Transformer life estimation and management has been developed based on asset ‘Health Index’ and it is well used by the UK transmission and distribution utilities nowadays. Conditions of transformer insulation, i.e. oil and paper, are the key elements for deriving the ‘Health Index’.

As a transformer ages, there is no doubt that different by-products such as water and acids will be generated and accumulated. Without intervention those by-products will further accelerate ageing and degradation of oil and paper insulation system. The risk of failure therefore increases as a transformer ages.

To face the financial constraints put upon asset replacement of aged transformers, life extension of some of the chosen transformer assets seems an inevitable and achievable solution. One of the life extension measures a utility can take is through oil regeneration.

This project is aimed to increase our fundamental understanding on oil regeneration process, produce a policy document to guide the oil regeneration process and to estimate the life extension for oil regenerated transformer asset.

“The full process of oil regeneration in this project shall contain steps of filtration to remove particles and suspended solids, reclaiming treatment by percolation to eliminate soluble and insoluble polar contaminants, and vacuum conditioning to eliminate water and gases.”

Darren Jones
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Project: Transformer life extension through oil regeneration

Key Activities:

• On-site trial of oil regeneration process on a 44-year old 132/33 kV distribution transformer using both on-line and off-line regeneration techniques.

• Assessment of regenerated oil performance through laboratory accelerated thermal ageing experiments.

• Laboratory trial of oil regeneration process on a 77-year old 6.6/0.4 kV distribution transformer with comprehensive monitoring measures implemented.

• Recommendation of the best practise of oil regeneration.

Definition of oil regeneration:

In IEC standard 60422, oil reclamation is defined as ‘a process that eliminates soluble and insoluble polar contaminants from the oil by chemical and physical processing’ while oil reconditioning is ‘a process that eliminates or reduces physical contamination by means of physical processes (filtration, dehumidification, degasification etc)’.