CIGRE Study Committee B1

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

WG N° B1.38	**Name of Convenor :** Mark FENGER (Canada) **E-mail address**: Mark.FENGER@kinectrics.com
Technical Issues # (2):9	**Strategic Directions # (3):1**
The WG applies to distribution networks (4): Yes	
Title of the Group: After laying tests on AC and DC cable systems with new technologies	

Scope, deliverables and proposed time schedule of the Group :

Background : Extruded (XLPE) insulation is rapidly becoming the insulation of choice in both new and replacement transmission class cable circuits. While the cable and accessories are tested in the factory, the workmanship to install the accessories can only be tested after the installation has been completed and before the cable system is put into service. As DC testing, commonly used for FF cables, is not efficient for XLPE cables for AC transmission systems, attention has to be focussed on AC testing methods. The testing of DC cable systems will also be addressed to define which technology is the most appropriate. In the past, test equipment capable of testing long lengths of cables were not available so that a soak test at operating voltage for 24 hours was carried out by connecting the cable to the power system. In the last ten years different power sources have been developed that have the power rating to test long cable lengths. These include AC resonant power supplies, damped AC (DAC) and, more recently, very low frequency (VLF). In addition, there have been significant improvements in diagnostic tools such as off-line PD and dissipation factor measurement to assess the condition of a cable system. However, as there are presently only withstand test levels given in IEC 60840 and 62067 for AC resonant test voltages, there is a need to establish test voltage levels for other voltage sources and also establish suitable diagnostic tests.

Scope :

The WG will examine the present status, including limitations, of available voltage sources capable of testing HV and EHV, AC and DC, land and submarine transmission cable systems. The WG will also investigate the practical implications, risks and test burden related to the different test methods. The WG will examine the technical considerations involved to establish test parameters for AC and DC cable systems such as voltage levels, test durations (number of shots for damped AC) and frequency ranges for the different voltage sources and recommend what work needs to be done to establish these parameters if the technical background is not available. If the technical data are available, test parameters will be discussed and recommended for use. The merits of different diagnostic tests will also be addressed. The final report will be passed to IEC for further consideration regarding standardization.
Great care will be taken to the work of D1.48 "Properties of insulating materials under VLF voltages"

Deliverables : The WG will prepare a TB that will include:

(a) Results of a survey of present test practices in different countries for both AC and DC, land and submarine transmission cable systems
(b) Results of a survey of test equipment presently available or under development
(c) A review of technical considerations to establish acceptance test conditions for both AC and DC transmission systems
(d) Recommended test conditions based on technical considerations

The WG will also prepare a paper for Jicable 2015 and a Tutorial

Time Schedule : start : July 2012 **Final report** : 2015

Comments from Chairmen of SCs concerned : SC D1:experts from SC D1 will participate

Approval by Technical Committee Chairman : Klaus Fröhlich
Date :20/08/2012

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