Contribution ID: **279** Type: **Poster Presentation**

The Effect of Partial Discharge on Electrical Life of Oil Immersed Paper

Wednesday 6 July 2016 14:40 (20 minutes)

Insulation paper immersed with transformer oil is used as an electrical insulation medium in transformer for its high breakdown field strength. In the normal operation state of higher voltage power transformers, the defects in insulation medium can cause partial discharge(PD) which do harm to insulation materials, resulting in a shortened life of oil immersed paper. PD activities vary according to the applied voltage, therefore the extent of shorten life is varied under different voltage.
In this paper, the average electrical life of oil immersed paper under different AC voltage is studied. The PD tests were performed on specimens of 1 mm thickness which was placed between the needle-to-plane electrodes in an oil cup. The specimen was immersed in vacuum with treatment of hot air drying in order to remove moisture. Because of dispersions in partial discharge in oil-paper insulation, the applied voltage is set according to the discharge inception voltage, such as twice as the inception voltage. Feature parameters of PD are acquired by PDCheck system and the waveform of pulses is acquired by an oscilloscope. The duration of specimen under AC voltage is considered to be electrical life of the oil-immersed paper. Relationship between average electrical life and applied voltage is evaluated using Weibull distribution, and the inverse power law as well as the exponential law is used to find the best fitting curve between electrical life and applied voltage. Moreover, fitting curve between discharge magnitude and electrical life using inverse power law is also presented in this power, which is a novel analyzing method of electrical life of insulation material.
Test results indicated that life of insulation paper tended to decrease rapidly with increase in applied voltage. Exponential law owns a better fit degree compared to inverse power law, which indicates the existence of a threshold voltage to the electrical aging of insulation material. Electrical life is likely to have much relevance to the discharge magnitude. When the discharge magnitude is larger, the electrical life is shorter.

Author: CUI, Yanjie (Xi'an Jiaotong University)

Co-authors: ZHANG, FAN (Xi'an Jiaotong University); Dr ZHU, Lingyu (Xi'an Jiaotong University); Mr CAO, Pei (Xi'an Jiaotong University); Mr OU, Xiaobo (Guangdong Electric Power Research Institute)

Presenter: CUI, Yanjie (Xi'an Jiaotong University)

Session Classification: Poster 1-C

Track Classification: Dielectrics, Insulation, and Breakdown