Corona Camera with Documentation package

Detection of high voltage leakage between phases on large AC generator (1000 Mega Watt) stator using the DayCor®II

Synopsis

A Megger test of the windings of a large General Electric Generator Stator showed low values between two of the phases. Use of UV Corona inspection was suggested during the GE Hi-Pot High Voltage leakage test.

...It was decided to use the Ofil DayCor®II camera during the Hi-Pot test to find the location on the windings with leaky insulation...

The Hi-Pot High Voltage leakage test increases the test voltage in increments. The test voltage is applied to each of the winding phases in sequence and the voltage and the leakage current are read and stored in the computer program used for the test. The maximum test voltage is typically 1.5 to 1.6 times the rated voltage of the generator. The rated voltage on this generator is 22 kV.

The inspected generator used water cooled windings and was found to have some water leakage that resulted in low Megger readings. Repair of the affected windings was performed and the Megger readings showed one phase to be perfect but two others to be on the low side. It was decided to use the Ofil DayCor®II camera during the Hi-Pot test to find the location on the windings with leaky insulation.

With the start of the test and increasing the test voltage on one of the phases to some 30 kV, corona was seen on a part of the winding. As the voltage was increased a neighboring location on the winding also showed corona and indicated insulation fault. The location of the fault area was marked for investigation. As the next suspect phase was tested and after increasing the test voltage on this phase to some 36 kV, corona was seen on a part of the winding close to the previous winding. When the voltage was increased, a neighboring location on the winding also showed corona and indicated insulation fault. As the voltage was further increased high intense corona and arcing was seen and the insulation was burnt. The location of the fault area was marked for investigation.

The affected part of the insulation was removed and revealed water and other contamination in this part of the winding. The part of the winding with insulation removed was temporary insulated and a new Megger test was performed. It read much improved values but not as good as the OK winding. It was again decided to use the Ofil DayCor IIa Camera during the next Hi-Pot test to find other locations on the windings with leaky insulation.

With the start of the test and increasing the test voltage on one of the phases to some 38 kV, weak corona was seen on a part of the winding at a different location on the stator compared to the first finding. As the voltage was increased severe corona and arcing and eventually smoke indicated insulation fault. The location of the fault area was marked for investigation. The affected part of the insulation was removed and revealed contamination in this part of the winding.

As new Hi-Pot tests were performed, voltage was increased to over 44 kV with no corona or arcing present. Re-insulation of the affected areas took place and the generator was assembled.

The DayCor®II camera will be used in the next Hi-Pot tests.