CIGRE Study Committee B3

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG N° B3.35	**Name of Convenor :** Dr Bill CARMAN (AU) **E-mail address**: bcarman@ausgrid.com.au
Technical Issues # (2): 9	**Strategic Directions # (3): 2**
The WG applies to distribution networks (4): Yes	
Title of the Group: Substation earthing system design optimisation through the application of quantified risk analysis	

Scope, deliverables and proposed time schedule of the Group :

Background:

Changes in earth fault levels and risk profiles arising as a result of; reconfigured transmission networks, greater interaction with 3rd party utilities, and conflicting safety criteria is challenging earthing designers to demonstrate due diligence in managing public and staff safety. The WG will examine means by which substation and the neighbouring environment earthing system design, may be optimised through the use of quantified risk analysis, to enable utility resources to be allocated in a manner that provides an acceptable level of safety to people commensurate with the probability of a hazard occurring.

Scope:

1. Survey and evaluate analytical approaches around the world that use quantified risk analysis to optimise earthing system design for HV substations. (AC and DC installations).
2. Examine any existing and proposed codified requirements for designers to demonstrate due diligence in meeting their duty of care through risk cost benefit analysis.
3. Compare and contrast the range of earthing design safety standards currently in use for power utility staff, the public, and other staff (e.g. pipeline, telecommunications, mining, and rail interference).
4. Identify approaches that follow IEC60479 to build upon the base physiological criteria to take into account other factors such as 'probability of faults, probability of contact with live or faulty parts, experience gained, technical feasibilities and economics'.
5. Where possible identify any assumptions governing those standards which do not overtly recognize the risk based nature of the design decisions, and hence where it may be inappropriate to rely upon such existing Codes and Standards.
6. Propose pragmatic & systematic processes to help identify, assess, and reduce risks associated with various design options, and thereby demonstrate due diligence in design and investment optimisation.
7. Establish a set of practical recommendations, guidelines and metrics for engineers to use which are technically and economically feasible, based upon realistic operating conditions and safety constraints.
8. Develop recommendations for IEC TC99 MT4 that may be covered by IEC61936 standard.

Deliverables: Report to be published in Electra or technical brochure with summary in Electra

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

Comments from Chairmen of SCs concerned :
Approval by Technical Committee Chairman : M. Waldner **Date** : 16/02/2013

(1) 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