



## CIGRE Study Committee B3 - Substations

<b>WG Number : B3.29</b>	
<b>Title: Field tests technology on UHV substation during construction and operation</b>	
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### Terms of Reference

#### Background:

Different countries in the world are planning and constructing UHV AC systems with operating voltages of 1100 kV and above. When constructing and operating a new substation, particularly at a new voltage level, field test is one of the most important issues. It is necessary that field hand-over test, commissioning test, preventive test should be conducted during the construction and operation of UHV substation. Relevant information will be collected to support the operation and maintenance of UHV substation.

The 800kV/765kV substation has also been constructed in lots of country (such as Brazil, Canada, China, India, Korea, Russia, South Africa, the United States and Venezuela). In January 2009, 1100kV transmission project was constructed in China, and the 1100kV substations have been operated almost for a year. In addition, 1100kV double circuit transmission project has been under planning and design.

The successful construction of UHV AC 1000kV transmission project of State Grid Corporation of China (SGCC) marked a major breakthrough of key UHV AC technologies and equipment manufacturing, which is greatly significant in ensuring the reliability of Chinese electric power supply, and Chinese researches and applications of UHV AC transmission technology and UHV experience could contribute to the world.

#### Scope:

- Hand-over test of primary and secondary equipments, such as Transformer, Shunt reactor, GIS/HGIS/AIS, CT, CVT, MOSA, Post Insulator, secondary devices as a substation (system coordination view:
  - The technical requirement of on-site hand-over test
  - Standards for on-site hand-over test
  - System coordination of on site tests of UHV equipment
  
- Content of commissioning test on UHV substation :
  - Items of commissioning test
  - Power flow and stability analysis of commissioning test
  - Electromagnetic transient analysis of commissioning test
  - Electromagnetic environment test of UHV substation
  - Transient voltage and transient current test of commissioning test
  - Characteristic parameter test of operated equipments
  - Introduction of commissioning test of the 1100kV transmission demonstration project of China
  - Introduction of commissioning tests of the 800kV/765kV transmission projects (Brazil,

Canada, China, India, Korea, Russia, South Africa, The United States, Venezuela)

- Preventive test of electrical equipments on UHV substation:
  - Preventive test method, item, cycle and criterion of UHV AC equipments maintenance.
- Operation and maintenance for electrical equipments:
  - Regulation, test method, item and cycle of UHV AC equipments maintenance.
  - Basic technical demand, safety technologies and measures for operation and maintenance worker
  - Spares and appropriate tool
- On-site special verification test :
  - VFTO verification test (Main circuit, Secondary circuit, and etc)
  - Switching surge verification test
  - Transformer Special verification test

**Deliverables and time schedule:** CIGRE Guide "FIELD TESTS ON UHV AC SUBSTATION CONSTRUCTION AND OPERATION" will be produced, summarizing the findings and giving guidance with regard to the hand-over test, commissioning test, preventive test, special verification test and operation & maintenance on UHV class Substation, and the summary of which may be published in Technical Brochure, Electra article.

Will start from 2010 and be disbanded by December 2012.

**SCs and Target Groups concerned:**

A2, A3, B2, B3, C4

Cooperation with IEEE SCK0 - Gas Insulated Substations Subcommittee

<Target Groups>

- UHV and 800kV Substation designers, planners and operators
- UHVAC apparatus manufacturers
- International standards organizations like IEC and national standards organizations
- Universities and test laboratories
- Consultants

**Approval by the TC Chairman: Klaus Fröhlich**

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