**CIGRE Study Committee A3**

**PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP**

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| **WG* N° A3.35** | **Name of Convener : André Mercier (Canada)**<br>**E-mail address: mercier.andre@ireq.ca** |
| **Technical Issues # : 5** | **Strategic Directions # : 2** |
| **The WG applies to distribution networks : Yes** | |
| **Title of the Group: Guidelines and Best Practices for the Commissioning and Operation of Controlled Switching Projects** | |

**Scope, deliverables and proposed time schedule of the Group :**

**Background :**

Controlled switching (CS) has become an economical solution to reduce switching surges. This mitigation technique is commonly applied on circuit breakers connected to shunt capacitor bank, reactor bank, transmission line and power transformers. The number of installations has increased rapidly since the late 1990's due to satisfactory service performance. CIGRÉ WG13.07/A3.07 published in 2004 an application guide based on their international surveys of the field experience.

The vendors and suppliers provide guidelines for their Controlled Switching System (CSS). Whilst there are similarities in the processes and procedures for commissioning the CSS, there is a need for updated guidelines in support of the best commissioning practices by reflecting the recent field experience with CSS.

This WG will use the results of the CIGRÉ WG A3.07 (TB 262, 263 and 264) and those of other relevant bodies as a starting point. WG experts will provide their knowledge and experience with the commissioning of past and present CS projects to develop a detailed guide for CS project commissioning and follow-up.

**Objectives:**

This WG will first update the previous 2001 CIGRE survey on installation records of CSS in service, gather worldwide experience with CSS (reliability, switching transient reduction performance, equipment ugrading / uprating, etc.) and then provide a guide for the best commissioning practices. This guide will reflect the recent field experience with CSS, including pitfalls to avoid. The investigations will be conducted in close cooperation with other related SCs.

**Scope :**

The Working Group will seek to develop a Technical Brochure providing guidelines for the commissioning of CS projects using a circuit breaker equipped with a CSS as well as projects retrofitting a CSS to an existing circuit breaker (CB). As far as possible, the Technical Brochure will seek to be independent of any specific CS technology. The main activities will include:

1. Perform a literature survey;
2. Collect world wide experience and reliability related to CS for different applications;
3. For each controlled CS application type, identify pertinent installation configurations and equipment specifics to consider during commissioning;
4. For each case subgroup, develop the stages, sequence and structure for the

commissioning of a CS project, focusing on the on-site system and the minimum yet sufficient number of tests to perform;

5. Detail each stage of commissioning, including development of test objectives, procedure and acceptance criteria and preferred location in the commissioning process;
6. Develop guidelines and recommendations for:
    a. documentation of the commissioning plan and commissioning test results;
    b. clarification of the CSS parameter configuration process;
    c. method to optimize the CSS settings;
    d. linking the results of the off-site and the on-site commissioning tests;
    e. demonstrating compliance with specifications in situations where extreme conditions cannot be achieved in-situ;
    f. on-site management processes during commissioning;
    g. training opportunities for owner staff.
7. Follow-up of the CSS to optimize its configuration, to get equipment characteristics not obtained during the commissioning and to get better knowledge on overall system behavior;
8. Provide recommendations for the improvement of relevant standards.

Utilities and Asset Owners around the world are faced with important issues. One of the most important issues is the “graying”/retiring of workforce before a new generation of engineers has a chance to acquire all the required skills. Under these conditions, it is essential to gather and document expertise from inside and outside the organization on all aspects of the controlled switching technology. Thereby, an important chapter of this Technical Brochure will be an update on CS technology including:

a) CSS overview and strategies used for CB opening and/or closing applications, including other functionalities (monitoring, alarm detection algorithms, etc.);
b) CB considerations (arc-extinguishing medium (vacuum, SF6, air, etc.), operating voltage, operating mechanism, scatter, idle time influence, RDDS (including very low value), presence or absence of the grading capacitors, single pole or gang operated, etc.);
c) Complex installations and equipment salient requirements;
d) Available simulation tools and equipment models update;
e) How to extract information from the commissioning tests;
f) Use of the CS data to monitor some type of equipment degradation (how to do it);

**Deliverables :**

Technical brochure + ELECTRA summary report

**Time Schedule** : start : Nov 2013 **Final report** : 2016

**Comments from Chairmen of SCs concerned** : A2, B3, C4

**Approval by Technical Committee Chairman** :
**Date** : 14/10/2013

M. Wald

(1) See attached Table 1 – (2) See attached Table 2

## Table 1: Technical Issues of the TC project "Network of the Future" (cf. Electra 256 June 2011)

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| **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)

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| **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 |