

	Engineering Instruction	National Transmission Company South Africa
---	--------------------------------	--

Title: TECHNICAL INSTRUCTION FOR THE MANAGEMENT OF PORTABLE AND PERMANENT ONLINE GAS ANALYSERS

Document Identifier: **240-185000284**

Alternative Reference Number: **n/a**

Area of Applicability: **National Transmission Company South Africa**

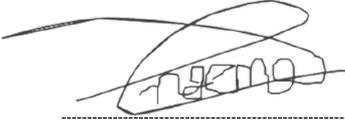
Functional Area: **Engineering**

Revision: **0**

Total Pages: **4**

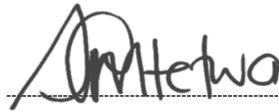
Next Review Date: **n/a**

Disclosure Classification: **Controlled Disclosure**

Compiled by


Londiwe Ngema
Engineer – SE&D

Date: 06/01/2025

Approved by


Sidwell Mtetwa
Corporate Specialist – Transformers and Reactors

Date: 06/01/2025

Authorized by


Bheki Ntshangase
Senior Manager – SE&D

Date: 6/01/2025

Content	Page
1. Background Information.....	3
2. Instruction.....	3
3. Revision History.....	4

CONTROLLED DISCLOSURE

1. Background Information

Transformer Dissolved Gas Analysis (DGA) is one of the most valuable tools of transformer condition monitoring. When faults, such as overheating or arcing occur within a power transformer, the insulation oil breaks down and produces various gasses which get dissolved in the oil. The detection of these gaseous by-products and their concentration and proportion in the oil are indicative of the type of fault present. The rate of increase of these gasses is indicative of the extent of the specific fault occurring. National Transmission Company South Africa (NTCSA) condition monitoring regime includes the use of DGA. The method is reliable and has been effective in preventing failures and is the basis of the required maintenance interventions. The traditional manual oil sampling method, where an employee goes to site, takes oil samples from the equipment, and then submit the same to the laboratory for analysis is still the baseline in NTCSA. While manual sampling has been relied upon for fault identification, there are several shortcomings associated with this periodic method. These mainly include resources demand and the wide blind time between the samples, which are primarily 6 months apart. Online condition monitoring was introduced to overcome the shortcomings of the manual sampling. The reliability of this technology was found to be low due to communication and durability issues. A number of these online gas analysers in NTCSA are broken and the cost of maintenance proved to be expensive and unsustainable.

2. Instruction

All NTCSA broken gas analysers will not be repaired and must be decommissioned and scrapped, the maintenance of the broken gas analyser is expensive and cumbersome. A capital project for new online gas analyser be pursued and this will be of 50 units, at first. 26 of the 50 units should be for Apollo Substation and 24 will be used on other critical site. These will form a basis of testing the new generation of online gas analysers, at least for five years, before embarking on a massive roll-out of a technology that has not been sufficiently assessed for durability. In the meantime, the Grids must procure portable gas analysers to be used to improve DGA based condition monitoring, i.e., bring to state better than six monthly, until a well assessed roll out is made and is in operation. The portable gas analysers must be used to sample the existing fleet in the following manner:

- All units at 400kV or 500MVA and above to be sampled every two months. The Grids must study the results and take proper action, which may be to consult the specialist when not sure.
- All units supplying critical customers to be sampled monthly. The Grids must study the results and take proper action, which may be to consult the specialist when not sure.
- All the other units must be sampled at least once in 3 months. The Grids must study the results and take proper action, which may be to consult the specialist when not sure.
- If units are abnormally gassing, the above indicated frequencies may be inadequate and the revised frequencies will be decided by the Engineering Specialist from SE&D.

CONTROLLED DISCLOSURE

All the above frequencies may be reviewed from time to time considering the factors like resources availability, activeness of faults, and other unforeseen operational and practicality aspects. Such must be discussed between Grids and Engineering. The objectives must remain being to safeguard the equipment rather than convenience.

3. Revision History

This is a new document.

Date	Rev	Compiler	Remarks
September 2024	0	L.N Ngema	First issue

CONTROLLED DISCLOSURE

When downloaded from the document management system, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorized version on the system. No part of this document may be reproduced in any manner or form by third parties without the written consent of National Transmission Company South Africa SOC Ltd Reg No 2021/539129/30