

Minutes
Task Force: Lubricant Life
Hilton Bonnet Creek, Orlando, FL
10 :15 AM – 12 :00 PM (EDT), April 12, 2022

1. Administrative

Jack Harley

Meeting called to order at 10:15 AM (EDT).

- A. IEEE Patent Policy and Call for Patents
 - Discussion of Patent Policy and call for patents made.
 - No known issues identified.
- B. IEEE SA Copyright Policy
 - Discussion of Copyright Policy made.
 - No known issues identified.
- C. Review of the Agenda
 - Meeting agenda was approved by consent.
- D. Introductions of the attendees
 Participants self-introductions with affiliations made.
 - 12 of 23 members present
 - 24 guests present
 - Attendance record at end of report
 - Quorum met
- E. Membership: this is the first meeting of this Task Force. Membership will be granted to all attendees who would like to become a member.
 - This was not first meeting of Task Force. First meeting of Task Force was in Fall 2019 – San Diego.
- F. Approval of the Agenda
 - Meeting agenda was approved by consent.

2. Business

A. Purpose of the Task Force

Doug Edwards

- Reviewed minutes from AdsCom 2019-05-02 meeting and LVSD SC 2019-05-01 meeting (screenshots below).

Excerpt from [2019-05-02 AdsCom meeting minutes](#)

10	Low Voltage Switchgear Devices (LVSD)	Dave Dunne
<p><i>See: LVSD S/C minutes</i> <i>(IEEE PES Switchgear minutes – Spring 2019)</i></p> <p><i>Approved TF for Evaluation of Aging of Lubrication.</i></p> <p><i>Keep under LVSD or move to AdsCom TF?</i></p> <ul style="list-style-type: none"> • <i>Motion by J Webb: Motion to elevate TF for Evaluation of Aging of Lubricates to AdsCom oversight. 2nd of Motion: Ken Edwards</i> <ul style="list-style-type: none"> ○ <i>Will evaluation processes include in environments other than just air, e.g. in SF6?</i> ○ <i>Answer – will consider.</i> • <i>Motion carried unanimously.</i> • <i>Doug Edwards to chair.</i> 		

Excerpt from [LVSD Subcommittee 2019-05-01 meeting minutes](#)

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6. Working Group/Task Force Status Reports

- a. C37.13 : IEEE Standard for Low-Voltage (1058 and Below) AC Power Circuit Breakers Used in Enclosures
 - i. Keith Flowers Task Force Chair
 - ii. 12 members 22 guests, Quorum met
 - iii. Topics: Aging for lubricants (Mechanical and time related)
 - iv. Form a task force for Investigating a Standard Method for evaluating lubricants used in circuit breakers. Unanimous decision to proceed. Doug Edwards agreed to be the task force chair.
 - v. Change title to include voltage rating “(1058 and Below)”

B. Discussion topics

Jack Harley

- Scope for PAR
 - Many thoughts about:
 - Tests to quantify statements of lubricant life.
 - Functional life of the lubricant seemed accepted as being tied to operation within the timing specifications of the specific circuit breaker in which it is installed.
 - Field tests for remaining life. A field solution might include use of data from newer relays to identify increasing trip time trends. This method does not address manufacturers’ marketing claims about aging.
 - Desire, by some, to include all the lubricants used in the breaker, not just in the mechanism. This may be addressed by the T&I group Aging of Switchgear.
- Purpose for PAR
 - No specific actions.
- Will results of the WG be a Guide or a Standard?
 - Discussed which type of document would likely be appropriate. Standard vs. Recommended Practice vs. Guide vs. White Paper.
 - Consensus was Guide.
- Title of the document
 - On-going
- Circuit breakers of concern: types, applications, number operations
 - Discussion was that specific requirements may vary.
- Uses of lubricants: sealed anti-friction bearings, roller bearings, linkages, chains, sprockets, gears, hydraulic systems, other
 - Desire, by some, to include all the lubricants used in the breaker, not just in the mechanism. This may be addressed by the T&I Task Force for Aging of Switchgear.

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- Define functional life of a lubricant in a circuit breaker mechanism
 - Strawman definition: Maximum age or other condition that allows operation within the timing specifications of the specific circuit breaker in which it is installed
 - Dependent on mechanism design factors and viscosity and lubricity of the lubricant

See Item 2 B. Functional life of the lubricant seemed accepted as being tied to operation within the timing specifications of the specific circuit breaker in which it is installed.

- What interval between lubrication maintenance cycles is desired?
 - Current market demands are pushing for 20+ years,
- Properties of lubricant
 - What properties are important?
 - Type of base oil: mineral oil, polyalphaolefin, ester, polyalkylene glycol, silicone, fluorosilicone, perfluoropolyether
 - Type of thickener:
 - Soaps (simple or complex or mixed) – calcium, lithium, sodium
 - Non-soap – clay, polyurea, PTFE
 - How to test?

General discussion of various lubricants provided.

How to test? See Item 2 B. Functional life of the lubricant seemed accepted as being tied to operation within the timing specifications of the specific circuit breaker in which it is installed.
- Causes of lubricant functional failure:
 - Differences by base oil: hydrocarbons; fluorosilicones
 - Viscosity limit: low temperature
 - Aging or gelling: high temperature
 - Bleed or compatibility: gelling
 - Environmental factors that accelerate failure: moisture, salt air, dirt particles, chemicals
 - Some maintenance work practices, sprays, and application methods

General discussion of physical and chemical evaluations.
- Evaluation methods that can be used in maintenance practices to maintain or extend the functional life of circuit breakers
 - Analysis of lubricants aged in field vs. laboratory aged
 - Other tests – application simulator
 - Lubrication practices
 - Purpose of ASTM tests

General discussion of evaluation methods.

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- Circuit breaker design factors that may influence performance
 - Mechanism trip forces
 - Air filtration
 - High temperature – too much heat in mechanism cabinet
 - Low temperature – insufficient heaters or insulate cabinetGeneral discussion of design factors.
- PAR
 - No specific draft of PAR developed.
 - Next steps: Target two (2) virtual meetings before the fall face-to-face Switchgear conference.

3. Adjourn

Meeting adjourned at 12:00 PM (EDT).

Jack Harley

Reported by,
Doug Edwards
Secretary, Task Force – Lubricant Aging
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Attendance

Role	LastName, FirstName	Company	4/12/2022
Chair	Harley, John	FirstPower Group LLC	X
Secretary	Edwards, Doug	Siemens Industry, Inc.	X
Member	Burse, Ted	Powell Industries, Inc	X
Member	Carne, Clint	Schneider Electric	
Member	Eftink, Emily	Burns & McDonnell	
Member	Flowers, Keith	Siemens Industry, Inc.	
Member	Grahor, Lou	Eaton Corporation	X
Member	Hartzel, Ronald	Eaton Corporation	
Member	Jarnigan, Christopher	Southern Company Services	X
Member	Lanning, Scott	S&C Electric	
Member	Leccia, Brad	Eaton	X
Member	Livshitz, Albert	CE Power Engineered Services	X
Member	Marzec, Peter	S&C Electric Co.	X
Member	Moser, Darryl	ABB	
Member	Orosz, Miklos	Myers Controlled Power	X
Member	Reid, Laura	Hubbell Power Systems	
Member	Ricciuti, Anthony	Eaton Corporation	X
Member	Riffe, Dave	Westinghouse Electric Company	
Member	Rohr, Richard	Powell Electrical Systems	
Member	Ward, Jeffrey	Doble Engineering Company	
Member	Webb, John	ABB	X
Member	Weishuhn, William	ABB	X
Guest	Ambrose, Chris	Federal Pacific	X
Guest	Barfield III, Walter	Electric Power Research Institute	
Guest	Blake, Randy	Hubbell	X
Guest	Bray, Elizabeth	Southern Company	X
Guest	Brunke, John	Power Engineers	X
Guest	Christian, Michael	ABB	X
Guest	Di Lillo, Patrick	Consolidated Edison Co. of NY, Inc.	X
Guest	Dunne, David	Schneider Electric	
Guest	Dwyer, Bernie	PECO	
Guest	Esco, Tanner	Eaton Corporation	X
Guest	French, Christopher	Eaton Corporation	
Guest	Hall, John	Tennessee Valley Authority	
Guest	Hawkins, Tom	Siemens Industry, Inc.	X
Guest	Hetzer, Matthew	PEPCO	
Guest	Hohnstadt, Benjamin	DTE	
Guest	Hutchins, Roy	Southern Company Services	X
Guest	Irwin, Todd	GE Grid Solutions	
Guest	Jala, Roopendra Hemanth	S&C Electric Company	

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Guest	Keels, Thomas	kEElectric Engineering	
Guest	May, Steven	Southern Company	
Guest	Meyer, Peter	S&C Electric Company	
Guest	Monroe, Andrew	Southern Company	X
Guest	Nenning, Andrew	Omicron Electronics	X
Guest	Owens, John	3M	
Guest	Owens, Mary	Eaton	X
Guest	Parks, Owen	ABB	X
Guest	Pellerito, Thomas	DTE Energy	
Guest	Peterson, Alan	Utility Service Corporation	
Guest	Peterson, Andrew	ABB	
Guest	Rakus, Paul	Eaton	
Guest	Reigart, Carl	CDR Technical Services, LLC	
Guest	Salinas, Alex	Doble/Vanguard	X
Guest	Shiller, Paul	FirstPower Group LLC	X
Guest	Sippel, Kevin	Eaton Electric	
Guest	Stemmerich, Joe	Trayer Engineering Corp.	X
Guest	Sullivan, Paul	Dupont	X
Guest	Thomas, Christo	Schneider Electric	X
Guest	Weeks, Casey	Siemens Energy	X
Guest	Weisker, Jan	Siemens Energy	X
Guest	Wen, Jerry	BC Hydro	
Guest	Worthington, Charles	Hubbell Power Systems	X
Guest	York, Richard	Mitsubishi	X
Guest	Zehnder, Lukas	Hitachi	X
Guest	Zhang, Wei	Hitachi	
Guest	Zia, Danish	UL LLC	X