The degradation of transformer insulating material is exacerbated by various factors, one of which is water content. ABB’s LFH drying solution can effectively reduce moisture and achieve extended equipment life, higher reliability and overload capability (no bubbling).

The water content within insulation material can be due to quality of the original drying process, ingress through breathing system or gaskets, aging of cellulose and during installation and commissioning.

Moisture has a negative impact on life expectancy and operating efficiencies of oil-filled transformers:
• The lifetime of a transformer with dry oil is significantly longer
• A transformer with dry oil can withstand more load
• Moisture increase in paper insulation from 3% to 4% causes aging comparable to a 6˚C to 8˚C temperature rise
• Predictive lifetime of paper insulation at 80˚C is 40 years at a 1% moisture level, and 10 years at a 3% moisture level

Onsite drying options
Conventional
• Hot oil circulation if vacuum cannot be applied
• Hot oil circulation and vacuum cycles (+ cold trap)
• Hot oil circulation and vacuum cycles with oil spray (plus cold trap)

LFH
• Low frequency heating under vacuum system (plus oil spray or hot oil circulation)

Advantages of ABB’s LFH drying solution
• Short drying time that is 30-50% less than conventional drying processes with hot oil circulation and vacuum system results in shorter downtime of the unit
• High drying efficiency, reducing moisture down to less than 1%
• Onsite service eliminates the risks and costs associated with transportation

The Low Frequency Heating technology works by applying a current to the windings at a low frequency (in mHz) so that leakage flux in the windings is negligible and the applied voltage is very low (due to low impedance voltage). This causes the temperature to be the same across the winding and thus the windings and insulation can be efficiently heated. The process is carefully controlled by an engineer to ensure a safe drying process.
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