

The comparison between different methods of partial discharge measurement on the oil-immersed power transformer

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Abstract

One arrester of the 345 kV/4.16 kV oil-immersed power transformer was damaged by lightning strike, and was later replaced. After the transformer passed the insulation test, the excitation current of S phase became very large and caused the voltage source to trip during the step-up high voltage test. An additional winding deformation test was then carried out and the result showed the transformer to be normal.

Because the core type transformer does not have enough space to do inside inspection, partial discharge measurement (PDM) was arranged to do further diagnostics. The test tap of a high voltage bushing is used for traditional PDM, and two internal partial discharge (PD) sensors, which are of electromagnetic field type, are installed to do on-line PDM.

During the measurement, the test tap of a high voltage bushing is easily interfered by background noise, and the sensitivity is reduced significantly. Internal PD sensors maintain high sensitivity due to the good immunity against background noise. According to the measurement results, there are strong PD activities inside the transformer.

Finally, the PD source location is determined through the use of internal PD sensors. The amount of internal PD sensors is too few to pinpoint the exact 3D location of the PD source, and the installed internal sensors can only show the PD source to reside at phase S.