CIGRE Study Committee D1

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

WG* N° D1.69	**Name of Convenor :** Richard TAYLOR **E-mail address**: rr.taylor@qut.edu.au

Technical Issues # (2): 9	**Strategic Directions # (3): 1**

The WG applies to distribution networks (4): Yes

Title of the Group: Guidelines for test techniques of High Temperature Superconducting (HTS) systems

Scope, deliverables and proposed time schedule of the Group :

Background :
High temperature superconducting (HTS) power applications (cables, fault current limiters, transformers, rotating machines and magnetic energy storage) and the important supporting technology such as cryogenics, superconducting and insulating materials have been deployed in a variety of networks, worldwide, over the last decade. Earlier, Emerging Test Techniques Common to High Temperature Superconducting (HTS) Power Applications has been studied by D1 (TB 644) and B1 (TB 538). Presently, WG D1.64 is dealing with electrical insulation systems at cryogenic temperatures. Manufacturers, designers and users of HTS systems have gained a lot of experience with formulating and installing a number of HTS power application systems around the world. However, there are no standardised procedures currently available for completely specifying and testing HTS components that make up an HTS power system installation. There are a number of recommendations derived from different application cases, but these vary significantly. There is a strong need for standardising these procedures to ensure this emerging technology is adapted in a safe, reliable and sustainable fashion by all participants in the power industry.
The topic is of high interest for standardisation. IEC TC 90 “Superconductivity” has expressed explicit interest that the subject will be studied by CIGRE.
(Relevant letter from Jun Fujikami was received, chairman of IEC TC 90)

Scope :
To study the existing HTS power installations and compile the relevant data that will assist the power industry to test HTS technology used in the transmission and distribution grid.

Special attention will be paid to:

- The present and future need for HTS power installations.
- Update on the status of field test experience of HTS power installations and comparison with existing guidelines.
- Aging of electrical insulation, superconductors and cooling systems.
- Failure mode analysis

The WG will summarise the best practices in the above mentioned topics and provide guidelines for test techniques of High Temperature Superconducting (HTS) systems.

Deliverables : Technical brochure, summary report in Electra and Tutorial Presentation.

Time Schedule : start : 1st Quarter 2017 **Final report** : 2020

Comments from Chairmen of SCs concerned :

Approval by Technical Committee Chairman :
Date : 09/02/2017

(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