Training on Diagnostics for High Voltage Equipment

Monday 19 October 2009

1. Issue of Purchasing a New Transformer

A key aspect when purchasing a new transformer is to ensure that the specification matches the operational environment. This provides the negotiation with the supplier discussing how the requirements are met within the design and construction. Equally important is to ensure that the product delivered matches the purchase specification. Doble UK will describe this topic within their experience in preparing the tender documents, assessing a factory, assessing design and management of the build and test, particularly how these relate to dealing with remote factories.

2. Introducing the Transformer and its Design Elements

This topic will start with a brief introduction to the inner parts of a transformer, the external accessories and their role. There will be a brief introduction to the design detail that will cover only elements of the winding and core design and how the basic concepts are used by a designer to meet the specified requirements.

3. Factory Tests and Their Role

The factory tests are most important when judging if the design and build have met the promises made. The basic dielectric and thermal performance tests are to be described, focusing on the need to be able to interpret the data presented.

4. Non-Invasive Survey Techniques to Detect Partial Discharge in High Voltage Equipment

This presentation will describe various methods to detect discharges in HV equipment that is non-invasive and without any outage. They are essentially simple survey methods that would be used as part of a condition based maintenance programme. The session will start by covering the most widely used technique, dissolved gas analysis, and how it can be used to identify problems well before they become critical. Then there will be a description of the use of RFI methods to survey a complete site - not just transformers but also circuit breakers, instrument transformers and bushings. Location of discharge sites will be described using RFI, acoustic emission and near field probes. Doble in the UK has located sites in over 50 transformers using acoustic emission and learning points will be described.

5. On-Line Partial Discharge Diagnostics

The technology for monitoring discharge levels in installed power equipment is becoming more achievable. The key is achieving an adequate rejection of interference by selecting the optimum conditions and then applying signal processing. The techniques for rotating machines, transformers, cables and GIS will be described in this presentation. Each relies upon fitting a suitable sensor (usually during an outage, and in some cases during construction) and then processing the data and configuring an alarm feature based on levels of discharge, repetition rates and their voltage related patterns.