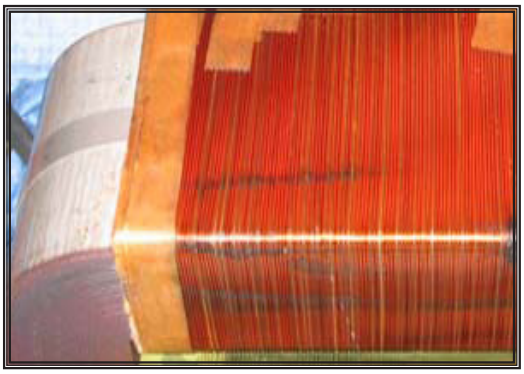
TNB RESEARCH

R&D Fund Project

Root Cause Analysis Of Trench Capacitor Voltage Transformer Failure



Punctured hole in 275kV series reactor

Sludge found in 132kV CVT Basebox

Project Overview

Twenty-six units of 275KV and thirty-three units of 132KV Trench Capacitor Voltage Transformer (CVT) have been reported to fail since 1990. Measurements suggested the absence of voltage at the secondary site of most of the CVT, in particular of the types TEV 300, TEV 138 and TEV 287.

This failure investigation work aims at determining the root causes of these failures and identifying the appropriate measures to mitigate these problems. Laboratory inspections and tests were performed at Power Link Testing Laboratory. Power Link was selected for its credential in these types of work. The failed samples were subjected to physical inspections and examinations, dissolved gas analysis (DGA) and various electrical tests.

Deliverables

a) Developed tests set-up and procedures to conduct CVT failure analysis
b) Identified the root cause of failures for the 132kV trench CVT – due to repetitive overvoltages in the base box.
c) Recommendation on the use of a 40 Ω resistor to be installed in series with the P1-P2 spark gap to prolong the life of the spark gap
d) Recommendation for the analysis of the remaining oil in the failed CVT

Benefits

a) Reduced risks of failures of similar CVT in the future
b) Increased reliability of power supply
c) Increased quality of CVT for TNB in the future
d) Reduced financial losses as a result of the reduced number of CVT failures