

POWER TRANSFORMER SERVICE



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Scope of Work

➤ Oil Analysis

- DGA
- Acid
- Colour
- BDV
- Water/ Moisture
- IFT
- Liquid Power Factor
- Specify Gravity
- Corrosive Sulphur
- Sediment and Sludge
- Metal in Oil
- Inhibitor
- Furan

➤ Assessment

- Winding Resistance
- Winding Insulation
- Transformer Turn Ratio
- Polarization Index
- Tan Delta
- SFRA

➤ Oil Purification

➤ Oil Regeneration

➤ OLTC Service

➤ Gasket Replacement

➤ Rubber Bag Replacement

➤ Radiator Replacement

➤ Accessories Replacement

- DGPT
- PRD
- Radiator
- Oil Level
- Oil Temperature
- Pressure Gauge
- Air Breather
- Tap Changer
- Terminal BCT

➤ Repainting

Transformer Gasket Replacement



Oil Treatment and Oil Regeneration

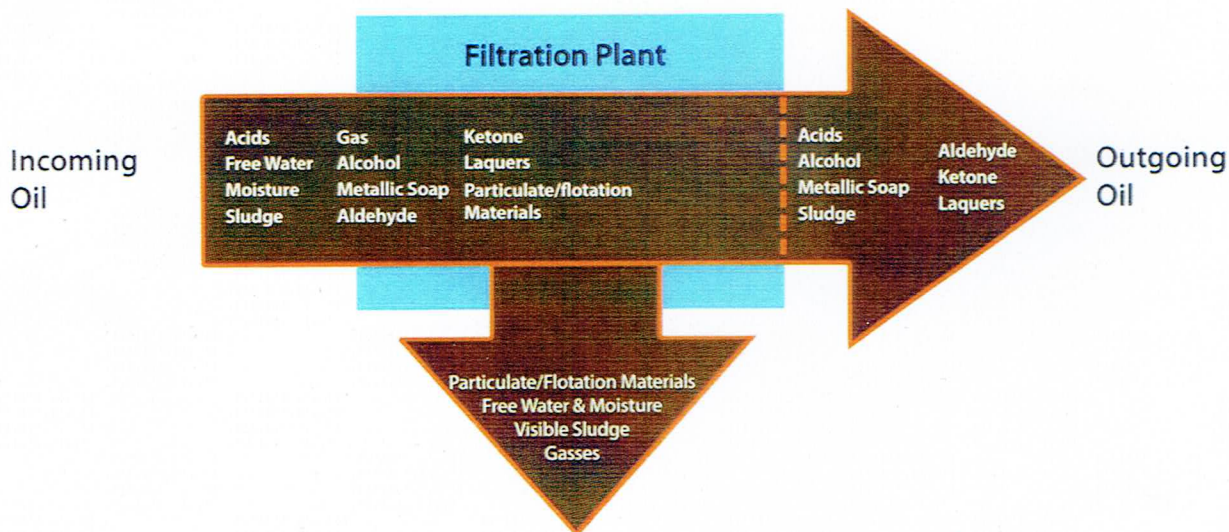
Transformer Oil Treatment

Oil in the transformer can be contaminated due to a number of factors such as; ageing, overheating, oxidation, faults in the transformer design, etc. Any one of these factors or combination will result in the built up of potentially harmful contaminants which could potentially destroy the transformer by shortening its useful operating life. If the transformer oil are diagnosed to have an **unacceptable quantity of contaminants** such as *acids, sludge, moisture and dissolved gases*, prompt treatment of the oil is required to prevent accelerating the deterioration of the transformer itself. Note that damage inflicted on a transformer cannot be reversed (unless it is stripped down and refurbished totally), but prompt and proper treatment of the contaminated oil can stop or at least slow down the deterioration process.

Oil Treatment Methods Available

Oil treatment options currently available are as follow

Filtration/ Purification



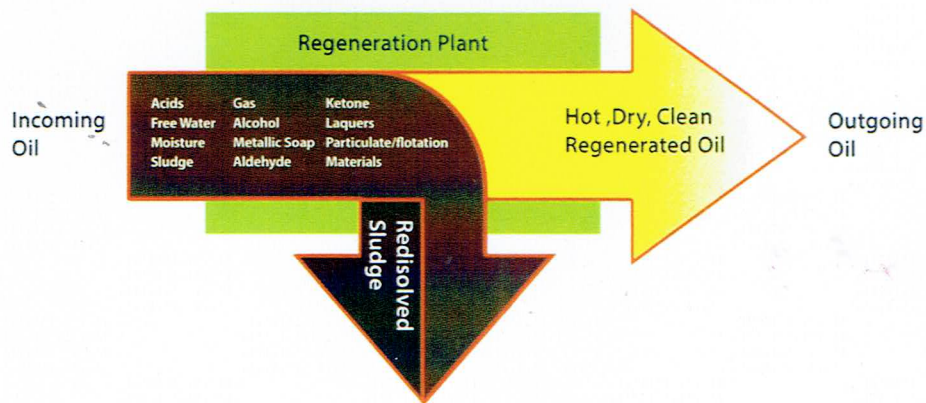
Filtration will remove most free water (includes some dissolved water) and some trapped solid matter. It has major weaknesses. As the oil in the transformer is not treated chemically, it does not solve the sludge problem. More importantly, the process cannot remove dissolved oxidation by-products (like dissolved gases and acids) in the oil.

Transformer Oil Regeneration (TOR)

This basically involves three distinct processes; heating, absorption (reclamation) and vacuuming. The oil goes through the heating process which transforms the oil in the transformer into solvent for the sludge/oxidized by-products from the tank and solid insulation.

Essentially, the heated oil dissolves such contaminants which otherwise the oil at normal temperature is unable to do so. The next process

involves the removal of acids, sludges and other contaminants from the oil via the reclamation process. Finally, vacuuming removes moisture and gas in the oil.



Comparison between method of corrective oil work

OIL FILTRATION / PURIFICATION	OIL REGENERATION	OIL CHANGE
Removes Moisture, Particulate Materials, Free Water, Visible Sludge and Gasses from the insulating oil in the transformer unit.	Removes all contaminants from the insulating oil, transformer core and sludge formed onto the transformer unit.	Replaces Oil with new oil. (Filtration of the new oil prior to putting it into the transformer unit is advised to ensure the oil replaced is low in moisture content.)
Primarily performed when Moisture is high	Performed when oil testing shows insulating oil is deteriorated.	Performed when oil testing shows insulating oil is deteriorated.
Partial removal of contaminants	Comprehensive removal of contaminants	Partial removal of contaminants. (During oil change, there will be residue contaminated oil in the transformer oil and the contaminated oil is also absorbed by the solid insulation. Sludge formed onto the internal surface will not be removed during oil change.)
Lower cost than the other methods. (Cost of filtration / purification, mobilisation cost)	Lower cost than oil change. (Cost of regeneration, mobilisation cost)	High cost relative to the other method. (Costly purchase of new oil, recommended filtration of oil, mobilization cost)
Environmentally Friendly — Oil recycled	Environmentally Friendly — Oil recycled	Environmentally Unfriendly — Oil disposal required.



Before Cleaning



After Cleaning

OLTC Service



Rubber Bag Transformer Replacement



Assessment Transformer



Re-Painting





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