


PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP (1)

WG* N° D1.70	Name of Convenor : Ivanka Atanasova-Höhlein (Germany) E-mail address: ivanka.hoehlein-atanasova@siemens.com	
Technical Issues # (2): 8		Strategic Directions # (3): 1
The WG applies to distribution networks (4): Yes		
Title of the Group: Functional properties of modern insulating liquids for transformers and similar electrical equipment		
Scope, deliverables and proposed time schedule:		
Background :		
<p>The diversity of transformer insulating liquids (mineral oils with varying refining, natural and synthetic esters, gas-to-liquid, as well as re-refined or reclaimed insulating liquids) for AC and DC, EHV or UHV on the market requires a better recognition of functional properties such as thermal, dielectric and chemical performance, relating both to design and service. Testing standards are not always suited for revealing the functional parameters e.g. between unused and reclaimed mineral oils, as well as between ester fluids. Furthermore, existing international standards describe only the minimum requirement to be fulfilled.</p>		
Scope:		
<ol style="list-style-type: none"> 1. Give an overview of functional requirements for liquids to be considered for design and operation, and to what degree there are standards that support verification of these properties. These are valid both for transmission and distribution. 2. Review the need for revising or establishing standards concerning traceability of origin and thermal stability of liquids: <ol style="list-style-type: none"> a. Methods for the determination of inhibitor content with a high repeatability and reproducibility valid for mineral oils and ester liquids. b. Procedures for oxidation stability for inhibited insulating oil, resp. for esters, based on the inhibitor consumption. c. Methods for determination and distribution of individual PAH compounds in unused and reclaimed mineral oils complimentary to IP 346 d. Elaborating of procedures for predicting the gassing behavior of new insulating liquids based on the use of transformer materials. 3. Review the need for standards concerning dielectric performance of liquids <ol style="list-style-type: none"> a. Explore possibilities for revising standards and lightning impulse testing of liquids b. Investigate relevance of PD testing as a functional requirement for transformer liquids. 4. Review the test methods for establishing thermal performance parameters of liquids – viscosity, density, thermal conductivity, temperature diffusivity, thermal expansion, specific heat capacity. 5. Give recommendation for further work on test methods and standards for transformer insulating liquids 		
Deliverables : Report to be published in Electra or technical brochure with summary in Electra and Tutorial		
Time Schedule : start : January 2017		Final report : 2021
Approval by Technical Committee Chairman :  Date : 30/11/2016		



- (1) Joint Working Group (JWG) -
- (2) See attached table 1 –
- (3) See attached table 2
- (4) Delete as appropriate

Table 1: Technical Issues of the TC project “Network of the Future” (cf. Electra 256 June 2011)

1	Active Distribution Networks resulting in bidirectional flows within distribution level and to the upstream network.
2	The application of advanced metering and resulting massive need for exchange of information.
3	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
4	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
10	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

Table 2: Strategic directions of the TC (cf. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Preparation of material readable for non technical audience