

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP (1)

WG* N° B5.47	Name of Convenor : Peter Watson (UK) E-mail address: watsonp@pbworld.com
Technical Issues # (2): 1 & 8	Strategic Directions # (3): 2
The WG applies to distribution networks (4): Yes /No	
Title of the Group: Network Protection Performance Audits	
<p>Scope, deliverables and proposed time schedule of the Group :</p> <p>Background :</p> <p>This relates to “Wide Area” Protection Performance Audits – not to be confused with Wide Area Protection schemes based on Synchronised Phasor Measurements or other System Integrity Protection Schemes (SIPS)! It is “Wide Area” because it refers to the extent of the system covered by the Protection Performance Audit i.e. system wide/wide area and is a Protection Performance Audit as opposed to Protection Coordination. Due to the vast number of relays involved in a wide area or network, the starting point must be based on existing settings.</p> <p>Protection Performance Audits utilise proprietary power system and protection analysis software which facilitates the interactive modeling of the behaviour of protection relays with the steady-state behaviour of the power system under various fault conditions.</p> <p>Generally the performance of non-unit protection is examined e.g. directional and non-directional overcurrent and earth fault and distance protection. Some software packages cater for differential and communication based distance protection schemes. These schemes operate for faults on the protected circuit and there is no operation for faults outside of the protected circuit, the benefit of including these schemes in a protection performance audit needs to be accessed.</p> <p>Scope :</p> <p>Identify the input information required for network protection performance audits and the possible criteria of appreciation for the following points :</p> <ul style="list-style-type: none"> • Data/Information required for a wide area protection performance audit and methods of obtaining this data. • Creation of a structured database for protection equipment and settings and links to the power system and protection analysis software. • Software available for a wide area protection performance audit. • Accuracy of the protection relay models/algorithms for both steady-state and transient performance. • Accuracy of CT and VT models for transient performance including saturation considerations. • Accuracy of the treatment of zero sequence mutual coupling effects by the power system and protection analysis software. • Importing of settings from relay set files to the database/power system protection and analysis software – requirements for a common standard for the interchange of relay settings. 	

- Methods used to assess protection performance on a wide area network, including stepped event analysis.
- Common findings of protection performance audits.
- Automated protection performance analysis algorithms/tools.
- Automated protection setting algorithms/tools.
- Generation of Comtrade files by the power system protection and analysis software for play-back of simulated incidents to protection relays via secondary injection test equipment
- Applicable reference documents for the design of the protection system
- Applicable reference documents for the determination of the protection settings

The report will highlight the issues to be considered when undertaking a protection performance audit, power system and protection analysis software requirements and methods for accessing protection performance on an interconnected wide area network.

Deliverables : Technical brochure with summary in Electra and Powerpoint presentation for tutorial

Time Schedule : start : January 2012

Final report : 2014

Comments from Chairmen of SCs concerned :

Approval by Technical Committee Chairman : Klaus Fröhlich

Date :24/01/2012

- (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	Interactive communication with the public and with political decision maker