, test procedures and material aging qualifications. Volunteers – Mike Franchek, Roger Wicks, Ken McNeish and Tom Golner.

Section 6 – Insulating Materials – characteristics, materials fluids Volunteers – Claire Claiborne, Javier Arteaga, Julio Calderia, Patrick McShane. There is an annex in C57.154 which can be a starting point for this work.

Section 7 – Types of transformers hybrid/semi-hybrid, etc. Power and Distribution transformers (very different insulation systems). Volunteers – Kurt Kaineder, Mike Franchek, Arup Chakraborty, plus other people to be assigned later.

Section 8 – Loading guidelines for high-temperature transformers. John Luksich, Arup Chakraborty

Section 9 – Nameplate. Rick Marek input – Nameplate information tends to be part of standards not guides. Rick Marek – motion to remove nameplate information from TOC. John Luksich – second. Javier reminded us why the nameplate information was described in the past document. Rick noted that it has now been defined in C57.154. Sam Mehta mentioned rational in past. Kurt Kaineder – missing class of material – not included – difference between IEC and IEEE standards. Motion passes to remove this information from the current draft TOC.

Section 10 – Heat run test and average winding temperature. Volunteers – Juan Castallenos, and Mike Franchek will work to get some additional volunteers on this document.

Section A – Gas Analysis – Discussion on this section. Arup Chakraborty – views it is important – not necessarily in line with typical transformers. Mike Franchek - Fluids – gas guide for alternative fluids (don't want to duplicate this). Past document – similarities/differences from typical units. Looking for input on this. Tom Golner asked about what the past data represented (Mineral Oil as the fluid – due to the scope of the document). Mike noted we likely would need to collect some information as part of this work.

Question about temperature limits. Rick Marek confirmed that the C57.154 has these limits and Mike Franchek noted that we shouldn't duplicate information from that document.

Mike Franchek – need to expand information in Bibliography. Mike added more already and solicited members and guests to provide documentation of more documents.

Mike Franchek noted the fact that the first draft (in the new IEEE format) has areas of gray highlighting where the bulk of the work is needed for this document. Dave Stankes asked about different between this formatted draft and our old document. Mike noted that there is a small

amount of work in the non-grayed areas, where work still needs to be done (by the groups noted previously), but that the gray areas are the ones needing the most work.

Mike Franchek asked the groups to meet via conference calls between now and the next meeting. We then worked to identify the leaders of each of the groups (with most groups assigned). Roger Wicks will send the list of volunteers (along with contact information) to each group.

G. Old Business

Need a secretary – Javier Arteaga – has agreed to be the secretary.

H. New Business

Open discussion – no formal proposals.

Patrick McShane raised a question about Industrial – double ended substations. Steady state 65C raise – withstand significant overload for longer replacement. Mike Franchek noted that this was an application/approach that was identified in the past.

Mike Franchek also noted irrigation transformers.

Patrick McShane noted high moisture content in older units – thermal life okay – moisture related issues.

Hasse Nordmann – Life length transformers for windmill. Made it according to loading guide – got reasonable value. Using exponents from guides – but it this case was using different fluids (ester example). Exponents may be conservative vs. mineral oil – would be helpful to have this for this document.

Rainer Frotscher – raised question regarding tap changers – components in compartment type – Mike Franchek mentioned a lot is already in C57.154 (guide like information not standards like). Tap switch could be an issue with high temperature transformers. Javier Arteaga mentioned bushings and other components. We will have to see what is in C57.154 and what might be needed separately for this guide (which can be more tutorial in nature).

Arup Chakraborty mentioned mobile substation transformers.

I. Adjournment

No further discussion, so with this, John Luksich moved to adjourn, seconded by Sam Mehta. Meeting adjourned at 4:20pm

H.1.2.5 Working Group on C57-119 IEEE Recommended Practice for Performing Temperature Rise Tests on Oil-Immersed Power Transformers at Loads Beyond Nameplate Ratings – Gael Kennedy

This was a new Task Force which will become a Working Group on Thursday. The Membership rooster shows 2 members total - Need 2 for Quorum - 2 showed up.

In accordance with the spring 2014 Meeting resolution on this Standard and after discussions with Tom Prevost, Bill Bartley, and Erin from SA, the sole purpose of this meeting was to approve the Document for forwarding to the Insulation Life Subcommittee for Approval to go out for Ballot.

The Motion was made by (Tom Prevost) Vice chair and Seconded by the Gael Kennedy) chair and unanimously approved “to forward to the Subcommittee for Balloting”. Upon receiving comments, a Working Group Meeting will be held at the Spring 2015 Meeting for further discussion.

Meeting adjourned till Spring 2015

Gael Kennedy

Chair & Acting Secretary

During the Insulation Life Subcommittee Meeting, G. Kennedy made the following motion:

Approve the WG going to ballot with the document.

T. Prevost seconded the motion. There was no discussion. The motion was approved unanimously.

H.2 Old Business

No old business.

H.3 New Business

There was no new business.

H.4 Adjournment

W. Boettger made a motion to adjourn. P. McClure seconded this motion. The meeting adjourned at 8:30 AM.

Respectfully submitted,

Eric Davis
Secretary, Insulation Life Subcommittee

Annex J Performance Characteristics Subcommittee

October 22, 2014
Washington, DC

Chair: **Ed teNyenhuis**
Vice Chair: **Craig Stiegemeier**
Secretary: **Sanjib Som**

J.1 Introduction / Attendance

The Performance Characteristics Subcommittee (PCS) met on Wednesday, October 22nd, 2014 at 3pm with 161 people attending. Of these, 68 were members and 93 were guests. Prior to this meeting, the total membership of PCS was 115 members; therefore, quorum was achieved.

The vice chair distributed four rosters for four columns of seating arrangement in the room.

J.2 Approval of Agenda

The Chair presented the agenda and proposed a motion to accept - this was seconded by Mr. Sanjib Som. It carried by unanimous vote.

J.3 Approval of Last Meeting Minutes of Spring 2014

The chairman presented the minutes of the last meeting held in Savannah, GA, USA – March, 2014. This was proposed by Mr. Mark Perkins to be accepted as is, which was seconded by Mr. Phillip Hopkinson. The minutes were passed by unanimous vote.

J.4 Chairman's Remarks

The Chair stated there are 15 documents in purview of PCS. All have a Chairperson assigned for responsibility and are on target to meet the revalidation deadline.

The following adjustment to Membership was presented: 31 Members missed 3 (or more) of the last 5 meetings and will be moved to "Guest" status. Breakdown of the remaining 84 members will be 74 Members after the Spring 2014 meeting and 10 Corresponding Members moved to Members. It was advised that anyone who believed there was an error should contact Craig.

The Chair also mentioned the PCS sponsored technical presentation for Thursday Oct 23rd 2014 on "Guide for the Application and Interpretation of Frequency Response Analysis for Oil Immersed Transfomers - C57.149" by Mark Lachman, Kirk Robbins, Charles Sweetser and Peter Werelius.

The following WG and Task Force reports were received next (the reports are below):

- WG on Tertiary/Stabilization Windings PC57.158 — E. Betancourt
- WG on PCS Revisions to Test Code C57.12.90 — M. Perkins
- TF on Audible Sound Revision to Clause 13 of C57.12.90 — R. Girgis
- WG on Non-sinusoidal Load Currents C57.110 — R. Marek
- WG on PCS Revisions to C57.12.00 — T. Ansari
- WG Shunt Reactors C57.21 — S. Som
- IEEE/IEC WG Wind Turbine Generator Transformers, P60076-16 — D. Buckmaster
- WG on Loss Evaluation Guide C57.120 — M. Miller
- WG 3-ph Transf. Connections C57.105 — A. Bromley
- WG on Distributed Photo-Voltaic Grid Transformers C57.159 — H. Shertukde
- TF on HV & EHV Transients C57.142 — J. McBride
- WG on Neutral Grounding Devices PC57.32 — S. Kennedy
- TF on C57.109 - Through-Fault-Current Duration — V. Mehrotra
- TF Core Gassing & Grounding — D. Buckmaster

During the WG report for "IEEE/IEC WG Wind Turbine Generator Transformers, P60076-16", there was a motion by Don Ayers (seconded by Phil Hopkinson) for the PCS to accept the document for balloting. This document was approved by this WG. This motion carried unanimously.

J.5 Unfinished (Old) Business

None

J.6 New Business

During the previous meeting in Savannah it was decided to appoint a Task Force to prepare text to insert into C57.12.00 to specify that core grounding or shielding of medium voltage transformers shall be applied to prevent electrostatic coupling with the medium voltage winding was approved.

The Task Force completed this text and it was presented to the PCS. The report submitted by this TF was accepted for next steps (meaning the TF fulfilled its task). The TF chair motioned to

send the text for C57.12.00 insertion to the Standards SC and to send the text for C57.12.90 insertion to the Dielectrics SC. There was some debate on this motion. The Chair stated that there should be a technical survey on the text prior to sending the text since there was insufficient time at the PCS meeting to properly review the text. The TF chair (Mr. Buckmaster) did withdraw his motion with prejudice. Since the meeting had to be adjourned, it was decided to send the text out for technical survey within PCS and then do an electronic motion to send the text on to the Standards SC and Dielectric SC as noted above.

Adjournment was proposed by Hemchandra Shertukde and seconded by Sam Mehta.

The meeting was adjourned at 4.15 pm.

J.7.1 WG on Tertiary/Stabilization Windings PC57.158 – Enrique Betancourt, Chairman; Steve Snyder, Secretary

The Chair Enrique Betancourt called the WG meeting to order at 9:30 am on October 20, 2014. Vice- Chair Brian Penny was also present. A statement was made as to the Working Group's purpose for preparing this Guide for publication and the meeting agenda was presented with no additions.

Introductions and a member roll call were taken. There were **20** members present out of **31** members accountable, thus a quorum to conduct business was attained. **39** Guests attended the meeting and **3** of them requested membership to the WG.

Hugo Flores	Efacec
José Izquierdo	Siemens Servicios
Shankar Nambi	Bechtel Power Corp.

The minutes from the Spring 2014 meeting in Savannah were presented and a motion to approve was made by Dr. Hemchandra Shertukde, seconded by Marnie Roussell and approved without comments.

A. Old Business

Next Agenda item: Draft 3 of the Guide for Application of Tertiary and Stabilizing Windings

The Chair announced that the document had been distributed among WG members and that it soon would be posted at the IEEE PCS web site. The new items included in Chapter 1 of Draft 3 of the Guide were presented and briefly discussed during the session. Included are several considerations about impact of zero sequence impedance of transformation banks on electric power systems performance:

- Shift of line (phase) voltage and neutral voltage to ground during line to ground faults
- Line to neutral voltage instability by loading of the neutral of the secondary side of Y connected banks with high zero sequence impedance
- Stable performance of Y-Y connected transformation stages when unbalanced loads do not draw current from the neutral of the secondary side

Technical follow-up sections will be provided in the Guide in support of all of these statements on how the stabilizing winding functions for various configurations and conditions.

As next Agenda Item, the necessary work to complete the original concept of this Guide was discussed, which includes Modeling of Steady State Behavior of TWs and SWs, Short Circuit Considerations to Comply with C57.12.00 and some Considerations for Evaluation of Transient Behavior of Transformers with and without Stabilizing Windings. A time table was agreed by the Group, aiming to complete discussion of Draft 3 and preparation of Draft 4 before the next Committee Meeting.

The Chair mentioned that with that plan the WG should be ready to release its first complete Draft by the Fall of 2015 meeting. The WG was requested to read and comment on Draft 3 over next two months and a vote was taken and a majority of the WG members (12 affirmative votes) agreed to conduct a web based meeting the week of Jan.12, 2015.

As a next Agenda Item, Mr. K. Vijayan presented a series of discussion topics related to application of Stabilizing Windings, aimed to help simplify specification, design and application of stabilizing windings. Some feedback was gathered during the presentation, and that material will be distributed among all WG members for complete assessment and comments (- External Tertiary Link, -No taps on tertiary, -LTC in the neutral, -Y connected test winding, instead of a delta connected one).

The last item briefly discussed by the Group was the definition of a kVA rating of a Stabilizing Winding when it is stated on nameplate. Getting close to time for adjournment, it was agreed to present a short tutorial on the subject of thermal loading of internal SWs during the next meeting of the WG (S.Patel, E.Betancourt, and other interested participants).

B. New Business for the WG

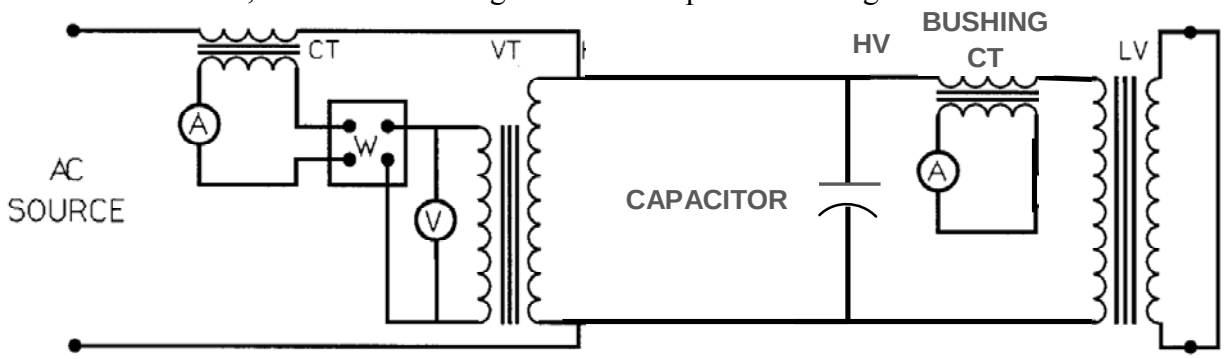
With no new business brought up, the meeting was adjourned at 10:50 AM.

J.7.2 Working Group on PCS Revisions to C57.12.90 - Mark Perkins, Chairman; Craig Stiegemeier, Secretary

1. Introduction of members and guests
    - Mark Perkins presided over the meeting at Chair. Craig Stiegemeier was secretary. Attendance rosters were circulated for those in attendance to record their presence and confirm their membership or guest status.
    - An introduction of members was not conducted to support getting down to business.
    - A review of the adjusted membership was conducted through the use of, and 37 of the 50 WG members were in attendance. This resulted in attendance of 74% of the membership, making this meeting "official" as a quorum was reached.
2. Minutes of the Savannah meeting

    A review of the Spring 2014 Savannah meeting was conducted by Mark. Ken Skinger made a motion, and it was seconded for approval of the spring minutes as written. Minutes were approved by the membership unanimously.
3. Old Business

    A review of proposed changes to Section 9.3.1 was conducted. The following proposed addition to section 3, tests for measuring losses and impedance voltage was discussed:



The benefits of this approach include:

- Single Phase or 3 Phase
- Requires no phase angle correction (more accurate)
- Source supplies only real power (0-50 A)
- Capacitors used on load side must be tuned to ZL
- Can use less expensive elements
- Practical for Field Test systems

Bernard Poulin made a point that the CT indicated as bushing CT would need to meet the accuracy requirements of the standards. It was agreed that metering class bushing CT's would meet this requirement.

A question of harmonics currents and their impact on the measurements was discussed. Wave forms are typically clean sine waves as they come from the tuned circuit from the capacitor bank.

The following measurement protocol using the alternate method under discussion was reviewed:

1. Tune the capacitor to the transformer impedance
2. Apply impedance voltage with source
3. Power Factor will be in the range of 0.9 to 1.0

4. Set the current with Ammeter on Bushing CT
5. Measure real power with the wattmeter
6. Measure Impedance with voltmeter and Bushing CT and Ammeter
7. Subtract the loss of capacitor bank (typical 0.5-2% of LL)
8. Can also be used to determine the phase angle error in loss measurement system.

Baitun Yang suggested that there were other losses in the circuit besides the capacitor bank.

Bertrand Poulin expanded and noted that losses outside the capacitor bank would be measured, and that would be the manufacturer's decision to accept those "surrounding" losses. It would be a rather slight positive error, and in the field he felt it would be acceptable.

Mark Perkins noted that the capacitance of the capacitors will change with temperature

Pierre Riffon noted that capacitors losses change due to temperature.

The following notes were suggested for inclusion into section 9.3.19 (note that the term bushing CT was replaced by CT in Figure 18):

- An alternate method for either single phase or three phase transformers is to provide capacitive compensation for the transformer impedance at the terminals of the transformer so that the AC source need only supply the real power for the test. Figure 18 shows the apparatus and connections for a single phase transformer for this alternate method. In this case, the wattmeter will measure the real power of the transformer under test plus the power of the capacitors, which will be very small compared to the power in the transformer. The load loss in the transformer is determined by subtracting the loss in the capacitors from the measured loss.
- For modern oil film capacitors, a loss of 0.2 watts per actual kVAR may be used unless a specific capacitor bank loss is known. This method requires a separate CT or set of CT's at the transformer for setting the current and measuring the transformer impedance. Normal bushing CT's can be used for this purpose as long as the CT and the current measuring device meet the accuracy requirement. The advantage of this alternate method is that the phase angle between the voltage and current at the wattmeter is low (closer to zero degrees) due to the capacitor compensation, so any phase angle errors in the loss measurement circuit are much less significant.

  Note – Separate CT such as a bushing CT is needed for this alternate method

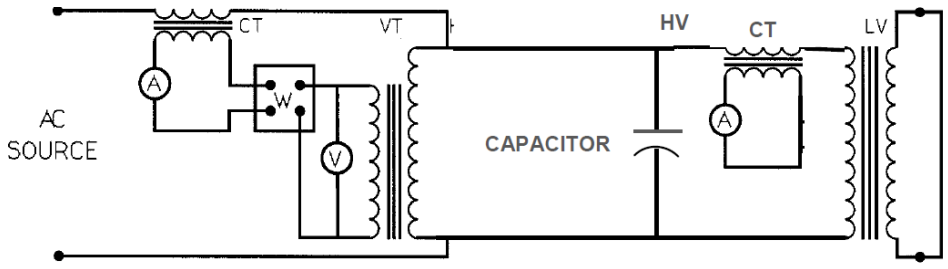


Figure 18 Alternate method for load loss measurement using capacitive compensation at the terminals of the transformer under test

The open discussion of the method included the following comments:

- Discussion of traceable calibration of the bushing CT. Accuracy of using a bushing CT, and impact on mounting it on/in the transformer was discussed. It was agreed

that if bushing CT's are used, they should be metering class to meet the accuracy requirement.

- Mark suggested that the method should be surveyed. John Herron suggested that sharing results of the testing that's been performed using this method would help the WG to understand the real world accuracy of this method.
- A discussion of the potential of using this method in the factory. Bertrand suggested that for factory measurements a certified CT should be used, where the bushing CT should only be used in the field.
- A suggestion was made that an externally mounted CT with appropriate accuracy and calibration could be used either on the line side or the neutral side.
- There was a question of what was meant by tuning the capacitor, which was answered that this was a matching the capacitor impedance to the transformer impedance.
- The major benefit of this method is allowing lighter and smaller components to support field measurements.
- A motion was made by Jeff Britton to survey the method, removing the "bushing" from the figure to allow the use of other than bushing CT's and including the data. John Herron seconded the motion. The motion passed with all members agreeing to send out the suggested survey.

4. New Business

   Proposal to specify current required for the load loss measurement:

   - Presently the is no allowance for using reduced current to measure load losses
   - Load Loss is generally linear, so scaling load loss is accurate
   - Temperature test section allows for reduced current

   Sanjay Patel noted that for certain large GSU there would be an impact in measuring the stray losses.

   Bertrand noted that in his experience the load loss was linear within the measurement uncertainty as long as the applied current was within 50% of rated. He also indicated that two items need considered - measured losses and reported losses. He suggested measuring losses in other positions than the guarantee, but measuring the guarantee at the rated position at as close to full current as possible.

   It was agreed to include further discussion on this topic as an agenda item.

5. Attendance roll call – Before the meeting, the Working Group had 50 members. See above for attendance, which resulted in sufficient membership present for a quorum.
6. Adjournment – Jeff Britton made a motion to adjourn, John Herron seconded, and the group passed the motion to adjourn at 12:15 pm

J.7.3 - TF on Revision of Section 13 of C57.12.90, Sound Level Measurement - Chairman Dr. Ramsis Girgis, Secretary Barry Beaster.

The TF met at 1:45 PM on Monday, October 20, 2014. Chairman Dr. Ramsis Girgis presided over the meeting. Secretary Barry Beaster assisted with some administrative duties.

After the spring meeting, the membership had been adjusted to 36 members. For review, an agenda of the fall meeting along with the unapproved spring 2014 minutes were circulated to all members, corresponding members, and guests in attendance at the last meeting.

The meeting was attended by 18 members, 5 corresponding members, and 63 guests for a total of 86 persons. A quorum was established. There were seven requests for task force membership.

After the introductions, Chairman Dr. Ramsis Girgis presided over the technical portion of the meeting. Members of the TF and PCS Subcommittee were surveyed for the 2nd time prior to the meeting with the proposed revision of section 13 of C57.12.90 and associated proposed additions / modifications to Table 18 in C57.12.00.

The chairman commented on the great return on the Survey (97%). He presented the results of this survey along with the following review of the 4 Disapprove Returns (6 comments) and the resolutions arrived at:

1. A suggestion that Table 18 should emphasize the need for the customer specification to clearly specify whether the guarantee is on no – load noise or total noise of the transformer. This suggestion was adopted into the revision.
2. A suggestion for applying the ambient noise conditions only to the main frequency components of the transformer noise when performing 1/3rd Octave or narrow band measurements. This suggestion was adopted into the revision.
3. One member questioned the need for reference load noise levels versus Total noise levels. Since reference Load Noise levels are very different than No Load noise reference levels, the concept of Reference Total Noise levels is technically not feasible.
4. A request to include the center frequency for Octave band noise measurements at 63 – 4000 Hz was deemed not necessary since such information is readily available in numerous references. Also, the text where this is to be introduced is the original text and there was need to change it.
5. A request for more tutorial text on the near – field effect was deemed not necessary since such tutorial material belongs to a Guide not a Standard and is also available in published papers.
6. A concern was indicated that manufacturers would use a default value for the Wall Sound – Reflection correction. The response to that concern was that the Standard provides detailed calculation formula of this correction; which is a function of the size of the transformer as well as the size and type of the sound test room.

The next subject on the agenda was whether there is a need to develop an IEEE Sound measurement / Sound Abatement Guide. The Chairman reviewed the situation with the present IEEE Guide. The PAR for the PC57.136 “Guide for Sound Level Abatement and Determination For liquid immersed Power Transformers and shunt reactors Rated Over 500 KVA” will expire at end of this year. The chairman presented an overview of the content of the present IEEE Guide as well as the IEC Guide presently being updated. He explained that the present IEEE Guide

covers two areas; (1) Basic information on transformer noise and its measurements and (2) Transformer Sound Abatement.

The first area is covered extensively, and in much more up to – date details, in the upcoming Revised IEC Sound Application Guide expected to be completed in mid 2015. So, there does not seem to be a need for developing an IEEE Guide to cover the same information. The area of transformer sound Abatement, to be worth developing, will need to include up to date information; which would be hard to come up with since such technologies are proprietary to the individual transformer manufacturers. The chairman requested input on this subject from the floor. None in attendance felt the need for the development of an IEEE Guide or for the PAR to be extended. Steve Antosz, who assumed the owner of the PAR, stated that the Guide will still exist in its present form. It was noted, however, that much of the technical information in this Guide is well out of date. All agreed with the decision to let the PAR expire and that there is no need to develop a new Guide or upgrade the present Guide at this time. This subject may be revisited later on.

The final item on the Agenda was the development of reference Load noise levels corresponding to the NEMA levels for No – Load noise. First, the chairman presented tested Load noise levels of 180 (50 & 60 Hz) transformers of 20 – 400 MVA power ratings collected from 4 different major power transformer suppliers. The tested data was compared with values calculated using the "Reiplinger equation". The data showed that the Reiplinger's curve represents a below – average value for load noise. The tested load noise levels generally varied between 15 dB higher to 5 dB lower values calculated using the "Reiplinger equation". The Chairman suggested that possibilities for reference load noise levels could be values that are 10 or 15 dB > values obtained using the Reiplinger equation. The Chairman then showed a comparison between the suggested Reference Load Noise levels vs. values from the NEMA TR1 table and (NEMA – 10 dB).

The chairman suggested using the "Reiplinger levels + 15 dB for reference load noise levels. Jeewan Puri and Sanjay Patel had questions regarding whether it is more useful to users to have reference Total noise levels rather than reference No – Load noise levels and reference Load Noise levels separately. Again, the chairman stated that the concept of defining reference Total Noise levels is not technically accurate. Bertrand Poulin supported the position of having reference levels for both no – load and load noise as they have different frequency spectra. These different frequency components travel differently to the residential areas. Also, noise levels allowed during the day with the transformer highly loaded are 10 to 15 dB higher than those allowed during the night hours with the transformer lightly loaded.

A final comment was made by the chairman that agreed that there could be a way to combine the reference no – load noise levels and reference load noise levels into reference Total noise levels. However, as stated earlier, the concept of Reference Total Noise levels is still technically not feasible and could lead to designs that will result in noise issues when the transformer is lightly loaded at night.

The meeting adjourned at 3:00 PM.

J.7.4 Task Force for revision of IEEE Std. C57.110 "IEEE Recommended Practice for Establishing Liquid-Filled and Dry-Type Power and Distribution Transformer Capability when Supplying Non-sinusoidal Load Currents" - Chairman: Rick Marek

The working group met in the Fairfax Ballroom B of the Sheraton Premiere at Tysons Corner Hotel and the meeting was called to order at 3:15 PM by the Chairman. This was the first meeting of the WG and it was convened with 57 attendees. There were no previous minutes to approve since it was the first meeting.

The Chair presented the approved PAR Title, Scope, and Purpose, pointing out that the title will be revised to show *Liquid-immersed* instead of *Liquid-filled.* The purpose will also be revised to show *when supplying* instead of *to supply.*

The Chair presented a clarification that was made in the earlier history of the document concerning precision and cautioned that if a user is applying the document equations in a spreadsheet then they should pay attention to the correct number of significant digits after each operation. A reader has submitted such an error found in the document and it will be corrected in this revision.

Since this is a revision of an existing document, the Chair requested volunteers to review specific clauses to make sure the information is still current or to upgrade accordingly. The following assignments were made:

- The Introduction section will be reviewed by Tim Holdway, Sasha Levin, and Jagdish Burde
- Clause 4 will be reviewed by Chuck Johnson, Derek Foster, and Sheldon Kennedy
- Clause 5 will be reviewed by Thomas Holifield and Larry Kirchner

A question was raised concerning the source of the 0.8 factor in Table 5 by Kiran Vendante and he noted that, in certain circumstances, a 0.9 factor could be applicable, especially when using tank shielding. This generated a discussion with input from other individuals noting that different factors have been seen in practice by different manufacturers. The Chair noted that the 0.8 is an average, but asked that all commenters submit their suggestions in writing as proposals so that appropriate qualifications or additions may be made.

The Chair asked if the Annex C temperature rise test procedure was really needed and whether anyone had actually used it. No one indicated that they had used the procedure. Several manufacturers noted that they had the capability to perform direct thermal testing with power supplies capable of supplying harmonic currents. The range was from 100kVA to 1500kVA.

Dhiru Patel commented that he would like to see more guidance on how to separate the eddy and stray losses. He further commented that there was some work being performed in CSA and that he would check to see if their draft document could be provided to the WG.

A question was raised on the impact of the harmonics on the flux density inside the core and there was an explanation that it depends on the source impedance.

The Chair reminded everyone requesting to be a member that they must participate that they were expected to read the current document and to send comments. All of the volunteers were also reminded to submit their suggestions in writing.

With no further business, the meeting was adjourned at 4:22 PM.

27 requested membership and Samuel Sharpless volunteered to serve as secretary.

J.7.5 - PCS WG on "General Requirements C57.12.00" – Tauhid Ansari, Chairman; Enrique Betancourt, Secretary

The PCS Working Group on General Requirements for C57.12.00 met on Monday, Oct.20, 2014, at 4:30 PM, with 54 members and 76 guests present. As the accountable Working Group membership stands at 89 members (71 Regular Members, and 18 Corresponding Members), we did have a quorum and were able to conduct official business. The following 8 guests requested membership, which will become effective only after attending two (2) consecutive meetings:

Daniel Blaydon	Baltimore Gas & Electric
Javier Arteaga	ABB
Hugo Flores	Efacec USA
Leopoldo Rodriguez	Efacec USA
Scott Dennis	ABB
Sukdevh Wallia	Brookfield Power
Thomas Melle	HighVolt
Verena Pellon	Florida Power & Light

The Chairman, Tauhid Ansari opened the meeting by stating the purpose of the Working Group, to address matters pertaining only to performance characteristics in standard C57.12.00. Following introductions, attendance sheets were circulated.

The proposed Agenda was presented by the Chair and approved by the members present (Motion by H. Shertukde, seconded by M.Perkins and carried by unanimous vote).

The minutes from the Savannah meeting were approved as submitted (Motion by J. Melanson, seconded by M. Perkins and carried by unanimous vote).

I. Discussion on Old Business topics

A. WG Item 97, C57.12.00 - 2010 Table 18. Routine, design, and other tests

Change Requested by: Joe Foldi – 2009 Ballot Comment

Requested Change: Could the details of the operational tests on the LTC equipment under full voltage (during No-Load test) and under full current (during Load loss test) be described here? The details of the LTC operational test should be described in C57.12.90, but the requirement for the test itself needs to be added here.

The Chair proposed to let this item pending till the next WG meeting, as Joe Foldi could not attend the meeting to provide further technical support to his request. The proposal was accepted with no comments.

B. WG Item 100, Table 7 Nameplate Information, Core Construction Indication on Nameplate

Change requested by Bipin Patel – April 21, 2011 per email communication.

Requested Change: Suggestion to the WG on Revision of C57.12.00 to consider the following for inclusion to the nameplate requirement for large power (Class II as a starting point) transformers:

1. Core construction designation: core or shell

2. Core details: three legged, five legged, or seven legged

This request starts from the need to evaluate performance of existing and new transformers under Geomagnetic Disturbance Phenomena. The type of core plays a critical role in the thermal and electrical response of the transformers. Single phase or three phase may be obvious by looking at the transformer but core construction and details are data not always requested by users and, if so, then kept available during the transformers service life. The identification of critical large power transformers for protection or mitigation efforts for GMD will be greatly helped for future units.

The Chair opened the floor for discussion, with comments mainly related to the terminology of the request, which was finally as follows:

1. Transformer construction: “core” or “shell”

2. Core Type: Number of limbs. Number of wound limb(s)

Users can use the extra nameplate information for specification of replacements. Some manufacturers already provide that information on the nameplate and some users already specify core type as part of nameplate information. It was clarified (P.Jarman) that the requested information was necessary but not enough for GMD assessment.

The motion was made by M.Perkins, and seconded by E.Tenyhuis to send the modified proposal for survey within the WG and PCS. The motion was modified by Steve Antosz to accept the proposal within the by the Group corrected wording, before sending it for survey. The motion was approved by 29 in favor, and 1 opposed.

C. Next Agenda Item WG Item 101 C57.12.00 -2010 New clause

Change Requested by: V Sankar email dated 11/05/2012

Requested Change:

“In this CIGRE Guide (working group 12.15), in clause 10.11 on page 23 of 75 it is stated that 'A purchaser may also recompense the supplier with a bonus payment if the difference between and guaranteed losses will result in lower purchaser operating costs'”.

An incentive as above will give encouragement for innovations. Request to consider this in your Working Group and include such a clause in C57.12.00 also.

The Chair opened the floor for discussion.

The proposal was considered unanimously as a commercial subject not pertaining to C57.12.00. With no further discussion, the Chair will inform Mr. V. Sankar that the request will not be considered further.

II. New Business

D. Requested Change WG Item 102 for C57.12.00 -2010 New clause

Change Requested by: Joseph Melanson email dated 09/30/2014.

Requested Change: Proposal for adding gas injection tests on conservator transformers as part of standards

The Chair invited Joe Melanson to present his proposal to the WG.

Joe explained how the gas injection test has become common place in many users specifications, and some manufacturers perform the test as extra QA control, although the procedure itself is not standardized.

Steve Snyder clarified that the proposal for a new test does not belong to the PCS, and Steve Antosz recommended Joe to describe in written the proposal and to submit it to the Administrative SC.

Some users found beneficial to perform a gas injection test as a routine test, but it was general opinion that such a test has to be first designed. Transformers shipped with oil can be of concern if bubbles remain inside the tank.

As further New Business, Mrs. Tarlapally proposed to add a Power Factor acceptance criterion on C57.12.00.

Mark Perkins clarified that the subject belongs to Dielectric Tests, with no further discussion.

The meeting was adjourned at 6:00 PM (J. Melanson, S. Metha).

J.7.6 – WG for Shunt Reactors Rated Over 500 kVA, C57.21 - Chairman Sanjib Som; Secretary Arturo Del Rio

The working group met in the Ash Grove A Room of the Sheraton Tysons Hotel. This was the First meeting of the working group.

The meeting was called to order at 9:30 PM by Chairman Sanjib Som

The Chairman stated that the position of Secretary was open, Mr Arturo Del Rio volunteered and the Chair requested him to take the position.

The working group C57.21 met for the first time on Tuesday October 21, 2014, at 9:30 with 55 participants. 14 requested membership.

- The meeting was opened with remarks from the WG Chair regarding the PAR approval and attendance sheets were circulated. PAR was approved on 21 August 2014 and expires in 2018.
- Since this was the first meeting for the WG, no previous meeting minutes were available.
- **Meeting was followed by a presentation on loss measurement by Luc Dorpmanns, Royal SMIT Transformers, followed by discussions:**
    - Bertrand Poulin proposed that loss measurements be performed at rated MVA instead of rated voltage, this topic to be discussed in future meeting. Also, a question was raised on the need to use a step-up transformer during the measurements.
    - S. Som requested an explanation on how to handle uncertainties in the standard. Has to be reviewed if this is not already elsewhere (B. Poulin)
    - Ed So mentioned the 6% tolerance on losses might be high compared to reachable measurement accuracy.
    - L. Dorpmanns mentioned that there is no specific requirement for accuracy of the measurement system in this standard. Review of the existing loss measurement guide is required in order to keep coordination.
    - The Chair noted that interpretation of this section by two different individuals should lead to same conclusion.
- **Review of current standard document for work items, asking input from the audience:**
    - Scope of work was reviewed from the PAR summary.
    - L. Dorpmanns to make a proposal to include variable shunt reactors (tap changer type).
    - There is a CIGRE WG A2.48 on Shunt rectors with similar work in progress, brochure to be published in 2016. Contents were shown by R. Ahuja.
    - Altitude correction table, refer to C57.12.00 - Daniel Kramer, Phoenix technologies, will supply additional information.
    - Review definition of linearity, rms or peak (B. Poulin). How is it assessed? How to measure this for higher voltage up to 1.5 pu? AC or DC methods, should be explained in the standard (B. Poulin), these will addressed in next meeting

- Insulation class 150 or 155 for dry type to be reviewed with other IEEE standard (S. Som)
- Vibration test is now classified under "other", proposal was made to make it a routine test (Darren Joe Meisner).
    - Noise level is considered more significant as control of manufacturing as compared to vibration measurement (B. Poulin)
    - Vibrations are easier to measure in the field then noise (Joe Meisner AEP) Should levels be lowered to IEC values. L. Dorpmanns stated that this was also discussed in CIGRE and current consensus is to use IEEE limits. L. Dorpmanns to provide a proposal for next meeting
- Request was made to the participants wanting to become a member to review the current standard and inform the chair which part they want to review.
- Gael Kennedy volunteered to provide inputs to section 4 unusual conditions.

Meeting adjournment: Raj Ahuja proposed and Dharam Vir seconded.

Meeting was adjourned at 10:30 am.

Chairman: Sanjib Som

Secretary: Arturo Del Rio

J.7.7 WG P60076-16 Standard Requirements for Wind Power Generator Transformers; Chairman: David Buckmaster; Vice Chair: Phil Hopkinson; Secretary: Donald Ayers

Meeting of joint IEEE-IEC Working Group

The Joint Working Group on Wind Power Transformers was held Friday and Saturday, October 17 & 18, 2014 in the Great Falls room, at the Sheraton Tysons Hotel, Tysons Corner, Virginia with representatives from both IEEE and IEC present. For the four hour meeting on Friday, 12 IEEE members, 3 IEC member and 1 guests attended. For the eight hour meeting on Saturday, 10 IEEE members and 3 IEC members attended.

The attendees reviewed the document as it was amended by the joint committee during a meeting held in Berlin plus additional comments submitted by other committee members. A discussion was held on whether to include words dealing with hermetically sealed liquid filled transformers. A. L. Hall agreed to propose language as to what constitutes a hermetically sealed liquid transformer. Mr. Hall also reviewed several other sections on which he had provided comments. He agreed to provide suggested language for each of the sections.

A lengthy discussion was held on the section dealing with incipient energy which had been significantly shortened during the Berlin meeting. It was agreed to revisit the language originally submitted with suggestions as to how to make the language broad enough to be acceptable. This discussion also led to a discussion on what constituted a compartmental type transformer with the need for a definition.

The meeting was suspended at 5:00 p.m. to be restarted on October 18 at 8:00 a.m.

The meeting reconvened at 8:00 a.m. on October 18, 2014.

The day was spent addressing comments and questions primarily presented by A. C. Hall, Stephan Voss and Rick Marek. Much of the document was re-written in efforts to address perceived weaknesses in the document as it was drafted after the joint meeting in Berlin. At the end of the meeting it was agreed that most of the issues were adequately addressed. The proposed document was put on the web site for people to review.

The meeting was adjourned at 4:45 p.m.

Respectfully submitted,
Donald E. Ayers
Secretary
The PAR expires December 2016.
Respectfully submitted,
Donald E. Ayers

J.7.8 - PC57.120 LOSS EVALUATION GUIDE FOR DISTRIBUTION AND POWER TRANSFORMERS AND REACTORS, Chair: Michael Miller, Vice-Chair: Rogerio Verdolin

Par status: Par approved
Par expiration date: December 31, 2016
Current draft being worked: D14

1. Attendance
    a. Members: 10 of a total 22 members
    b. Guests: 41
    c. Guests granted membership: 2 pending requirements met.
    d. Guests requested membership2
    e. Total: 51
2. The meeting was called to order at 11:00 am on Tuesday, October 21, 2014.
3. Michael Miller announced that he is taking over the position of the former Chair, Al Traut. Rogerio Verdolin accepted to be the Vice-Chair of the Working Group.
4. The minutes of meeting from the Working Group Spring 2014 meeting in Savannah, Georgia could not be approved since there was no quorum. To have a quorum we needed 11 members to be present.
5. The purpose and scope of the PC57.120 was presented during the meeting.
6. Estimate Timeline was presented during the meeting:
    a. Final Draft from WG – April 2015
    b. MEC (Editorial Review) – May 2015
    c. Initial Ballot (30-day) – Jul 2015
    d. Comment Resolution – Nov 2015
    e. Re-Circ Ballot (10-day) – Dec 2015
    f. Submit to REVCOM – Oct 2016
    g. REVCOM Meeting – Dec 2016
7. Price and cost information:
    a. The draft loss evaluation guide includes examples of price and costs denominated in dollars and cents. Working group chair Michael Miller commented on this issue in an email communication dated April 25, 2014, describing the following options being considered by the committee:
        i. Create an annex for the examples so currency could be used
        ii. Use a generic currency sign (¤) to denote unspecified currency
        iii. Keep it as it is if IEEE will allow.
    b. Option (i) is not recommended because moving costs into an annex does not mean that the information is not in the guide – it is simply moved to another place in the guide. Moreover, it probably reduces the value of the examples. The cost estimates directly relate to loss evaluation for distribution and power transformers and reactors, which is the object of the draft guide. The examples are also integrally woven into the draft text, and the guide could accommodate this suggestion without extensive revision.

c. Option (ii) is not recommended because it likewise does not really address the legal issue and also makes the document less user-friendly. Using specific numbers with an unspecified currency sign (¤) may make the estimates more difficult to understand, and if the numbers used are recognizable as likely drawn from the U.S. (or from some other identifiable jurisdiction), then the legal problem is still present.
d. Option (iii) is not recommended, because the guide may then be read as implying that participants in developing the guide discussed appropriate levels of costs and prices.
e. Additional options were suggested:
    iv. Substitute algebraic references for specific cost or price information.
    v. Use the Cost/Price Numbers but with further protections.
f. The option (iv) clearly complies with the current policies, because it simply identifies cost or price categories without discussing their actual values. We recognize that it also may not be as reader-friendly as a document that uses specific dollar amounts.
g. The problem with the language in option (v) is that it refers to costs and prices, but the risk that the antitrust policy guards against is the risk of price-fixing (by buyers or sellers) or inappropriate information-sharing.
h. Mike stated for the new draft D14 he would include the legal language added before the examples and also use the public information on dollars where possible. He asked if there was any disagreement with this approach and there was none.One suggestion from Michael Miller is to refer the dollar values from public information, such as DOE.
i. Wallace B. Binder stated that he has presented a spreadsheet from public cost information in previous meeting. He agreed to send an updated version of the spreadsheet to Mike.

8. Michael Miller discussed some comments from the draft D13.
9. Michael Miller and Rogerio Verdolin will review the definitions and list of terms and allocate these two Sections in an appropriate place in the draft.
10. Rogerio Verdolin will review the Table in the Section 4.3.1.1, Avoided Cost of Generation Capacity. A column will be added in this table with generic public information, such as DOE.
11. Michael Miller and Rogerio Verdolin will work on a new draft to be discussed in the coming 2015 Spring Meeting, April 12-16, San Antonio, TX.
12. The meeting adjourned at 12:15 PM

Respectively submitted,
Michael Miller, Chair
Rogerio Verdolin, Vice-Chair

J.7.9 - C57.105 – IEEE Guide for Application of Transformer Connections in Three-Phase Electrical Systems, Chair: Adam Bromley, Vice-Chair: Rogerio Verdolin

Par status: Will be submitted after this meeting

1. Attendance
    a. Members: 2
    b. Guests: 24
    c. Guests requested membership14
    d. Total: 40
2. The meeting was called to order at 1:45 pm on Tuesday, October 21, 2014.
3. This is a newly formed TF or WG without a PAR so establishing a quorum was unnecessary.
4. The working group discussed the scope and the title of the new draft.
5. Several suggestions and topics were discussed, such as:
    a. Three-phase system or three-phase electrical system
    b. Inclusion of auto-transformers
    c. Rated voltage limit of the power transformer
    d. Inclusion power transformer class
    e. Inclusion of a purpose
6. The final Title and Scope of the draft are as followed:
    a. Title: IEEE Guide for Application of Transformer Connections in Three-Phase Electrical Systems
    b. Scope: This guide describes transformer connections and configurations in 3-phase electrical systems. The characteristics of the various transformer connections and possible operating problems under normal or abnormal conditions are treated. All combinations of Δ and Y, grounded and ungrounded, T connected, zigzag, and certain special connections are considered. Only two-winding and auto- transformers are included.
7. The meeting adjourned at 2:45 PM

Respectively submitted,
Adam Bromley, Chair
Rogerio Verdolin, Vice-Chair

J.7.10 – WG on "Distributed Photo Voltaic (DPV) Grid Transformers" PC57.159, Chairman Hemchandra Shertukde; Vice Chairman: Mathieu Sauzay; Secretary: Sasha Levin

The meeting was convened with 36 participants present, 19 of them are members (that constitutes a quorum out of 33 current members in the roster minus 4 absent corresponding members). Four participants requested a membership.

Old Business
Spring 2014 Savannah Meeting Minutes were approved.

New business
Meeting Agenda was approved.

1. The previous Draft 2 of the Guide was reviewed in between the Spring and Fall 2014 meetings. The WG thanks everyone who provided their comments and suggestions. The majority of the comments were resolved by revision of the Draft 2. Some comments need to be further discussed. The current Draft 3 of the IEEE Guide has been distributed to the WG for the review in advance to the Fall 2014 meeting.

2. The WG held an additional meeting on Sunday, October 19. C. Gaytan, B. Jensen, S. Kennedy, A. Levin, A. Narawane, M. Sauzay, and H. Schertukde participated.
S. Levin informed the WG on the Sunday's discussion.

3. The WG discussed comments to the Draft 2 and Draft 3 of the Guide. The following is the list of the reviewed topics of the Draft 3 and open Action Items:

1) Use a term "Inverter step-up transformer" in next revision.
2) General observation: some comments were concerned with the Guide having too much of a tutorial. Do we think that tutorial aspects of the Guide are helpful and shall stay?

Some tutorial-type information can go to Annexes.

3) Chapter 4.3.3 – does low voltage ride through issue is an important one to consider and shall be added to this Chapter?

E. Betancourt commented that the size of the DPV generation system is growing, the issues of complience with the interconnection standards becomes more and more important.

ACTION: "LV Ride Through" Chapter - H. Shertukde, C. Gaytan

4) Chapter 5.1.1 and 5.1.2 – do we agree on the recommended row of rated output kVA and nominal voltage?

"Typical" instead of recommended.
kVA – add 3000 kVA
LV voltage - add 575 V and 690 V; HV voltage – 24940 V instead of 23000 V

5) Chapter 5.1.3 – Is DETC necessary? Consideration points:

- inverter can regulate output voltage in order to match grid voltage
- DETC is a feature with lower reliability and good to be avoided, if not necessary.

Does everyone agree that reverse power flow isn't an issue (problem) for the medium voltage, medium power transformers as DPV inverter transformers?
+/- 5% DETC is recommended. Other regulation can be specified as needed.

6) Chapter 5.1.4 – is this possible and beneficial to have two LV windings of the same inverter transformer with "Y" and "D" winding connections in order to have 30 deg. voltage phase shift and reduce harmonic content (IEEE C57.129, Fig.1)?

In the system of 2 input LV windings, the voltages and excitation currents of these windings shall be in phase, therefore only identical winding diagrams can be used (2 "Y" or 2"D"). Place note about step-down operation and connection diagram.

7) Chapter 5.1.5 – LV1-LV2 impedance – measurement vs. calculation. Does Chapter describe the topic sufficiently? S. Walia commented that LV1-LV2 impedance shall be defined and warranted for the system performance calculation.

It is recommended to measure LV1-LV2 impedance.

ACTION: S. Sarkar and V. Tendulkar will review the Chapter 5.1.5 and provide recommendations and references for the LV1-LV2 impedance test.

8) Chapter 5.2.1 (plus 5.4.1) – daily day / night de-energization / energization (730 cycles / year).

B. Degenef commented that switching off a transformer at low load or no-load can create the significant voltage transients. Typically daily de-energization / energization is not recommended, but, in case is requested by the user, refer to IEEE C57.142 for the recommendations on analysis and protection. A system developer can conduct power quality study by modeling or direct measurement in the similar systems (overvoltage, resonans, etc.) and provide parameters of the transient process in the Specification.

The requirements to the standard tests proving a performance of the transformer in these conditions need to be recommended. Both parameters and tests are recommended to be included in the specification (e.g., are higher HV tests necessary? Does higher impedance necessary?) Include notes on this aspect in Chapters on mechanical requirements, transient overvoltages, inrush current and Specification.

9) Chapter 5.3.4 – we need to refine wording of the Chapter. Any comments, suggestions? Is PF consideration important? What would be "normal" and "abnormal" PFs? What are the consequences of "abnormal" one?

PF requirements and related tests are not addressed in IEEE standards on distribution transformers.

Refer to NETA and IEC (what documents?).

PF requirements and test for power transformers can be applicable – review IEEE Std 62 and C57.12.00.

ACTION: C. Gaytan will provide information on NETA document and will review related IEC standards for the relevant information on the PF requirements and tests for the distribution class transformers.

10) Chapter 6.4 – recommended accessories – shall we describe accessories for liquid-immersed and dry-type transformers separately?

What are recommended accessories for the inverter dry-type transformer?

ACTION: C. Johnson will provide list of typical accessories for the dry-type inverter step-up transformers.

11) Chapter 6.6 – useful warning sings – what shall we keep in the Guide, if any?

Make reference to the standards: ANSI Z535, NEMA, UL

12) Chapter 7.1

– is inverter transformer a power or distribution transformer? What test requirements shall we follow?

- Are there any tests addressing PF aspects necessary? What is the reference?
- Change term “Heat run test” to “Temperature rise test”.
- PD test is recommended as routine test for dry-type transformers and as type test for oil-immersed transformers. Test and Limits – IEEE C57.12.01 for dry-type transformers and IEEE C57.12.00 and C57.90 (or new proposal stemming from WG on wind power transformers) for liquid-immersed transformers.

4. WG discussed the timeline of the Guide Preparation and Ballot:

Schedule (PAR expiration date – 31 December 2016)
30 November 2014 – review of Draft 3 and submit comments (form was provided)
15 February 2015 – Draft 4 (final) sent to WG
30 March 2015 – review the Draft and conduct Straw Poll of WG by e-mail (2/3 majority)
12-16 April 2015 – submit Guide to Performance Characteristics Subcommittee for approval (simple majority)
? – editorial review
? - Sponsor Ballot
? – comments resolution

5. WG approved without reservation a transfer of the copyright to the Task Force White paper to the WG Chairman H. Scrtukde, so as allowing him to sumbit the paper to the appropriate IEEE PES sub-area for the publication as a Transaction Paper.

With no old or new business the Meeting adjourned at 3:00 PM.

Chairman: H. Shertukde
Vice-chairman: M. Sauzay
Secretary: S. Levin

J.7.11 - TF to Investigate the Interaction between Substation Transients and Transformers in HV and EHV Applications; Chairman - Jim McBride, Secretary – Tom Melle

1) Welcome and Chair's Remarks. The TF objectives were presented.
2) Circulation of Attendance Sheets (quorum delayed to allow additional members to arrive)
3) Agenda was presented with no opposition
4) The Chair requested any interested Guests please request membership at this meeting.
5) The Chair briefly reviewed the CIGRE brochure work presented at the last meeting by Ms. Angelica Rocha.
6) Pierre Riffon presented some transients from test on EHV disconnect switches. The tests were a simulation of the breaking of small capacitive load to simulate de-energization of substation. Two videos were shown one of a making operation and one of a breaking operation. Presentation materials including videos will be made available to the group. Sanjib Som asked if snubber circuits for HV/EHV circuits are available. These circuits are primarily only used in medium voltage applications.
7) Xose Lopez-Fernandez presented two mitigation methods that are described in detail in the CIGRE brochure on interactions. These two methods are frequency domain severity factors and time domain severity factors. Xose is the developer of the time domain technique. In addition, Xose presented a high frequency model developed for the disconnect switch energization case that has been presented in our past task force meetings. There was some agreement between major resonance frequencies of the model and the measured data. The measured resonance occurred at 41 kHz and the simulation occurred at 50kHz. There were some questions about the inclusion of some of this information in the revision of the C57-142 document.
8) Bob Degeneff discussed new work that is beginning within CIGRE on high frequency modelling and the verification of these modeling with transient data. The target maximum frequency range for this modeling is 500-750 kHz. The designation for this new working group is JWG A2/C4.52.
9) The Chair has begun a TF summary document based on the presentations and data gathered over the last two years. The chair requested that the members of the task force review and provide feedback on this task force summary paper. The chair summarized the three general failure modes for HV/EHV transformers found in the HV/EHV failures from the CIGRE brochure and other documents we have reviewed during our meetings. The chair encouraged the members to review these failure modes and provide feedback to assist in finalizing the work of the task force.
10) Quorum failed (22 members required). Approximately 18 counted. Minutes will be approved by email.
11) Paul Jarmin stated that IEC has an agenda item at their upcoming meeting to consider adopting C57.142 as dual logo IEEE/IEC standard.
12) A straw ballot was conducted with the task force members present. There was unanimous agreement that HV/EHV information should added to C57.142.
13) Motion to adjourn the meeting made and the meeting was adjourned at 4:25PM.

Respectfully Submitted,

Tom Melle, Acting TF Secretary

J.7.12 - WG for IEEE Standard Requirements, Terminology, and Test Procedures for Neutral Grounding Devices, PC57.32, - Sheldon P. Kennedy - Chair, Tom Melle (for Fred Elliott) WG Vice-Chair

The Neutral Grounding Devices working group was called to order at 4:45 PM on October 21, 2014.

1. Quorum was established by a head count and confirmed by the attendance rosters after the meeting – 8 working group members were present (of 13 members) with 9 guests.
2. The agenda was presented. Motion to approve was by Don Ayers. It received a Second by Mike Sharp. Agenda was approved unanimously.
3. Minutes from last meeting approved. Motion to approve was by Don Ayers. It received a Second by Mike Sharp. Minutes were approved unanimously.
4. Tom Melle (vice chair) is maintaining the official draft document. Draft 13 was issued prior to the meeting.
5. Sheldon Kennedy summarized the present status of the Draft 13.
6. Test code Annex A (normative) contains obsolete test information from old standards. This clause will either be removed (after any significant information has been moved to the relevant device clauses) or updated to reflect existing standards. The equipment clauses will also use references to other standards as needed to keep the information current.
7. Sergio Panetta commented that the "Ground End" designations should be changed to "Neutral Terminal". A motion was made by Sergio Panetta (seconded by Don Ayers) that was approved. This change will be made throughout the document.
8. Sheldon Kennedy reported that general clauses 4-9 still contain technical material which should to be moved to specific device clauses and updated. Then the general clause information can be deleted.
9. Klause Pointner reported that the Neutral Grounding Reactors clause makes no references to shared clauses 4-9 can stand alone.
10. Clause numbering issues (tables, figures, equations) will be corrected once the new template macros are enabled.
11. Ed teNyenhuis commented that all tables borrowed from other standards should be re-verified. This was planned for the test Annex, but will now occur throughout the entire document.
12. The document will be reviewed for consistency of terminology for liquid immersed devices (defer to C57.12.00).
13. A motion was made by Don Ayers (seconded by Klaus Pointner) to remove Annex A (test code) from the document. Necessary information from the test Annex will be moved to each clause.
14. Schedule: Updates to draft sections need to be sent to Tom Melle by November 15, 2014. Monthly web meetings will be used to attempt to finalize the draft in 2014. A working group survey will be done after this. A Subcommittee Survey will be done before the Spring 2015 Meeting. This document must be approved by the end of 2015.

Motion to adjourn by Sergio Panetta. Seconded by Don Ayers. The meeting adjourned at 6:00 pm.

Respectfully Submitted,
Tom Melle (for Fred Elliott)
WG Vice-Chair

Sheldon P. Kennedy
Chair

J.7.13 – Task Force for revision of IEEE STD C57.109 Guide for Liquid-Immersed Transformer Through–Fault-Current Duration, Chairman - Vinay Mehrotra

The kick off meeting for revision of this guide was held in the Washington Boardroom from 9.30 to 10.45 am on Tuesday. Seven members participated in the meeting.

The participants reviewed the current guide's title and scope. It was decided to leave the title unchanged. The current guide applies to transformers referenced in the IEEE standard C57.12.00 as categories I, II, III and IV. A question was raised by Brian Penny if this guide would apply to phase- shifting transformers or the scope needs to include them.

The purpose statement was reviewed and changes were suggested. All the participants agreed that the guide is old and need significant revisions.

It was decided to take up a PAR for revision of this guide.

Respectfully submitted

Vinay Mehrotra

TF Chair
October, 2014

J.7.14 - Task Force on Core Gassing and Grounding - Chairman: David Buckmaster, Vice Chairman: Phil Hopkinson, Secretary: Donald Ayers

The Task Force on Core Gassing and Grounding was called to order at 3:15 p.m. EST on Tuesday, October 21, 2014 at the Sheraton Tysons Hotel, Tysons Corner, Virginia.

There were 72 attendees. Twelve members were present out of a membership of 18 members. A quorum was present.

The minutes from the last meeting were reviewed. Phil Hopkinson moved and Ed teNyenhuis seconded to approve the minutes. They were approved unanimously. Gary Hoffman moved and Aniruddha Narawane seconded to accept the proposed agenda for the meeting. Acceptance was unanimous.

Based on comments submitted by Jeewan Puri and Aniruddha Narawane about moisture within the core that had not been completely removed during drying, modified language for the changes to IEEE C57.12.00 was proposed to the task force. Several proposals were made from the floor to improve the language but all proposals were eventually withdrawn after brisk discussion.

Phil Hopkinson moved that the proposed language as presented be accepted without change. Steve Shull seconded the motion. More discussion was held to clarify certain aspects of the language. The vote was 7 for and 1 abstention. The motion passed.

Gary King asked why Low-High-Low construction was not excluded from the discussion. Phil Hopkinson responded that the test was a type test and should be used for all constructions, but would not expect L-H-L to have problems. Mr. King also questioned why the work only applies to transformers 15 kV and above. Response by Messrs. Hopkinson and Buckmaster state that data collected in the field did not find issues with voltages below 15 kV.

The language for proposed changes to C57.12.90 was presented and Phil Hopkinson reviewed the background for the test. Gary King asked what the duration tolerance was on the individual steps. After discussion, Gary King made a motion that the duration be a minimum and that the title of the section be changed to “Minimum test duration …”. Steve Shull seconded the motion and the motion passed unanimously.

Don Platt asked on what tap the test would be made. The response was at rated voltage tap as stated in the proposed language. A question was raised as to why only wound cores were being addressed. Dave Buckmaster responded that not enough data existed on stacked cores to develop a definite conclusion as to possible issues. Some data is just coming in that may suggest areas to investigate, but it is too early to make conclusions.

Phil Hopkinson made a motion to accept the language as modified by Gary King’s motion. Steve Shull seconded the motion. During discussion, it was asked how many readings were to be made at each voltage level. Wally Binder made a motion to amend the original motion to add that one PD reading should be taken at the end of each level. Steve Shull seconded the motion which then passed unanimously.

The vote was then taken on Mr. Hopkinson’s motion as amended. The vote was 9 for and 1 against. The motion passed.

A motion was made by Don Ayers that the results of the Task Force be reported out to the Performance Characteristic Subcommittee. Phil Hopkinson seconded.

During discussion, Garry Hoffman offered an amendment to the motion for the task forced to seek approval for a PAR for the creation of a working groups to generate an amendment to for

C57.12.00 and C57.12.90 to include the language approved by the task force. Without a second, a lengthy discussion was held. The conclusion was that the task force did not have the authority to perform the requested task. At the end of the discussion, Gary Hoffman withdrew his amendment to the motion.

A vote was then held on the motion and it passed unanimously. Since the charter of the task force has been completed, it was announced that this would be the final meeting.

A motion was made and seconded to adjourn the meeting. The vote was unanimous.

The task force was disbanded at 4:35 p.m. EST.

Respectfully submitted,
Donald E. Ayers
Secretary
Encl: Final proposed language for C567.12.00 and C57.12.90

Proposed wording to insert into IEEE C57.12.00

6.7.2.1 Grounding of Wound Cores

In medium and high voltage applications of transformers with wound cores, the transformer core shall be properly grounded to the tank. One purpose is to prevent development of a voltage across the wound core loop that could result in the dielectric breakdown of the thin insulating fluid film between the core laminations and the initiation of PD and the generation of H2 and other hydrocarbons.

It should however be noted that PD generation in transformers can possibly occur due to various other factors which may be internal and/or external to the transformer and the capacitive coupling described is one of these factors.

In order to validate that the core will not be susceptible to such discharges during normal operation, a design test, specific for this type of transformer is defined in C57.12.90, Section 10.8 with acceptance criteria in Section 10.8.4. Transformers which require this design test are those manufactured with a wound core and having a high voltage winding with nominal system voltage of 15 kV or greater.

Proposed wording to insert into IEEE C57.12.90

10.8 Special Induced-Voltage Test for distribution and class I power transformers with a wound core and having a high voltage winding with nominal system voltage of 15 kV or greater.

10.8.1 Minimum test duration and application of voltage

1. Voltage will be raised to 100% of rated volts for 30 seconds and PD will be measured and recorded.
2. Voltage will be raised to 110% of rated for 30 seconds and PD will be measured and recorded.
3. Voltage will be raised to 150% of rated and held for one minute and PD will be measured and recorded.
4. Voltage will be lowered to 140% of rated for 1 minute and PD will be measured and recorded.
5. Voltage will be lowered to 130% of rated for 1 minute and PD will be measured and recorded.
6. Voltage will be lowered to 120% of rated for 1 minute and PD will be measured and recorded.

7. Voltage will be lowered to 110% of rated for 10 minutes and PD will be measured and recorded.

PD can be measured as apparent charge in pico-coulomb (pC) or RIV in micro-volt (μV). One reading shall be made at the end of each interval.

10.8.2 Test Frequency

As an induced-voltage test applies greater-than-rated volts per turn to the transformer, the frequency of the impressed voltage shall be high enough to limit the flux density in the core to that permitted by 4.1.6.1 of IEEE Std.C57.12.00-2010. The minimum test frequency to meet this condition is given in Equation (27):

(27)
where

E_t is the induced voltage across winding (V)

E_r is the rated voltage across winding (V)

10.8.3 Grounding of Windings

When a transformer has one end of the high-voltage winding grounded, the other windings should be grounded during the induced-voltage test. This ground on each winding may be made at a selected point of the winding itself or of the winding of a step-up transformer that is used to supply the voltage or that is connected for the purpose of furnishing the ground.

10.8.4 Failure detection

The test is considered passed if PD recorded in step 7 of 10.8.1 does not exceed partial discharge level of 100 pC or RIV level of 100 μV.

Annex K Power Transformers Subcommittee

Date October 22, 2014
Tysons, Virginia, USA

Chair: Joe Watson
Vice Chair: Bill Griesacker
Secretary: Kipp Yule

K.1 Meeting Attendance

The Power Subcommittee met on Wednesday, October 22, 2014, at 1:30 PM. A show hands indicated 55 of 107 members in attendance achieving quorum at the meeting, as there are no longer corresponding members.

K.2 Approval of previous meeting minutes, and meeting agenda

The Chair presented the Agenda, Attachment K.2

The Chair requested a motion to approve the Spring 14 meeting minutes; Jeewan Puri moved for approval and Peter Balma seconded: and the minutes were subsequently approved by unanimous vote.

K.3 Chair's Remarks

At the Administrative SC meeting it was announced the role corresponding member is being eliminated. The Power SC had 39 corresponding member had have been changed to guests. It was also emphasized that not being an IEEE member, or missing two of three meetings would not allow member role to be continued. Also, missing three out of five meeting may be possible with an advance excused absence.

The SC Chair expressed surprise with the recent loss of Roland James and indicated that while no meeting would be held at F14, Peter Boman will take over as the WG Chair for PC 57.140, Revision of Guide for Evaluation and Reconditioning of Liquid-Immersed Power Transformers.

A request for any New Business topics was requested by the Chair. Phil Hopkinson requested there be an awareness of the Task Force efforts being performed on core gassing.

SC Chair noted that the Working Group for revision of C57.12.10 Standard Requirements for Liquid-Immersed Power Transformers will be on the meeting schedule for S15, and be chaired by Gary Hoffman.

K.4 Working group reports

K.4.1 Revision of C57.93 IEEE Guide for Installation and Maintenance of Liquid-Immersed Power Transformers – Mike Lau

See Attachment K.4.1 for the detailed discussions regarding various sections and subclauseses on tests, Energization under cold conditions, hot air drying, DGA, and Vacuum filling. There is planned survey of WG on terminology & set times. The SC Chair will propose wording to address static electrification when using pumps. The presentation can be viewed at the WG

webpage link: http://www.transformerscommittee.org/subcommittees/power/C57.93/F14-C57.93D1-Comments.pdf

K.4.2 Revision of C57.125 Guide for Failure Investigation, Documentation, Analysis and Reporting for Power Transformers and Shunt Reactors – W. Binder

See Attachment K.4.2 for the detailed minutes.

The Guide has been balloted, the results reviewed, and a Ballot Resolution Group formed to resolve the 158 comments, the plan is to recirculate by the Spring 2015 meeting.

Coordination Activities with CIGRE were reported by Thomas Melle.

Mark Rivers presented what is currently being developed as Failure reporting database.

K.4.3 TF to Compare C57.131-2012 Standard for Load Tap Changers and IEC 60214-1 ED 2.0 for consideration of recommending adoption of IEC standard for (Also WG 60214-2 Tap-Changer Application Guide) - Craig Colopy

WG Chair overviewed new IEC Document – starting as a task force to look at the documents and see if there is concurrence. Task is to determine the differences and provide recommendation to Power SC for future adoption of IEC standard, or future joint revision of IEC tap changer standard.

A request was presented to chairman to consider combining TF meeting with the Joint revision WG for tap changer application guide for the next IEEE meeting in the Spring 2015 meeting in San Antonio.

K.4.4 Development of PC 57.153 Guide for Paralleling Transformers - Tom Jauch

See Attachment K.4.3 for the detailed Ballot results on D9.2 and the first recirculation of D10. The comments were 575 and 119 respectively and another recirculation is planned. There are PAR revision and PAR extension requested and pending. The Standards Coordinator, Bill Bartley, discussed the ballot recirculation process, and upcoming changes to the process

K.4.5 Development of PC57.156 Guide for Transformer Tank Rupture Mitigation of Liquid-Immersed Power Transformers and Reactors - Peter Zhao

See Attachment K.4.5 for the detailed discussions.
Peter Zhao requested the Power SC acceptance to go to ballot, and requested a motion be made. Jeewan Puri motioned that SC vote for PC57.156 to “Go to Ballot” with a Second by Phil Hopkinson. SC Chair asked for discussion, and questioned if all the work was complete, and the WG had the required two thirds majority to go to Ballot; the Wg Chair explained yes, and asked for a PTSC vote. There were no objections, and no one abstained. PC 57.156 - **Passed** to Go to Ballot.

K.4.6 Development of PC57.157 Guide for Conducting Functional Life Tests for De-Energized Tap Changer Contacts - Phil Hopkinson

The WG Chairman provided a history of the efforts involved form initial TF on through to WG efforts to bring the Guide to the present condition. In addition to acknowledging the creation of

the guide by all the dedicated individuals, the WG Chair thanked those manufacturers that contributed much research and innovative testing methods to determine the methodology and establishment of guide lines based on real testing. It is an achievement to have the data and test results that culminate in a the present Guide for Conducting Functional Life Tests for De-Energized Tap Changer Contacts

Phil Hopkinson requested the Power SC acceptance to go to ballot, and requested a motion be made. Adam Sewell motioned that SC vote for PC57.157 to "Go to Ballot" with a Second by Peter Zhao. SC Chair asked for discussion, and questioned if all the work was complete, and the WG had the required two thirds majority to go to Ballot; the WG Chair explained yes, and asked for a PTSC vote. There were no objections, and no one abstained. PC 57.157 - **Passed** to Go to Ballot.

See Attachment K.4.6 for the details.

K.4.7 Development of Standard Requirements for Phase Shifting Transformers - IEEE/IEC 60076-57-12 - Raj Ahuja

See Attachment K.4.6 for the details.

The Standard has been balloted in both IEEE Ballot Process and IEC Ballot Process; there were 67 and 43 comment respectively. The 100 comments are now in the ballot resolution process during these TC meeting sessions, and again in Tokyo in November; followed by CDV in December 2014.

K.5 Old Business

None

K.6 New Business

See Chair remarks regarding member status. The criteria at this time is attendance at 2/3 meetings will qualify to request a member role; and missing 3out of 5 meetings will be criteria to be dropped form member role.

K.7 Adjournment

The meeting adjourned as scheduled. The motion to adjourn was by Richard Amos and seconded by Pierre.

K.8 Attachments –Working Group Meeting Minutes and Agenda

Attachment K.2 – F14 PTSC Agenda
Attachment K.4.1 – PC57.93 Installation Guide
Attachment K.4.2 – PC57.125 Failure Investigation
Attachment K.4.3.1 – TF IEC / IEEE Tap Changer harmonization
Attachment K.4.3.2 – WG 60214-2 IEC Tap Changer Part 2 Application Guide
Attachment K.4.4 – PC57.153 Paralleling Guide
Attachment K.4.5 – PC57.156 Tank Rupture Guide
Attachment K.4.6 – PC57.157 Functional Life DETC Guide
Attachment K.4.7 – IEEE / IEC 6076-57-12 Phase Shifting Transformers

AGENDA

IEEE Transformers Committee / Power Transformers Subcommittee
Wednesday, October 22, 2014, 1:30-2:45 PM
Fairfax Ballroom, Sheraton Tyson Hotel, Tysons, VA
Joe Watson – Chair, Bill Griesacker – Vice Chair, Kipp Yule - Secretary

1. Call to order
2. Introduction and distribution of attendance sheets
3. Determination of a quorum
4. Approval/correction of the spring 2014 minutes
5. Report from the Administrative Subcommittee meeting
6. New Business
7. Working Group and Task Force reports

Project	Title	Chair
C57.12.10	Revision of IEEE Standard Requirements for Liquid-Immersed Power Transformers* (2020)	Gary Hoffman
C57.17	Revision of Requirements for Arc Furnace Transformers* (2022)	Robert Ganser
C57.93	Revision of IEEE Guide for Installation and Maintenance of Liquid-Immersed Power Transformers (2018) (PAR to 2016)	Mike Lau
PC57.116	Revision of Guide for Transformers Directly Connected to Generators* (2018) (PAR to 2015)	Gary Hoffman
PC57.125	Revision of Guide for Failure Investigation, Documentation, Analysis and Reporting for Power Transformers and Shunt Reactors (2018) (PAR to 2015)	Wallace Binder
C57.131 IEC 60214-1 IEC 60214-2	IEEE Standard Requirements for Load Tap Changers* (2022)	Craig Colopy
C57.135	IEEE Guide for the Application, Specification and Testing of Phase-Shifting Transformers* (2021)	Jin Sim
PC57.140	Revision of Guide for Evaluation and Reconditioning of Liquid-Immersed Power Transformers* (2018) (PAR to 2015)	Paul Bowman
C57.143	Guide for Application for Monitoring Equipment to Liquid-Immersed Transformers and Equipment* (2023)	Donad Chu
C57.148	Standard for Control Cabinets for Power Transformers* (2021)	Joe Watson
C57.150	Guide for the Transportation of Large Power Transformers and Reactors* (2022)	Greg Anderson
PC57.153	Development of Guide for Paralleling Transformers (PAR to 2014)	Tom Jauch
PC57.156	Development of Guide for Transformer Tank Rupture Mitigation of Liquid-Immersed Power Transformers and Reactors (PAR to 2015)	Peter Zhao
PC57.157	Development of Guide for Conducting Functional Life Tests for De-Energized Tap Changer Contacts (PAR to 2015)	Phil Hopkinson
IEEE 638	Revision of IEEE Standard for Qualification of Class 1E Transformers for Nuclear power Generating Stations* (2023)	Craig Swinderman
IEEE/IEC 60076-57-1202	Development of Standard Requirements for Phase Shifting Transformers (PAR to 2016)	Raj Ahuja

* No meetings were scheduled in Tysons for these documents

8. Old Business
9. Collection of Attendance Sheets
10. Adjournment

Attachment K.4.1

WG Revisions to Installation of Power Transformers C57.93

Monday, October 20, 2014 11:00 AM – 12:15 PM

Washington DC

Minutes of the Working Group Meeting

Chair Mike Lau called the WG meeting to order at 11:00 am on October 20, 2014. 14 of 25 members were present, so a quorum was achieved. 30 guests and one corresponding member also attended, for a total attendance of 45. 1 guest requested membership.

A motion to approve the Spring 2014 minutes was made by Ewald Schweiger, seconded by Bruce Fairris. The minutes were approved unanimously. The agenda was approved by acclimation.

Chair Mike Lau presented sections of Draft 1.1 of the guide re the vacuum processing tables. A powerpoint presentation summarizing the discussion will be posted on the website.

The following sections were discussed:

- **Subclause 3.7 Tests –** acceptance values for mineral in storage vs. mineral oil in equipment. Joe Watson will submit a proposal to address the issue
- **Subclause 3.8.3 Energization under cold conditions –** this subclause will be revised to address issues when using natural ester fluids. Stephanie Denzer, Deanna Woods and Jim Graham will propose the revisions.
- **Subclause 4.9.3 Method 3 hot air drying of insulation –** Alan Peterson will review and revise the fire extinguishers which should and should not be used in case of transformer fires.
- **4.9.5 Completion of drying –** Several people cautioned against applying high voltage to check for moisture during vacuum filling. Mike Lau will investigate the issue and submit a recommendation.
- **3.9.1 Routine DGA Testing –** DGA test intervals and criteria used to determine test intervals were discussed. Two key times were identified to do take samples for DGA, application of full voltage and load current. There is no DGA testing clause for the large transformers; Dick Amos will propose a DGA testing subclause to be added to clause 4.
- **4.8.5 Vacuum filling –** The location of the liquid fill and vacuum valves was discussed in great detail. It was pointed out that the mfr's recommend liquid velocity not be exceeded, and precautions should be taken to avoid spraying hot oil directing on the windings to prevent insulation damage.

A survey will be sent to the working group to clarify terminology and duration for set times.

Joe Watson will submit a proposal covering static electrification issues when using pumps.

The working group meeting was closed by acclimation at 12:15 pm.

Respectfully submitted

Mike Lau	Saurabh Ghosh	Jim Graham
WG Chair	Vice Chair	Secretary

Attachment K 4.2

WG for Revision of C57.125 Guide for Failure Investigation, Documentation, Analysis and Reporting for Power Transformers and Shunt Reactors
Meeting Minutes
Monday October 20, 2014
Washington, DC

1. Introductions – Identify Representation and Determination of Quorum By Roll Call

   Attendance was taken and quorum was established.

2. Presentation of Agenda / Revisions to Agenda

   Agenda was presented. There was no concerns or questioned raised.

3. Approval of Previous Meeting Minutes – Spring 2014

   Motion was made by Ken Skinger to approve the meeting minutes and Dave Murray seconded the motion. The motion passed, the meeting minutes were approved.

4. Chairman's Remarks – Wallace Binder

- Chairman expressed his appreciation for all the members of the working group and the effort they put in to get the Guide to ballot.
- Reviewed the ballot results:
  167 in the ballot group
  80% response rate - Meets the threshold of 75% to be a complete ballot
  93% approval rate - Meets the threshold of 75% to be an approved ballot
  158 comments to resolve and recirculate

- Target schedule is to complete the ballot recirculation by the Spring 2015 meeting.
- Volunteers were requested to work on the ballot resolution committee
- Due to the removal of the "corresponding member" classification; current "corresponding members" of the working group will be made members.

5. Old Business

   There was no old business discussed.

6. Report on Coordination Activities with CIGRE – Thomas Melle

   Minutes from the 5th CIGRE A2.45 "Post-Mortem" WG meeting are available on the C57.125 webpage. The planned meeting for August 23, 2014 in Paris was cancelled. The 6th WG meeting is proposed for Spring 2015 (date and location TBD). The CIGRE WG hopes to have the brochure completed by the end of 2015

7. New Business
    - Mark Rivers made a presentation on the Failure Reporting database currently being developed.
    - There was no additional new business discussed

8. Announcements

    No announcements were made.

9. Adjournment

    Ken Skinger made a motion to adjourn the meeting and Bruce Farris seconded the motion. The meeting was adjourned.

Respectfully Submitted,
John Roach, WG Secretary
10/20/2014

Power Transformer Subcommittee
Task Force Report

Document #: NA **Current Standard Date:** NA

Action Plan: **Compare C57.131-2012 and IEC 60214-1 ED 2.0 for consideration of recommending adoption of IEC standard for**

Craig A. Colopy - Chairman Gael R Kennedy - Secretary

PAR Approval Date: NA **PAR Expiration Date: NA**

Current Draft Being Worked On: NA

Meeting Date: Oct 21, 2014 **Time:** 13:45 – 15:00

Attendance: Members	1
Guests	55
Guests Requesting Membership	14
~~Total~~	~~56~~

Meeting Minutes / Significant Issues / Comments:

Introduction of Members: Introduction by Craig and overview of new IEC Document – starting as a task force to look at the documents and see if there is concurrence. Look at the differences and provide recommendation to Power SC for future adoption of IEC standard/ or future joint revision of IEC tap changer

Chair's Remarks:
a) C57.131 – 2012 existing IEEE Document
b) IEC 60214-1 May 2014 is latest published Tap Changer standard.
c) Revision of IEC 60214-2 Application Guide will include application topics from C57.131-2102

Members will be asked to take specific parts of each standard comparing them and document the differences and improvements/corrections needed.

A request was presented to chairman to consider combining TF meeting with the Joint revision WG for tap changer application guide for the next IEEE meeting in the Spring (San Antonio).

Submitted By: Gael R Kennedy
Date: 10/21/2014

Power Transformer Subcommittee
Working Group Report

Document #: **PC60214-2** **Current IEC Standard Date: 60214-2 Ed 1.0 2004**

Document Title: Tap-Changers - Part 2: Application Guide

Craig A. Colopy - Chairman **Axel Kraemer – Vice-Chairman** **Gael R Kennedy - Secretary**

PAR Approval Date: 12-Jun-2014 **PAR Expiration Date:** 31-Dec-2018

Current Draft Being Worked On: **CD (IEC Committee Draft)**

Meeting Date: **Oct 21, 2014** **Time:** **15:15 – 16:30**

Attendance: Members	**2**
Guests	**25**
Guests Requesting Membership	**13**
~~**Total**~~	~~**27**~~

Meeting Minutes / Significant Issues / Comments:

Scope: This application guide assists in the understanding, selection, and operation of tap-changers designed in accordance with the latest IEEE C57.131 and IEC 60214 Part 1 standards which include both resistor and reactor types, de-energized tap-changers, and their associated equipment. It applies for use with the tapped windings of power and distribution transformers of all types and reactors. It applies to tap-changers immersed in mineral insulating oil, air or gas insulation or other insulating liquids if applicable. It applies to tap-changers with arcing and arcing-free contacts depending on the application.

Harmonization strategy and an overview of the latest published IEC and IEEE Tap Changer Test standards 60214-1 Ed 2.0 (2014) and IC57.131- 2012, respectively were presented. Work is set in motion on a revision of the supplemental IEC tap changer application guide, 60214-2. A PAR has been approved in June 2014 to establish a WG for a joint IEEE/IEC revision of this application guide. Similar documentation (RR) for IEC is in process of being issued to coincide with our first meeting here at the IEEE meeting. WG will be continuing to meet this Thursday afternoon and all day Friday in the Presidential Theater Room.

Initial work on Table of Contents for a PC60214-2 Draft was presented to the WG. A section on the Selection of the Tap Changers is included. A total of 16 members of the IEC community, including

two from the US are part of this joint Working Group representing their respective countries. Annex E, LTC Tutorial, from IEEE C57.131-2012 is included in this joint revision document.

Table of Contents currently outlined are the following:

- Application of tap-changers for regulating transformers and reactors
- Types of Tap-Changer
- On-Load Tap-Changers
- De-energized tap-Changers
- Protective Devices
- Fittings and Accessories
- Mounting and Testing
- Field Services
- Safety
- Information to be provided by the transformer manufacturer.

- Two day work session similar to added session at this Fall 2014 meeting (Thursday and Friday) afterwards will be considered for San Antonio Spring 2015. Along with the General meeting time slot. It is also likely an additional meeting will be planned between the two IEEE Transformer Committee meetings.

Closing of Meeting - Depart at 16:30

Submitted By: Gael R Kennedy **Date: 10/21/2014**

K.10 Minutes from C57.153 - WG Transformer Paralleling Guide

Washington DC
Tuesday, October 21, 2014
4:45-6:00pm
Chair – Tom Jauch
Secretary – Mark Tostrud
Vice Chair – Jim Graham
Total attendees - 42

20 of 33 members were present
22 Guests (10 new)
Attendance was recorded in AMS
New members are not being added since we are in the balloting process.

- Quorum was achieved
- Motion to approve the agenda for this meeting
  - Hemchandra Shertukde
  - Marnie Roussell
  - Vote - unanimous
- Motion to approve the minutes from Savannah
  - Hemchandra Shertukde
  - Marnie Roussell
  - Vote - unanimous
- Reviewed results of the ballot on D9.2
  - Participants – 182
    - Affirmative – 120
    - Negative – 13
    - Abstention – 13
  - Comments 575 total (456 must be satisfied)
- Reviewed results of recirculation ballot D10
  - Participants – 182
    - Affirmative – 131
    - Negative – 8
    - Abstention – 119
  - Comments 119 total (91 must be satisfied)
- One PAR revision was requested and is pending
- One PAR extension was requested and is pending
- Bill Bartley discussed ballot recirculation process and upcoming changes to the process
- Motion to adjourn
  - Hemchandra Shertukde
  - Murti Yalla
- Meeting was adjourned at 5:10pm

REPORT OF MEETING
WG PC57.156– GUIDE FOR TANK RUPTURE MITIGATION
1:45pm – 3:00pm Monday 10/20/14
Washington, DC

The meeting of the Working Group for the Guide for Tank Rupture Mitigation convened Monday afternoon at 1:45pm. Chairman Peter Zhao presided.

Introductions were made and attendance rosters were passed around.

Attendance was 69 (18 members, 51 guests). Membership is 28. Therefore a quorum was confirmed. As a result, we were able to approve the agenda and actions discussed in regard to the Guide.

Josh Herz moved that minutes of the 14S meeting in Savannah be approved. Omar Ahmed seconded the motion and the motion passed by a show of hands.

Chairman Zhao provided introductory remarks and previewed the agenda to be covered for the meeting.

The chairman reviewed the summary of survey for approval results. We have 28 members. Survey results were 14 members approving, 10 members approving with comments, and 4 not responding. The chairman also stated that the guide has been pared down to conform to scope limitations.

Discussion of individual comments received from the survey ensued. Patrick McShane commented that his comment was misrepresented on the overhead, and clarified that he recommends the guide refer to the liquid in transformers as "fluid", except when the context is limited to mineral oil.

The reference to a General Electric test in which the tank was ruptured even though the cover had been removed, has been deleted from the document, because no published data was found to verify the experiment nor its results. Don Chiu confirmed that the transformer tested was a distribution (network) transformer.

It was confirmed the scope of the guide is restricted to the transformer itself. However, in response to a comment that other mitigating opportunities include relays, breakers, etc., a brief mention of such factors has been added to the guide.

The chairman noted that Joe Watson was in attendance and asked as to the process to be followed to proceed with the balloting process., and Joe confirmed the need for a super majority for the vote.

Returning to discussion of comments received, Marc Foata explained that Cigre has done a lot of work relevant to our efforts and that document should be useful in the guide. Marc agreed that inclusion of a reference to the Cigre document would suffice.

Marc moved to include the Cigre document among the references in the guide. Sam Mehta seconded, and the motion passed by 14 "for" and no votes against.

Omar Ahmed discussed his desire that the guide include some reference to the availability of rupture discs that did not have the limitations of those discussed in the document (goosenecks with breakaway glass). Discussion resulted around the restriction from including devices/solutions for which there is only one supplier. Conclusion was that reference to other rupture discs would not be added until someone can provide wording to resolve the issue of single-source.

A comment from the survey recommending elimination of a reference in 4.2 (d) to a shutter or flow-rate-dependent check valve in the pipe to the conservator tank was discussed. It was agreed to leave this reference in the document.

To conclude the business of this meeting, Josh Herz moved that the latest revision of the guide, with only changes as agreed to in this meeting be submitted for a ballot of the committee. Greg Swinderman seconded and the motion passed 16 "ayes" and 4 "nays". Some discussion resulted as "Nay" voters were invited to express their opinions.

The meeting was adjourned at 3:05pm.

Respectfully,
Robert Thompson, V Chair 10/21/14

1. Attachment K4.6

2. IEEE/PES TRANSFORMERS COMMITTEE

WG FUNCTIONAL LIFE TESTS ON SWITCH CONTACTS PC57.157

MINUTES

Document #:	**PC57.157**	**Current Standard Date:**	**NA**
Document Title:	**WG Functional Life Tests on Switch Contacts PC57.157**		
Chair:	Phil Hopkinson	**Vice-Chair**	**NA**
Secretary	Adam Sewell		
PAR Date:	**12/07/2011**	**PAR Expiration Date:**	**12/31/2015**
PAR Status:	**NA**		
Current Draft Being Worked On:	**6.1**	**Dated:**	**Oct 2014**
Meeting Date:	**October 21, 2014**	**Time:**	**8:00-9:15 AM**

Attendance:		
	Members	**13 (out of 23)**
	Corresponding Members	**3**
	Guests	**36**
	Guests requesting Membership	**3**
	Total	**52**

The Working Group was called to order at 8:05 AM on October 21, 2014.

A. Introductions

The chairman welcomed attendees and all attendees announced their name and company name. Attendance sheets were passed out. A count of members was made at this time, and a it was determined that a quorum was present.

B. The minutes were approved from the Spring 2014 meeting in Savannah, GA.
- J.Sewell – motion, Hem – second
- none opposed, APPROVE

C. Old Business

- A revision to the PAR made to match the Draft document was submitted by A.Sewell and was shown to the group
- Comments from Draft 6.0 were reviewed and changes to the Draft 6.0 were made at the meeting to resolve the comments and saved as new Draft 6.1.
  - '$T_{bulk/oil}$ is generally in the range of 20°C' was changed to '$T_{bulk/oil}$ is generally in the range of 20°C to 45°C'
  - '2 times load' was changed to '2 times rated through-current' in two places

- The chairman then asked for a motion to approve the Draft 6.1 and to send it to the Power SC for ballot.
    - J.Sewell – motion, K.Ellis – second
    - 18 approved, 1 opposed
    - Draft 6.1 will be sent to Power SC for ballot

D. Future Work

- The Draft 6.1 will be taken to the Power SC and requested to be put in for ballot

E. Adjournment
The meeting was adjourned at 9:15AM
Motion-A. Kraemer, none opposed

F. Time and place of next meeting

- Next in person meeting will be at the Spring IEEE Transformer Committee meetings in San Antonio, TX during the week of April 12-16, 2015.

WG IEEE/IEC 60076-57-1202, Dual Logo Standard on Phase Shifting Transformers,

AGENDA

WG IEEE/IEC 60076-57-1202 Phase Shifting Transformers
Savannah, Tuesday October 21, 2014
11 AM to 12:15 PM
Great Falls

- Introduction of members & guests
- Roll call for quorum
- Approval of Spring 2014 minutes
- Status on response from IEEE Ballot Pool Members and IEC Member Countries on Committee Draft 1
- Review of the comments received on CD1
- Input from WG members/any additional comments
- Future Meeting Schedule
- Adjourn

Ballot Response from IEEE Members on Draft

- Editorial Input -- May/June
- Ballot Pool Created -- July/August
- Ballot initiated on 8/18/14
- Ballot closed on 9/18;14
- No. of balloters registered: 75
- Response received from 89% , approval rate 92%, abstain 2%.
- No. of Comments received: 67
  - 26 Technical, 32 Editorial, 9 General

Ballot Response from IEC Member Countries on Committee Draft

- Ballot initiated on 5/16/14
- Ballot closed on 9/5]14
- Response on draft received from 3 countries – France, Germany and Italy
- No. of Comments received: 43
  - 28 Technical, 14 Editorial, 1 General
- Total Comments: 110
  - 54 Technical, 46 Editorial and 10 General

Future Planned Activities

- Comment Resolution –
  - 10/21 WG Meeting 11 AM – 12:15 PM
  - 10/21 WG meeting 6 PM – 9 PM Washington Board Room
  - 10/23 WG Meeting 1:30 PM – 5 PM Ash grove "A"
- Comments Resolution (Contd....)
  - Meeting in Tokyo – Saturday Nov. 8th A/N and Sunday Nov. 9th all day
- Plan for CDV - Dec. 31st 2014

IEC and IEEE Target Dates

IEEE

- Target Dates
  - ❑IEC
    - ➢CD March 31st 2014 - **Actual May 2014**
    - ➢CDV October 2014 -- **Planned for Dec 2014**
    - ➢FDIS
    - ➢IS/TS **March 31st 2015, 1 Year Extension will be required** – **Plan to complete in Dec. 2015**
  - ❑IEEE
    - ➢**PAR Expires 12/31/2016** – **Plan to publish Standard in Dec 2015**
- Questions

Annex L Standards Subcommittee – Unapproved Minutes

October 22, 2014
Washington DC Metro Area, Tyson, Virginia

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 not met.

Bill then requested a review of the Agenda; no vote was taken without quorum.

L.1 Meeting Attendance

The Standards Subcommittee met on Wednesday, October 22, 2014, at 4:30 PM. A role call showed 20 of 52 members in attendance falling short of quorum at the meeting. Overall the attendance roll showed there were 73 attendees, 26 members, 47 guests, including 4 that requested membership upon tabulation of the circulated rosters with 2 being accepted by the chair.

L.2 Approval of previous meeting minutes

The Chair asked if there were any comments or corrections to the previous meeting minutes of the Spring 2014 meeting in Savanah, Georgia. 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 March 1, 2014 to October 17, 2014. In the last six months, no new Standards, six Revisions and one Corrigendum were approved by Standards Board. In this same period, the Standards Board approved seven PARs for new standards or revisions to standards; three PAR modifications, and four PAR Extensions. The full Standards Report is available on the Transformers Committee website at the following link:

http://www.transformerscommittee.org/meetings/F2014-WashingtonDC/Minutes/F14-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.

Bill announced the forming of two new task force teams:

1. Kipp Yule will chair a task force to develop a white paper that will ascribe what goes in standards C57.12.00 and C57.12.90 with a Venn diagram that will simplify the intersecting contents of both standards.

2. Steve Antoz will chair a task force to develop a ballot procedure seeking to write down the unwritten rules and how we can make them better.

Each task force will formal convene at the Spring 2015 meeting in San Antonio.

L.4 Working group reports

L.4.1 Continuous Revision of C57.152

The group did not meet at this meeting.

L.4.2 Guide for Establishing Power Transformers Capabilities while under Geomagnetic Disturbances – Jane Verner

Bill Bartley reported for the meeting hostess Jane Verner.

This was the first face to face meeting for this Transformer Standard GMD Working Group. We began with introductions of all.

We had a total of 161 people. There were 13 members present, 148 guests of which 36 guests requested membership. We did have a quorum. Note that we have many transformer manufacturers requesting membership and we need a balanced group for voting. Users are encouraged to join the WG.

The web meeting minutes from September 3 and October 1 were approved in accordance with Robert rules of meeting conduct.

The PAR was submitted in January. NESCOM is voting on the on PAR March 26. We reviewed the PAR and the document developed to date thru 5 web meetings.

Proposed Draft - Project Authorization Request (PAR)
Scope

This guide describes the effects of Geomagnetic Disturbances (GMD) on power transformers when there is the presence of Geomagnetically Induced Current (GIC) in a power transformer. It establishes specification parameters and performance characteristics for power transformers to minimize the risk and impact when GIC is present in the power system. It provides background that can help evaluate the effect of GIC on a power transformer design and its GIC capability. This includes the evaluation techniques to determine the performance characteristics while under the influence of GIC.

It does not include the effect of GIC on other power system devices beyond power transformers and accessories. It does not discuss mitigation techniques and mitigation devices such as neutral blocking devices on equipment beyond power transformers and accessories.

A presentation of the content of Draft 1.7 was given. The work to draft the document was divided into smaller task forces.

- Scope
- Normative references
- Definitions
- Background
- Effects of GIC on power transformers
- Thermal response of Transformers to GIC
- Evaluation of GIC capability of power transformers in the presence of GIC
- Specifications
- Monitoring
- Annex A - Bibliography

Figure 15 in Clause 6 was discussed since it only shows the GIC profile in the positive direction. It was agreed to include a note that GIC is both positive and negative because a better example is not available.

There was much discussion on the need to include more information on existing transformer susceptibility to GIC based on the design type. Clause 7.3 was discussed. Roger Verdolin, Rod Sauls, Peter Balma??……. volunteered to strengthen this clause.

We discussed NERC compliance and NERC Standards Updates. NERC has issued a GMD Planning Standards which was mentioned.

TPL-007-1 Transmission System Planned Performance during GMD was just voted down but NERC wants a Standard in place by January 2015. This standard will require a planning assessment of the system for its ability to withstand a Benchmark GMD Event without causing a wide area blackout, voltage collapse, or large load loss.

TPL-007 provides a voltage waveform; while the induced voltage in the earth is the driver the resultant current in the transformer is our concern.

A note should be added to draft 1.7 that the square GIC signature profile or wave shape is very conservative.

Comments on the draft are welcome. Draft 1.7 is available on the Transformer Committee Website under the Standards Subcommittee.

A doodle pool will be sent out to determine the best date to schedule the next web meeting. November 21 and 24 are being considered.

Respectively submitted by Jane Verner, WG Chair, 22 October 2014

L.4.3 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.

Standard C57.12.00 was last 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 all the material ready for a new ballot has been compiled, the draft document sent to IEEE for MEC, and the ballot pool has been formed. Some statistics of the ballot pool:

Invitation Period	August 26 to October 5, 2014	
Invitation Pool	834	
Balloters signed up	244	
Consulting	66	27.0%
General Interest	18	7.4%
Producer / Manufacturer	30	12.3%
Producer / Component	36	14.8%
Producer / Other	6	2.5%
User / Other	44	18.0%
User / Industrial	9	3.7%
User / Consumer	5	2.0%

There are a few minor adjustments to make as a result of the editor's feedback, but the document is essentially ready for the ballot launch, pending subcommittee approval.

Respectfully submitted by Steven L. Snyder, WG Chair, on October 22, 2014

L.4.4 Continuous Revision of C57.12.90-2006

This is a working group by committee. 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 December 31, 2015.

Status

The document was closed for new additions immediately after the Spring meeting in Savannah. The final draft was completed in July and submitted to IEEE-SA in August for Mandatory Editorial Coordination (MEC). Changes and updates were incorporated.

The 30 day ballot pool formation notice was opened at the end of August. Near the end, additional emails were sent out to over 500 people in certain working groups associated with revisions to C57.12.90. A 10 day extension was opened, followed by another 3 day extension … to allow for people who missed the initial 30 day period.

Finally the ballot pool was concluded in early October. A rough estimation of the participant mix is 25% consultants, 30% producers, and 24% users. The rest fall into various other categories. This seems to be an acceptable mix.

A clean copy and a redline copy of the document are ready to go. The clean copy will be the official balloted version, and the redline copy will be used as an aid to the balloters to easily see the changes. We will launch the ballot at the same time that C57.12.00 is ready to launch. This is expected to occur with a week or two.

Respectfully submitted by Stephen Antosz, WG Chair, on October 22, 2014

L.4.5 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 with 8 members and 6 guests in attendance.

Patrick McShane called the meeting to order and introductions were made. The roster was 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.

The first order of business was to ask if there were any additional corrections that might be made to the proposed whitepaper. Hearing none, the Chair indicated he would like to move this report to the Subcommittee and would like the direction from the Task Force. A motion was made by Jerry Murphy and seconded by Don Cherry to provide this as our final report to the Subcommittee. This was passed unanimously.

With this, the meeting was adjourned and the Task Force terminated.

Respectfully submitted by Stephen Shull on October 22, 2014.

L.4.6 TASK FORCE for Comparison of IEEE & IEC Standards for Cross Reference

The task force meeting was held at 4.45 pm on October 21, 2014. 2 of 15 members were present, so a quorum was not achieved. 8 guests also attended, for a total attendance of 10. 1 guest requested membership.

A summary of the Task Force activities was presented which was followed by two presentations on comparison of IEEE and IEC standards. The first presentation was done by Ajith Varghese. Testing requirements in C57.12.00-2010 sections 8 & 9 and C57.12.90-2010 were compared with IEC 60076-1(Ed. 3 2011-04) and IEC 60076-3 /FDIS. Kurt Kaineder clarified that IEC standard 60076-3 has now been published.

The second presentation was by Vinay Mehrotra and covered important differences between C57.12.00 (2010) and IEC 60076-1(2011).

Dejan Susa volunteered to take up comparison of the loading guide C57.91 and the current IEC standard 60076-7.

The task force meeting was adjourned at 5:40pm.

Respectfully submitted by Vinay Mehrotra on October 21, 2014

L.5 Old Business

None

L.6 New Business

- Phil Hopkinson presented his desire to request for two amendments regarding core gassing that could not be acted upon without quorum; one each to C57.12.00 and C57.12.90. Phil asked if the subcommittee would send out amendments electronically. Bill said once the Performance Characteristics subcommittee approves the amendment it could be presented to the Standards subcommittee for consideration. Steve Snyder asked at what time the Dielectric Tests subcommittee become involved.

L.7 Adjournment

The meeting was adjourned by Chair without objection; the meeting adjourned around 5:12pm.

Respectfully submitted by Jerry R. Murphy, Standards SC Secretary

Annex M Underground Transformers & Network Protectors Subcommittee

October 22, 2014
Washington DC Metro Area

Chair: Dan Mulkey
Vice Chair: George Payerle

M.1 Meeting Administration

Introductions – The meeting was called to order at 11:00 AM in the Ash Grove room of the Sheraton Tysons Hotel in the Washington DC Metro Area. Introductions were made and sign-in sheets were routed.

Leadership Changes – Dan Mulkey reported that Carl Niemann had resigned due to personal issues preventing him from attending, and that he had been requested to assume the chair position. Dan then reported that he had asked George Payerle to assume the Vice-chair position.

Quorum – The members were listed on the screen and by a show of hands, it was determined that there was a quorum with 14 of the 17 members in attendance.

Approval of Minutes – The Spring 2014 minutes were approved as submitted. They were motioned for approval by Bill Wimmer and seconded by Brian Klaponski. The subcommittee approved these without opposition.

Members in attendance:

Adam Bromley - Fort Collins Utilities
Carlos Gaytan – Prolec GE
Said Hachichi - Hydro-Quebec
Brian Klaponski - Carte International Inc.
Alejandro Macias – CenterPoint
Charles Morgan – Northeast Utilities
Daniel Mulkey - Pacific Gas & Electric
George Payerle - Carte International Inc.
Jeremy Sewell - Quality Switch, Inc.
Adam Sewell - Quality Switch, Inc.
Anastasios Taousakis – PEPCO Holding
Giuseppe Termini - PECO Energy
Alan Traut - Power Partners
William Wimmer - Dominion

Guests in attendance:

Kahveh Atef – San Diego G & E
Sergio Coreno - Siemens
Valery Davydov - Mr. Valery Davydov
Fredric Friend - American Electric Power
Benjamin Garcia – Southern Calif. Edison
Roger Hicks – PEPCO Holding

5.5. This would make sure that the intent of the section is to state what the reference temperature is. Brian K. made a motion to change title from "Impedance and Losses" to "Reference Temperature" and delete first two sentences; George Payerle seconded. Discussion: Giuseppe asked why we want to delete the second sentence; Al stated that this is redundant and the information is implied. Vote: Motion carries unanimously.

7. Al asked if there was a motion to include impedance standards as we do in other standards. Dan M. said that we probably should because our other standards do. Dan Mulkey made a motion to include min impedance table information from the proposed C57.12.20; coordination with C57.12.20 is very important in order to include the same information in each standard. Brian K. seconded that motion. NOTE: Al has the action item to bring the impedance table in from 12.20 since he is the OH WG chair. Vote: Motion passed unanimously.

8. Alex asked if we wanted to put "Unless otherwise specified by the user". Mike Miller stated that the way it reads right now, it could be misconstrued during an arc flash lawsuit. Brian and Dan stated that we need two sentences to describe what the intent is. Al wrote proposed language in the draft. We had a discussion regarding whether to include "nameplate" in description of impedance. Nameplate impedance is "adjusted design" impedance from testing. Josh V. suggested that we use "nominal" impedance as we do in C57.12.34.

9. Brian K. made a motion to tweak the proposed language to clarify the responsibilities between the user and the manufacturer on determining impedances (nameplate and minimum). Josh stated that C57.12.00 has some requirements for impedance on nameplates but it states these requirements are for units 501 kVA and larger. The last sentence should be included somewhere else. Ed Smith seconded Brian's motion. Vote: 18 yes votes, 2 no votes (Josh and Giuseppe opposed the motion).

M.2.1.3 Adjournment – Meeting was adjourned at 10:45 AM

M.2.2 C57.12.24 Working Group Report – Three-Phase Submersible Transformers

Giuseppe Termini, Chairman
Revision due date: **6/17/2019**
PAR Approval Date: **11/9/2011**
PAR Expiration Date: **12/31/2015**

M.2.2.1 The meeting was called to order at 9:30 AM, on Monday, October 20, 2014 in the Ash Grove A Room of the Sheraton Tysons Hotel in the Washington DC Metro Area. Introductions were made and an agenda was presented. The meeting was attended by 19 members and 29 guests. Membership stood at 20, and with 19 members present there was a quorum. Four (4) guests requested membership. George Payerle acted as recording secretary.

M.2.2.2 Minutes from the previous meeting in Savannah were presented. Dan Mulkey motioned to accept the minutes as presented, Kent Miller seconded the motion and the motion was approved unanimously.

M.2.2.3 The chair thanked everyone who provided comments regarding the draft document that was sent prior to the meeting. The comments were incorporated into the standard draft and

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

M.2.1 C57.12.23 Working Group Report – Single-Phase Submersible Transformer

Alan Traut, Chairman, Adam Bromley, vice-chair.
Revision due date: 3/19/2019
PAR Expiration Date: 12/31/2018

M.2.1.1 Meeting Administration:

Introductions – the meeting was called to order at 9:30 AM on Tuesday, October 21, 2014 in the Ash Grove A Room of the Sheraton Tysons Hotel in the Washington DC Metro Area, and everyone was asked to introduce themselves. Rosters were sent around.

Quorum – We had 35 attendees, 20 members, 9 guests with 6 requesting membership. This gave us enough members for a quorum.

Chair Report – Al talked about when the PAR expires and how long we have to complete our work. Mentioned changes to Scope during the last meeting prior to submitting for a PAR.

Approval of Agenda – Motion: Ron Stahara, Second: Ed (HJ), unanimous

Approval of Minutes – Motion: Ron Stahara, Second: Ed (HJ), unanimous

M.2.1.2 New Business

1. One thing we have typically done is to reference a specific year of the standard. Al asked for a volunteer to review the document to update IEEE standard dates and look for currency issues. Juan Saldivar volunteered for this task.

2. Rating Data – A question was raised on whether we needed to include natural esters. Manufacturers said that there are plenty of customers that use it, which means that we should add KNAN to the cooling class. A motion to add KNAN to the cooling class was made by Dan Mulkey and seconded by Ron Stahara. Discussion about whether the K covers synthetics as well; Brian K. said that we should check on this before we move on. O is insulating liquid with fire point below 300° C, K is over 300° C, and L is no fire point (covers silicon). Motion passed unanimously.

3. A question was raised regarding the need to look at the 65° C insulation system. It was determined that the user should be knowledgeable in this area in order to specify what they need.

4. Insulation Levels – Table 1: Al and Adam to update the table to include the units added to the Scope (34.5 GndY/19.9 kV).

5. Table 2 – 600 V not included as is included in the Scope. Al asked if the group wanted to include it. Al asked Giuseppe about what we did in three phase sub WG –he stated that they did add that voltage level. Brian stated that we would need to include both 347 and 600V if we are going to be inclusive; it is a Canadian standard. Brian made motion to add both voltages to Table 2 and Mike Hardin seconded. Motion passed unanimously.

6. Impedance and Losses – A question was asked about why the manufacturer is specifying the nominal impedance and if it would be clearer to strike the first two sentences of section

highlighted in yellow. The rest of the meeting consisted of the review of the changes highlighted in yellow in draft D2. The following sections were discussed:

a. 7.5.12 - Connector and terminal markings. There was a discussion about whether to include additional details for character height and font type. After this request was debated, it was decided to leave this section as written. Al Traut motioned to accept this section as written in draft D2, Said Hachichi seconded the motion, and the motion was approved unanimously.

b. 7.3.5 - Protective covers. Said Hachichi motioned to accept this section as written, Cory Morgan seconded the motion, and the motion was approved unanimously.

c. 7.3.4 - Overcurrent protection. George Payerle made a motion to accept the section as written in draft D2 and Brian Klaponski seconded the motion. During the discussion phase, Dan Mulkey stated that the mechanical interlock between the bayonet fuses and the load-break switch should not be listed as a requirement in sub-section d). It was suggested to change sub-section d) to allow the user to have an option not to have the bayonet fuses be interlocked with the load-break switch. The motion was amended by George Payerle to modify sub-section d) as described below. Brian Klaponski seconded the amended motion and the motion was approved unanimously.

   d) Unless otherwise specified, the bayonet fuses shall be interlocked mechanically with the load-break switch described in Section 7.3.3 to allow access to the bayonets only when the switch is in the open position

d. 7.5.1 - Material requirements. This section was extensively debated. The section as presented did not clearly establish the minimum material requirement for the tank and accessories. As written, it was left to the manufacturer to interpret the minimum requirement of the tank material based in which environment transformer would be installed. After this section was debated, it was agreed to list copper-bearing steel (with a minimum copper content of 0.20%) as the minimum material requirement. It was also agreed to add the recommendation of using cathodic protection if copper-bearing steel is used and the option of using 304L and 316L stainless steel based on the environment in which the transformer would be installed. Adam Bromley motioned to approve Section 7.51 and sub-sections 7.5.1.1 and 7.5.1.2 as modified below, Cory Morgan seconded the motion and the motion was approved unanimously.

e. 7.5.1 Material requirements

   The transformer tank, including walls, cover, parking stands, bottom and auxiliary coolers shall be constructed of copper-bearing steel material with a minimum copper content of 0.20%.

   7.5.1.1 For transformers located in a wet vault or manhole it is recommended the user installs cathodic protection or specifies 304L stainless steel.

   7.5.1.2 For transformers located in a vault or manhole, where cycling between wet and dry conditions occurs or highly corrosive mineral content is present, it is recommended the user installs cathodic protection or specifies 316L stainless steel.

f. The chairman stated that the remaining changes in the draft will be reviewed prior to the next WG meeting. The meeting was adjourned at 10:45 AM with the next meeting scheduled for April 2015 in San Antonio, TX.

g. In the subcommittee meeting, Giuseppe suggested that he send our rev D3 of the document and that the members collaborate by email before the next meeting so we can get the document to ballot. Requesting an extension was discussed but we were told that the time to do that is after we go to ballot.

M.2.3 C57.12.40 Working Group Report – Secondary Network Transformers

Brian Klaponski, Chairman
Revision due date: **12/31/2021**
PAR Approval Date: **8/30/2012**
PAR Expiration Date: **12/31/2016**

M.2.3.1 The WG met on Tuesday, October 21, 2014 at 11:00 am with 15 members and 13 guests. Two (2) guests requested membership.

M.2.3.2 An agenda was presented and approved; and introductions were made.

M.2.3.3 The minutes of the March 25, 2014, meeting in Savannah, GA were reviewed. Cory Morgan made a motion to approve the Meeting Minutes, Alejandro Macias seconded the motion and the minutes were approved unanimously.

M.2.3.4 The Chair briefly reviewed the previous changes in Draft 1 made at the last meeting in Savannah and why he was taking an approach in Draft 2 of just having one Figure 1.

M.2.3.5 The remaining of the meeting consisted of the review of the proposed changes in Draft 2.

M.2.3.6 Section 7.1 - Bushings and bushing wells, was discussed and modified as shown below:

"Entrance shall be by means of bushings or bushing wells (meeting the requirements of IEEE Std 386) for connection to the distribution system through adapters, separable insulated connectors, or both. The user should evaluate and select the primary incoming bushings. Noting that the incoming bushing experiences the same fault currents as the primary switch, selection may be evaluated based the effectiveness of the bushing components to withstand the rated short circuit currents and associated times of withstand defined in this standard (6.2.2.1 and 6.2.2.2). The available fault capacity of the individual system along with effective time of the system protection scheme to clear the fault may allow for withstand levels of individual components to be less than the requirements of the specified network switch requirements. Particular attention should be paid to the bushing current carrying elements to ensure they can withstand the current/time values without melting or losing mechanical strength due to reaching annealing temperatures. See Annex A

Unless otherwise specified by the user, the bushings or bushing wells shall be located on the top of the primary switch chamber except when using 35kV 600 amp bushings (see Figure 1), in which case they will be located on the front of the primary switch chamber. The inside (under oil) part of the bushings or bushing wells shall not be used to support switch contacts in any way. Only flexible leads may be connected to these bushings."

M.2.3.7 Larry Dix volunteered to work with Tas Taousakis to draft an Annex to aid users on the selection of 200 versus 600 amp bushings. Tas will also provide a table to be inserted in Section 7.1 for the electrical ratings of the 200 and 600 amp bushings.

M.2.3.8 Discussion: Our PAR expires at the end of 2016. IEEE standards is adding complexity to the process by doing things like requiring figures in the document to be numbered consecutively instead of using e.g. 1a, 1b, 1c. This seems like a pointless change and will be confusing to those already accustomed to referring to particular figure by a designation that has been the same for years.

In the IEC, comments are brought up between meetings and only those comments are eligible for discussion at the next meeting. This speeds the discussions up quite a bit. Bill Wimmer asked if we couldn't do that. We should discuss with the main transformers committee.

M.2.4 C57.12.44 Working Group Report – Secondary Network Protectors

Bill Wimmer, Chairman, Mark Faulkner, Secretary
Revision due date: **3/27/2024**
PAR Approval Date: none
PAR Expiration Date: none

Chairman's Comments:

Bill Wimmer stated that their document has been balloted and published. As the document was going to print a couple of minor corrections came to light. There was discussion and it was decided to put off the changes till the next revision.

Bill got an email from someone who had an interest in his working group. Alan Traut said he just logs them in as a guest in the AM system so that individual starts getting information.

M.3 Old Business:

We requested some changes in the AM system. There was a problem with attachment size. That was changed. There are other issues. The 123 email system changed and now some emails are being rejected, e.g. IFD and Weidmann people were rejected when Brian emailed them. In some cases emails were delivered even though there was a bounce back. Greg has been working on it.

M.4 New Business:

Tas mentioned that they are changing their specification, removing the OID switch and changing the single phase sub design. Should this be brought to this group and included in a standard?

Dan Mulkey and Giuseppe do two different styles, loop and radial. How many different designs do we want to be part of the standard?

Brian stated that Con Ed has the switch in the unit. PG&E has the switch and the unit separated. Maybe these other options should be in the next version of the spec. We could also put together a task force to discuss the options and whether they should be included in the standard though that would make the next revision more complicated and difficult to write and approve. What should the standard include? All possible variations, or just common variations?

With no motion, the subject was tabled.

M.5 Adjournment –

The meeting was adjourned at 12:15 PM with the next meeting set for San Antonio, TX in April 2015.