CIGRE Study Committee N° D1

PROPOSAL FOR CREATION OF A NEW WORKING GROUP

WG* N° D1.38	**Name of Convenor :** Hitoshi Okubo (JP)

Title of the Group : Emerging Test Techniques Common to High Temperature Superconducting (HTS) Power Applications

Scope, deliverables and proposed time schedule of the Group :

Background :

High temperature superconducting (HTS) power applications are highly expected to be the future systems in which the HTS power equipment will play a main role of power delivery with highest efficiency and reliability. The current development of HTS power equipment is coming to the level of actually applicable status with prototype etc., and the 2nd generation of HTS materials fulfils major specifications of target power applications. In addition, there have been a lot of on-site field testing experiences of HTS power equipment. Such situations promote the discussions about the actually applicable HTS power equipment, focusing on the design concept, operational conditions and testing procedures and techniques.

Scope :

To study the emerging test procedures and test techniques common to HTS power applications, including the electrical insulation techniques, HTS materials development and thermal/cooling techniques for HTS power equipment.

The investigation items of the proposed WG are as follows.

1. Electrical insulation for HTS power equipment
   - Fundamental insulation characteristics under cryogenic conditions, including size effects
   - Insulation degradation mechanisms, V-t characteristics and insulation reliability assessment
   - Systematization of electrical insulation properties for insulation design
   - Database for cryogenic electrical insulation

2. Investigation of HTS materials for power equipment
   - Fundamental characteristics of 2nd generation materials
   - Material properties required from equipment design
   - Material properties required from operational conditions of power equipment

3. Thermal/cooling techniques for HTS power equipment
   - Common cooling structures and the enhancement of cooling efficiency
   - Cooling related materials and thermal isolation techniques including vacuum
   - Common cooling techniques for HTS power equipment

4. Testing procedures and techniques concerning electrical insulation, materials and thermal/cooling behaviour of HTS power equipment in respect to methods and not to acceptance criteria

Deliverables : Report to be published in Electra and technical brochure with summary in Electra

Time Schedule : start : 2010 **Final report** : 2014

Comments from Chairmen of SCs concerned : A2, A3, B1, B3, C4

Approval by Technical Committee Chairman : Klaus Fröhlich **Date** :27/05/2010