Eskom
Rotek Industries

Memo

Name: Thabo Tsimane
Title: Oil Depot Manager

To:

Copy to:

Date: 29 September 2026

Subject: T&SS enabling contract for Transformer Oil Inhibitor dosing

1 INTRODUCTION

T&SS is an essential and strategic link in the service provision of Eskom, has the responsibility to operate and maintain an ever-increasing fleet of generation, transmission, and distribution assets. T&SS provides essential and strategic repair, maintenance, refurbishment, and related engineering services, both on site as well as at our workshop facility in Rosherville. The regular inhibitor dosing on transformer oil is essential to ensure longevity of transformers oil

The dosing of additives is new to the South African market and technology to perform this has been absent. BHT is a solid, manufactured in the form of crystal-like flakes, melts at about 70 °C and boils at about 210 °C. It is insoluble in water, but soluble in transformer oil. Its specific gravity is very close to that of water.

During normal operation slow but steady oxidation occurs in transformer oil, resulting in deterioration of many of the desirable insulating properties. In order to reduce the
oxidation rate an oxidation inhibitor, normally butylated hydroxytoluene (BHT) also known as di-tert-butyl-para-cresol (DBPC), is added in a concentration of approximately 0.35 % to the transformer oil. Over time the concentration becomes depleted and it is desirable to monitor and if needed, replenish the chemical to restore the specified concentration. Oil containing additives normally behave differently to uninhibited oil. The anti-oxidant additive delays the formation of acids and sludge. Routine monitoring of colour, sludge, the interfacial performance and acids will result in no trends of degradation being evident. Thus, most conventional analytical testing methods will not yield results as expected.

This service will be for performed within Eskom(Power Stations, Transmission and Distribution substations) and industrial installation for power utilities and private sector alike.

2 SCOPE OF WORK

The scope of work covers the supply of Inhibitor dosing plant and butylated hydroxytoluene (BHT) to perform inhibitor dosing treatment process to various sites within ESKOM nationwide for a period of 5 years. The contract does not guarantee that any specific sites will be done during the period of the contract. The inhibitor dosing will be requested for the projects on an “as -and -when -required” basis.

2.1 Purchase BHT product in plastic drums .
2.2 Pre-screen BHT product to ensure there are no large solids present .
2.3 Attend pre-site meeting on site.
2.4 Attend substation induction course.
2.5 Take work permit, conduct risk assessment and complete workers register .
2.6 Ensure dosing vessel, pumps and pipes are in clean condition
2.7 Connect oil circulation pipes and pump and bleed free of trapped air.

Tel: +27 11 629 4973
Fax:
Cell: +27 83 240 7211
E-mail: TsimanTS@eskom.co.za

2.8 Switch oil circulation pump on .
2.9 Connect dosing plant inlet / outlet on delivery side of circulation pump.
2.10 Flush dosing plant pipes.
2.11 Disconnect breather.
2.12 Extract 300 litres of oil into dosing plant vessel .
2.13 Mix the oil in the vessel while heating it to 60°C .
2.14 Measure exact volume of inhibitor compound (restore inhibitor content to 0.35%) .
2.15 Once oil temperature is at 60°C add required inhibitor.
2.16 Perform visual inspection that the inhibitor compound is fully dissolved in the oil.
2.17 Start dosing procedure – mixing shall continue for entire dosing process.
2.18 Circulate oil in transformer for 2 hours for units with an oil volume of below 50 000 liters and 4 hours for units with oil level of 50 000 liters and above
2.19 Close valves and disconnect pipes.
2.20 Restore oil to correct level .
2.21 Bleed Buchholz relay and perform conservator bleeding procedure .
2.22 Fit Chromadec information plate (fit next to nameplate)
2.23 Clean site
2.24 Take an oil sample from the Buchholz relay and send for analysis for inhibitor content 6 months after date of dosing procedure – inform site staff
2.25 Complete handing over certificate .
2.26 Complete Transformer / Reactor work report.

NB:

Provision shall be made for a medium and large plant to cater for smaller and larger transformers. For transformers with an oil volume of up to 50 000 litres the oil volume extracted shall be 150 - 200 litres to allow for addition of 80 kg of inhibitor powder. For transformers exceeding 50 000 litres the oil volume shall be 300 –350 litres and allow for the addition of 150 kg inhibitor powder. In both cases the total oil volume of the vessel shall be 50% more than the oil extraction volume. The plant can be designed as two separate units or combined in one with oil volume selection function.

Note: 1 kg of inhibitor powder will increase the oil volume by approximately 1 litre.

3. SITE / EQUIPMENT REQUIREMENTS S/P ESK

3.1 Personal Protective Equipment (PPE) .
3.2 Tools, equipment, material and consumables .
3.3 220 / 380V supply .
3.4 Chromadec information nameplate with 3M VHB double sided tapev(UV, oil and heat resistant)
3.5 Oil additive dosing plant (500 litres oil vessel with heaters) – Comply with 240-100947435 Rev 1
3.6 Butylated Hydroxytoluene (BHT) in dry form.
3.7 High volume (20 000 l/h) oil circulation pump with 50 mm pipes and connection flanges.

4. SPECIAL REQUIREMENTS S/P ESK

4.1 Chromadec information plate with inhibitor type information, quantity added and date of dosing (no site engraving allowed) –
4.2 Do not attach label on transformer nameplate, but next to it .
4.3 Information plate to be secured to tank wall with 3M VHB double sided tape (min 1 mm thick) .
4.4 Heating elements shall not scorch/blacken the oil.
4.5 Protective devices shall be installed to prevent possible air ingress into transformer.
4.6 Inhibitor dosing shall be done with the transformer removed from service.

Annexure 1: (NAMA PLATE)

Actual size (6 x 12 cm) – white with black border

Text: Arial, Bold, Capitols, 16pt

NOTE: TRANSFORMER OIL

INHIBITED WITH 0.35% OF

BHT

…… kg INHIBITOR

ADDED SERIAL NO:

…….. DATE: …….

Compiled by:



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Thabo Tsimane
Oil Depot Manager
Transformer & Switchgear Services