

CIGRE A3

High Voltage Equipment

April 2013

Mietek Glinkowski – USNC representative to A3

CIGRE A3- High Voltage Equipment

- CIGRE Study Committee A3 covers High Voltage Equipment:
 - Switchgear (HV, MV)
 - Capacitors
 - Surge Arresters
 - Instrument Transformers
- 24 Countries have memberships
- Operates as Technical Advisory to IEC
- Focus on technical/engineering/scientific aspects only (no standard development)
- Work based on WG meetings (separate)

A3.27

- **A3.27 – The impact of the application of vacuum switchgear at transmission voltages, chair: Rene Smeets, NL, TOR available upon request**
- US members:
 - Kirk Smith, Eaton
 - Mietek Glinkowski, ABB Inc.
 - Pete Meyer, S&C
 - Dave Johnson, consultant
- UGT group participated in the global survey with 22 responses (largest group!)
- Last meeting – Galveston, TX- April, 2013

A3.28

- **Switching phenomena and testing requirements for UHV & EHV equipment**, chair (new): Denis Dufournet (FR) TOR available
- Field experience and switching behavior during and after commission
- Benchmark study of interrupting requirements of GCB based on model UHV/EHV networks
- Benchmark study of switching requirements of DS, HSGS and ES based on model UHV/EHV substations

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- **DETERIORATION OF AGEING SUBSTATION EQUIPMENT AND POSSIBLE MITIGATION TECHNIQUES**
- Convenor: Ankur MAHESHWARI (AU)
- **Scope:**
 - Material and equipment deterioration/degradation
 - Lifetime (residual life) assessment techniques
 - Life extension:
 - Life management for new equipment
- **TOR** posted on Webpage
- US members: Ken Edwards (BPA), Harvey Wilson (Mitsubishi), Jon Woodworth (Arresterworks)-active?, Arvind Chaudhary – active?,

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IMPACT OF OVERSTRESSING OF SUBSTATION EQUIPMENT

Convenor: Antonio Carvalho (BR)

- Review key network parameters and anticipated stresses affecting equipment capabilities
- Review of methods already in use to assess the risk of operating beyond the performance limits
- Identification of potential failure modes of overstressed equipment and their impacts (safety, reliability, availability)
- Determination of the capabilities of the equipment involved (Standards, Test Protocols, manufacturer's information, re-testing)
- Mitigation techniques
- Impact of overstressing on residual life (where immediate failure is avoided)
- Usefulness of information supplied at type and endurance testing & proposals for enhancements
- Interaction with age and/or condition information

TOR posted on our Webpage

US member: Ken Edwards (BPA)

Instrument Transformers with digital output

Convenor: Farnoosh Rahmatian, CA

- Proposal & analysis of procedures for calibration of the entire measuring chain, both in the factory and on site, for digital output of NCITs or for a SAMU connected to classical ITs and/or EITs.
- Description of the practical applications of using flexible EITs for on-site calibration without disconnection or de-energisation.
- Consideration and description of the migration of the digitalisation process from low voltage equipments (protective relays, meters, ...) to the high voltage equipments. Overall accuracy of the measurement chain, including transient responses for both protective and measuring classes, and taking into account the work of B5.24, will be proposed for consideration by IEC standardisation committees.
- Investigation & proposals for DC accuracy classes and calibration method for HVDC applications.
- Proposal & analysis of EMC test methods considering various earthing and shielding techniques for specific application of EITs and SAMU up to 1100 kV. A test procedure will be developed & proposed taking into account the requirements of the IEC 60044-8.
- Analysis & discussion of redundancy requirements for EITs and SAMU in the context of protection schemes.
- Proposal and analysis of solutions where control functions using digital signals, e.g. for disconnectors or circuit breakers, are integrated into the NCIT or SAMU hardware.

- US members: None

The group will maintain a close dialogue with the relevant IEC committees via shared membership & mutual reporting.

Proposals for new WGs (Aug 2012, Paris)

- **Non intrusive methods for condition assessment – CIGRE_CIRED JWG A3.32**
- **Equipment for series-shunt compensation – A3.33 Mr. Li Guofu (China)**
- Reliability of Surge Arresters (B. Richter)
- Protection of capacitor banks (B. Richter)
- TRV for transformer limited faults (A. Carvalho) – not at this time
- Monitoring of solid dielectric equipment (N. Uzelac) –clarify scope –solid dielectric or all equipment, non-intrusive methods,
- Application of micro-varistors (B. Richter) – semi-conductive coating, DC mixed grading, cables and rotating machines included- should be led by SC D1 (materials)
- Simulation of Temperature rise test (N. Uzelac)
- Reliability WG Follow-Up (M. Runde) - connect with IEEE WG 1325, Devki Sharma
- Two phase systems, Questions to DC applications (H. Ito)- 72kV DC – not at this time

Future CIGRE activities related to A3

- Meetings of Study Committee A3
 - Fall 2013 – Sept 16-20, Auckland, New Zealand jointly with A2, B2, B3, C6, 3 tutorials and colloquium planned, contact: Ray Brown- NZNC
 - 2015 – proposals from India, Japan, China,
- Tutorials to IEEE Switchgear Committee:
 - A3.27 – Application of HV Vacuum Swgr- Spring 2013

CIGRE General Session 2014

- 4 US synopses submitted to A3 under three preferential subjects (currently under evaluation) :
- **PS1 > Equipment to cater for changing network conditions** • AC and DC substation equipment to meet new demands. • Equipment for future distribution systems. • New requirements for design, testing and equipment modeling.
- **PS2 > Lifetime management and ageing of T&D equipment** • Maintenance, monitoring and equipment diagnosis. • Influence of asset management practices, operating duty and Stresses on reliability.
- **PS3 > Impact of extreme operating conditions on T&D equipment** • Environmental stresses e.g. temperature, humidity, earthquake, wind, heavy rain, altitude. • System stresses and over-stressing e.g. short-circuit current, temporary overvoltage, transient recovery voltage, uprating or higher operating voltages. • Operational regime.