CIGRE Study Committee B3

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

WG N° B3.54	**Name of Convenor:** Stephen Palmer (AU) **E-mail address**: spalmer@safearth.com
Strategic Directions #[2]: 2	**Technical Issues #[3]:** 9
The WG applies to distribution networks[4]: Yes	
Potential Benefit of WG work #[6]: 1, 3, 6	
Title of the Group: Earthing System Testing Methods - historic approaches, recent developments and recommended approaches	

Scope, deliverables and proposed time schedule of the Group:

Background:

Historically, the measurement of earthing systems has been difficult, expensive and in some cases inaccurate. New testing methods, new instruments and new analysis methods are being developed and are increasingly being adopted across the industry. However, earthing is becoming more complex due to shrinking substation footprints, closer proximity to third party infrastructure and increased interconnection through the wider use of cabled networks. This has made simple test methods ineffective and led to the broader adoption of more advanced methods.

Scope:

1. Survey the different approaches (methods and frequency) used around the world for the testing and monitoring of earthing systems across a range of HV Substations.
2. Examine legal requirements for asset owners or operators to demonstrate due diligence in meeting their duty of care through proving substation earthing systems fit for purpose, both initially at commissioning and over the life of the substation.
3. Compare and contrast the range of earthing system test methods available from both a theoretical and practicability stand point.
4. Provide a thorough description of the technical and practical requirements of the various testing methods available.
5. Identify the characteristics that provide reasonable boundaries between different earthing system types.
6. Establish a set of practical recommendations, guidelines and metrics for engineers to use which are technically and economically feasible.
7. Develop recommendations for the inclusion of testing methods descriptions and recommendations in existing Codes and Standards.

Deliverables:

☒ Technical Brochure and Executive summary in Electra

☒ Electra report

☒ Tutorial[5]

Time Schedule: start: September 2018 **Final Report**: September 2020

Approval by Technical Council Chairman:

Date: 21/08/2018

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