CIGRE Study Committee B3

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP [1]

WG N° B3.41	**Name of Convener :** Paul Fletcher (UK) **E-mail address**: paul.fletcher@mottmac.com
Technical Issues # [2]: 10	**Strategic Directions # [3]:** 1, 2
The WG applies to distribution networks [4]: No	
Title of the Group: Mobile Substations Incorporating HV GIS – Design Aspects	

Scope, deliverables and proposed time schedule of the Group :

Background :

In recent years a number of Utilities have reported on the use of 'mobile' substations employing a high level of off-site construction (e.g. B3-102, 2012). A number of specific objectives have been described, such as the ability to quickly substitute a failed transformer in an emergency; however the underlying aim is the ability to provide new/extended/replacement substation facilities at short notice and with a reduced site construction period compared with traditional solutions. Feedback suggests that there is a growing interest in such 'build off site' solutions as transmission and distribution owners come under pressure to respond rapidly to changing User demands. The ability to respond to these demands is one element in delivering smarter grids for the 21st Century.

Mobile substations generally (although not exclusively) utilise GIS technology with many designs based on compact switchgear assemblies with the addition of integrated control/protection facilities. Thus, in addition to individual standards covering the design/testing of the functional components of the substation, the following existing standards are partly relevant to mobile substations:

- IEC62271 High-voltage switchgear and controlgear - Part 202: High voltage/low voltage prefabricated substation.
- IEC62271 High-voltage switchgear and controlgear - Part 205: Compact switchgear assemblies for rated voltages above 52 kV.

These standards, however, do not necessarily consider the specific requirements for design, construction and testing of mobile substations and recommendations are required on this issue. Further topics such as design for transport, dis-assembly, relocation and the ability to cater for differing connection arrangements are considered as well but some aspects will be dealt with in future Working Groups.

In some circumstances (depending on the application) it may not be appropriate for mobile substations to fully comply with conventional standards regarding, for example, foundations/structures and environmental conditions. This is currently not addressed by standards or CIGRE guidelines and recommendations would be beneficial.

The early adopters of this technology have now gained valuable experience regarding the implementation and use of mobile substations and it would be valuable to capture this experience and make it available to other potential purchasers.

Notes:

- This subject will be coordinated with the activities of WG B3-13 'Reducing Replacement time of HV Equipment.

- The scope will be limited to installations incorporating switchgear of rated voltage ≥52kV to avoid conflict with future IEC62271 Part 212.

Scope :

1. Scope to cover mobile/prefabricated/build off-site substations.
2. Drivers for deployment of mobile substations.
3. Benefits of using mobile substations.
4. Experience of implementation/operation of mobile substations.
5. Applicability of existing standards to mobile substations.
6. Guidelines for specification/design of mobile substations.
7. Case Studies.

Deliverables:

- Technical Brochure
- Summary of work for Electra
- Contributions to CIGRE events
- Tutorial

Time Schedule:

- TOR Approved: Q3 2014
- Initial Meeting of WG: Q4 2014
- Technical Brochure/Electra Article: Q4 2016
- Tutorial Available: Q1 2017

Comments from Chairmen of SCs concerned :

Approval by Technical Committee Chairman : M. Wald

Date : 11/08/2014

(1) or Joint Working Group (JWG) - (2) See attached table 1 – (3) See attached table 2
(4) Delete as appropriate

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