



## Study Committee B3

### 2010 ACTIVITY REPORT FOR STUDY COMMITTEE B3 (SUBSTATIONS)

#### Highlights

The SC B3 Paris session gathered more than 350 persons. The session was based on 25 papers answering to the three following preferential subjects:

- New techniques/New design of substations,
- Existing substations, new challenges,
- New secondary system challenges in substations.

The special report proposed 19 questions on them. Finally 59 prepared and 21 spontaneous contributions were accepted for the session.

SC B3 organised also a poster session which was a success despite the time between the panel session (Tuesday) and the technical session (Friday) that was a difficulty for persons interested in SC B3 activity but who cannot afford the whole CIGRE event.

During the session a questionnaire was distributed regarding subjects of interest for people attending the SC B3 session.

Nearly 100 answers have been gathered. The information in the questionnaires is an important way to identify new activities in the SC.

#### New working Bodies

TORs for following new working bodies have been approved by Technical Committee

- WG B3.29 : Field tests technology on UHV substations during construction and operation (May 2010),
- WG B3.30 : Guide to minimize the use of SF6 during routine testing of electrical equipment (August 2010).

These Working Groups have started their activities.

The TOR of the Joint Working Group B1/B3.33 has been approved : Common dry type interfaces for GIS connections above 52 kV

#### Status of SC reference model implementation

SC B3 comprises three Advisory Groups: a Strategic Advisory Group, a Customer Advisory Group and a Tutorial Advisory Group to support the Chairman, make recommendations and motivate decisions.

The organisation scheme is based on four clusters of WGs :

- Substation Concepts and Developments,
- Gas Insulated Substations,
- Air Insulated Substations,
- Substation Management.

One member of the SAG per cluster assists the Chairman:



## Study Committee B3

- to exchange information and experience between WGs
- to watch on the coherency of activities of the working groups within their group of WGs,
- to propose future technical activities of the SC.

All the SC B3 working groups have Terms of Reference fulfilling the requirements of the study committee reference model.

### **Update of SC B3 2005-2014 Strategic Plan**

The 2005-2014 Strategic Plan has been finalized by Strategic Advisory Group and approved by Technical Committee. After intensive discussions the Strategic Plan could be shortened and the main Technical Directions could be reduced and the organisation simplified.

### **Main technical directions currently being pursued by the SC**

The main technical directions has been updated according to the new revised 2005-2014 Strategic Plan :

- T1. New substation concepts* : Development of new concepts including bus arrangements, hybrid solutions, new applications and functions including specification of corresponding design/layout criteria for substations constituting integral parts of totally optimised networks.
- T2. Substation management issues* : Organisational aspects including human resource and training needs, in-service support, software management including quality control and maintenance. Asset management including technical, financial and regulatory requirements.
- T3. Life cycle management and maintenance* : Monitoring in-service experience including digital and sophisticated measuring equipment, substation condition assessment, aspects of maintenance outsourcing, short-and long-term needs, opportunities for cost reduction, spare parts. Increased utilisation (life extension, upgrading, dynamic loading), refurbishment / renovation concepts, investment strategies, principles for combining existing and new equipment - taking into account specific demands from network-reliability and customer demand-side points of view.
- T4. Impact of new communication standards and Smart Grids on existing and new substations* : New technologies to be used in substations, impact of distributed generation and power flow control systems, increased use of advanced information and communication technologies under HV conditions.

## **SC B3 working groups and task forces – Progress of work**

### **Substation Concepts and Developments**

#### **WG B3.12 “Obtaining value from substation condition monitoring”**

The WG has published an initial ELECTRA article in April. He has prepared its final Technical Brochure and an accompanying second ELECTRA article that should be both issued in early 2011. The web-tool developed by the WG for its own purposes has proved to be an excellent tool.



## Study Committee B3

### **WG B3.13 “Reducing replacement time of HV equipment”**

The work of CIGRE B3.13 has been structured in a two-side analysis between current practices and trends to reduce replacement time for equipment:

- Engineering concepts
- Equipment concepts
- Working methods.

The group has prepared an Electra report which should be issued mid 2011.

### **JWG B3/C1/C2.14 “Circuit configuration optimisation”**

The group has tried without success since its beginning to get members from C2 and has now one recent member from C1.

However the work is in progress. Deliverables, an ELECTRA Article and a Technical Brochure, are scheduled early 2011:

The group aims to develop a guideline to support the process of circuit optimization taking into account:

- Security, Availability, Accessibility, Maintainability
- Different technologies AIS, GIS, MTS

### **WG B3.26 “Guidelines for the design and construction of AC offshore substations for wind farms”**

The work is in Progress. The WG has issued in December an Electra article entitled "The Challenges Facing AC Offshore Substations for Wind Farms". The final Technical Brochure is scheduled summer 2011.

## **Gas Insulated Substations**

### **WG B3.17 “Residual life concepts applied to HV GIS”**

The WG is finalizing the 19 th draft of its Technical Brochure “Residual Life Concepts Applied to HV GIS”. The document should be issued mid 2011, following an ELECTRA report.

### **WG B3.18 “SF<sub>6</sub> tightness guide”**

The SF<sub>6</sub> Tightness Guide has been published (CIGRE Brochure No. 430 - Oct 2010). The working Group has been disbanded.

### **WG B3.25 “SF<sub>6</sub> analysis for AIS/GIS and MTS condition assessment”**

The work is in good progress. The final documents, ELECTRA article and Technical Brochure are scheduled mid 2012.

### **WG B3.29 “Field test technology on UHV substation construction and operation”**

The work is in progress. The final documents, ELECTRA article and Technical Brochure are scheduled end of 2012.

### **WG B3.30 “Guide to minimize the use of SF<sub>6</sub> during routine testing of electrical equipment”**

This just born WG has scheduled its final documents, ELECTRA article and Technical Brochure in 2013.

## **Air Insulated Substations**



## Study Committee B3

### **WG B3.21 “Turnkey substations”**

The WG has finalized its work by issuing a Technical Brochure (N° 439) and an ELECTRA article in December.

The WG has been disbanded.

### **WG B3.23 “Guidelines for uprating and upgrading of substations”**

The work is in good progress. The final publications (Electra and Technical Brochure) are expected mid 2012.

Documents for CIGRE SCB3 tutorials 2011 Chicago cooperation with IEEE have been prepared

### **Substation Management**

#### **WG B3.06 “Substation management”**

TF04 : (Replacement Philosophy for Substation Equipment) has revised the draft brochure. The main text has been almost finalized, while the number of annexes increased to 11 examples from utilities' practices. A Technical Brochure is scheduled to close this TF in 2011.

TF05 : (Practical Application of asset management information strategies) finalized their analysis of the questionnaire about data and asset management tools (intelligence gap). The results will be integrated in the former TF03 concept-brochure 'General principles for asset management information strategy'. The technical Brochure is scheduled in 2011.

TF01 : The earlier disbanded TF01 produced an unfinished paper on maintenance organisation and outsourcing. The work dates back to 2005 and is being updated. A Technical Brochure should be issued under the title “Aspects for outsourcing of utility services”. In 2011.

#### **WG B3.10 “Primary/Secondary system interface modelling for total asset performance”**

The working group focusses on interfaces with primary equipments and considers the proper balance between factory and field testing.

The working group takes into account in his activity the process bus as defined in IEC 61850.

The Technical Brochure is quite finalized and will be ready for publication beginning of 2011. It will give an overview of possible process bus architectures, summarize all possible primary/secondary interface signals and which of them are mapped on the IEC 61850 standard.

The Working Group will then be disbanded.

### **SC website**

To exchange or provide information the CIGRE webpage is one of the main tools. Many documents are put on the SC webpage to enable the members to have access to all relevant information. This web page has been continuously updated. Many Working Groups use protected web page areas too for the exchange of information and as data bank for their work. However further improvements are necessary to use this webpage as an active working tool.

### **Study Committee Meetings**

The 47<sup>th</sup> meeting of the Study Committee was held on August 25<sup>th</sup>, 2010 in Paris.



## Study Committee B3

### **Regional Meetings and Symposia**

South East Asian Seminar HV substations in Melbourne (Australia) March 2010: This event was a great success.

### **Relations with other organisations**

The secretary of IEC SC17C "High Voltage Switchgear and Control Gear Assemblies", being a member of SC B3 Strategic Advisory Group, provides a strong relationship between those two counterpart groups of CIGRE and IEC.

There is a close link to IEEE in the field of substation standards since the American National Member of SC B3 and also one of the SC B3 SAG members have got key positions concerning IEEE standards.

There is no official liaison with CIREN today, but it is intended to strengthen the link with CIREN at each level of the SC. All SC members have been asked to establish liaisons with CIREN people into their own country.

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