

**Minutes**  
**Task Force: Lubricant Life**  
**Hilton Bonnet Creek, Orlando, FL**  
**10 :15 AM – 12 :00 PM (EDT), April 12, 2021**

**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: <a href="#">LVSD S/C minutes</a></i>  <i><a href="#">(IEEE PES Switchgear minutes – Spring 2019)</a></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"> <li>• <i>Motion by J Webb: Motion to elevate TF for Evaluation of Aging of Lubricates to AdsCom oversight. 2<sup>nd</sup> of Motion: Ken Edwards</i> <ul style="list-style-type: none"> <li>○ <i>Will evaluation processes include in environments other than just air, e.g. in SF6?</i></li> <li>○ <i>Answer – will consider.</i></li> </ul> </li> <li>• <i>Motion carried unanimously.</i></li> <li>• <i>Doug Edwards to chair.</i></li> </ul>		

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  
T: +1 (919) 270-1148  
E: [doug.edwards@ieee.org](mailto:doug.edwards@ieee.org)

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**Attendance**

<b>Role</b>	<b>LastName, FirstName</b>	<b>Company</b>	<b>4/12/2022</b>
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