CIGRE Study Committee A2

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

WG N° A2.59	**Name of Convenor: Yukiyasu SHIRASAKA (Japan)** **E-mail address**: yukiyasu.shirasaka.xt@hitachi.com	
Strategic Directions #[2]: 1 and 2		**Technical Issues #[3]: 4, 9, and 10**
The WG applies to distribution networks[4]: ~~Yes~~ / No		
Potential Benefit of WG work #[6]: 1, 3, 4, and probably also 2 and 5		
Title of the Group: On-Site Assembly, On-Site Rebuild, and On-Site High Voltage Testing of Power Transformers		

Scope, deliverables and proposed time schedule of the Group

Background:

Most large power transformers are transported to site with the active part fully assembled inside the tank. Installation work at site is limited to assembly of external parts and filling with oil, or other dielectric fluid. The mass of the main tank including the active part may be very high in case of large power transformers – more than 200 tonnes. For some sites, it may not be possible to transport the main tank including the active part to site using the existing infrastructure. For such sites, a new technology has been developed to allow installation of large power transformers without the need to develop new infrastructure. The active part of the transformer is prefabricated in large sections for assembly at site. This greatly reduces the maximum transport mass, but introduces new challenges during the assembly process at site. It is applicable mainly to transformers rated at 150 MVA and larger and 145 kV class and higher.

A similar situation may arise for existing transformers at some sites. In the event of failure, it may not be possible or practical to return the transformer to works for repair. However it may be possible to disassemble the transformer, including the active part on site, and repair or replace damaged components. This involves many similar challenges to on-site assembly.

Following on-site assembly or on-site rebuild, and sometimes also in other circumstances, there is a need to prove that the transformer is in good condition, ready for service. For transformers which are not assembled or rebuilt on site, this is normally done by high voltage testing in a laboratory. For transformers which have been assembled or rebuilt at site, there is still a need to make high voltage tests, usually using mobile equipment. This introduces a number of new challenges.

The aim of the working group is to address the new challenges presented by on-site assembly, on-site rebuild, and on-site high voltage testing.

Scope:

1. Survey of international experience and best practice with on-site assembly, on-site rebuild, and on-site high voltage testing.

2. Applications and case studies for on-site assembly. Should also include alternatives, e.g. 2x3-phase transformers in parallel or 3x1-ph transformers to reduce mass and dimensions.
3. Design and construction issues, mainly for on-site assembly.
4. Dis-assembly and re-assembly issues, mainly for on-site assembly but also on-site rebuild
5. Scope of works test etc., mainly for site-assembly
6. Applications and case studies for on-site high voltage testing. Should also include limits of what is possible with currently available technology.
7. Any additional requirements for pre-commissioning and trial operation.

Deliverables:

☒ Technical Brochure and Executive summary in Electra

☒ Electra report

☒ Tutorial[5]

Time Schedule: start: January 2017 **Final Report**: December 2019

Approval by Technical Committee Chairman: M. Waldhr

Date: 06/02/2017

Notes: [1] or Joint Working Group (JWG), [2] See attached Table 2, [3]See attached Table 1, [4] Delete as appropriate, [5] Presentation of the work done by the WG, [6] See attached table 3

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
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 (ref. 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

Table 3: Potential benefit of work

1	Commercial, business or economic benefit for industry or the community can be identified as a direct result of this work
2	Existing or future high interest in the work from a wide range of stakeholders
3	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
4	State-of-the-art or innovative solutions or new technical direction
5	Guide or survey related to existing techniques. Or an update on past work or previous Technical Brochures
6	Work likely to have a safety or environmental benefit