C.8.3.5.

Diagnostic Method for Water Tree Aging XLPE cable with Residual Charge Measurement

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Water tree is a main factor of deterioration in XLPE cable, however, in case of over 22 kV class cables, breakdown occurs before water tree is bridged over insulation, so the needs of diagnostic technique for non-bridged water tree is increasing day by day. Authors paid attention to superior way of "Residual charge method" as a diagnostic technique for non-bridged water tree as follows;

Electrical charge, accumulated in water tree by DC voltage, is released by AC voltage and detected as a deterioration signal.

The charge from unrelated with deterioration part lowers reliability of diagnosis, so we paid attention the difference of relaxation time between charge from water tree and charge unrelated with deterioration part, and developed the way of extracting fast relaxation charge by advanced measurement circuit and method of AC application. As a result, we found that there is a relationship between fast relaxation charge and deterioration level of XLPE cable. In addition, this technique has been conducted at 22-66 kV class XLPE cable lines on site and confirmed its usefulness.