IEEE/PES Transformers Committee
Spring 2014 Meeting
Savannah, Georgia

Transformer Interaction with Switching of Vacuum and SF6 Breakers

— Technical Presentation —
Thursday, March 27

Presented by Bob Degeneff and Angélica Rocha

Abstract

The following topics will be covered:

- Short overview of the transients introduced by breakers onto transformers
- Historical background of how switching impulse testing in IEEE standards occurred
- Modern day breakers and the changes introduced to switching for transformers
- Overview of CIGRE document on switching transients

Learning Objective

Presentation will increase awareness of the possible interactions between breakers and transformers.

Learning Outcomes

As a result of attending this technical presentation, members will gain an understanding of the following:

- Interaction between transformers and breakers
- In what types of switching environments might a transformer be placed and the transients the transformer might encounter
- Need to specify and design transformers to mitigate switching transients

Presenters' Biographies

Dr. Robert Degeneff is the president of Utility Systems Technologies, Inc. which builds electronic voltage regulators and power quality mitigation equipment while providing consulting to the utility industry. Prior to assuming his role at UST, Dr. Degeneff worked as a professor of electric power engineering at Rensselaer Polytechnic Institute (RPI) in Troy, NY for 17 years and was involved in research into the design and performance of utility and industrial power apparatus. Dr. Degeneff was also employed with General Electric for 16 years, initially as a senior development engineer with GE's Large Power Transformer Department and then as a manager in various positions of increasing responsibility in the power transformer business, HVDC systems and utility planning area.

Dr. Degeneff received his Bachelor of Engineering from Kettering Institute and his master's and PhD in engineering from RPI. He is a PE in New York State; a member of Tau Beta Pi, Eta Kappa Nu and Sigma Xi; an achiever of IEEE Fellow grade and 2008 recipient of the IEEE Herman Halperin Electric Transmission and Distribution Award "for innovative and pioneering contributions to the computation and understanding of transient voltages in transformers and systems." Dr. Degeneff has also published over seven dozen papers (two IEEE prize papers), chapters in five books, one complete book and holds eight patents.

Angélica da Costa Oliveira Rocha received her Bachelor of Science in Electrical Engineering from Federal University of Juiz de Fora, Brazil in 1980. Shortly after earning her degree, she joined Companhia Energética de Minas Gerais. At CEMIG, she worked in the Transmission Operation Planning Department as the senior engineer in charge of system operation transient studies, such as restoration after blackout, transmission line and substation equipment switching and system transient disturbance analysis. Since October 2013, she has worked as an independent consultant with a focus on transient interaction between systems and equipment.

Angélica has been a CIGRE member since 1996 and has contributed to different CIGRE study committees, including A2 Transformers, C4 System Technical Performance and A3 High Voltage Equipment. She also served as the convener of both the current CIGRE joint working group A2/C4.39 Electrical Transient Interaction between Transformers and the Power System and a CIGRE Brazil working group dealing with this phenomenon. Her scientific activities include publication of several papers in technical journals and conference proceedings, recently focusing on the different aspects of transient interaction between transformers and the power system.