Case Study

Manufacturing | Afrox Linde | Sasolburg 6.6kV Substation Motor Terminations

"On-line condition monitoring provides information on the reliability of the terminations. Conducting investigations and corrective measures after high level findings will ensure a running and reliable power plant. This will prevent premature failures and unplanned power outages ."

Client Background

The client provides engineering services and a focused range of performance enhancing atmospheric gases, welding and safety products and LPG to valued customers. Given the criticality of the services offered by the client, MV components in all electrical networks must be kept to a highly reliable and maintainable standard to prevent premature failure.

Should the client experience downtime of this critical electrical plant, the result would be a loss of production and severe repair or replacement costs.

As a result, Martec conducted an on-line assessment using the Partial Discharge Frequency System Analyzer (PDFSA) technology to ascertain the condition of the MV components in 6.6kV substation in Sasolburg. High PD activity was detected in the frequency range of the terminations (112 to 200MHz).

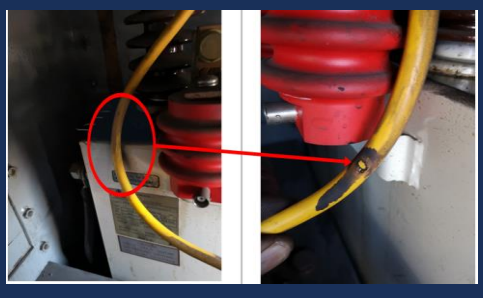
Key Challenges

Over bending of termination leads, this will create voids under the anti-tracking tube and result to partial discharge and ultimately, a complete failure.

Water ingress to the terminal boxes. Termination leads exposed to water while energised are susceptible to a water treeing phenomenon in which tree-like micro voids are formed in the insulation.

Martec Intervention

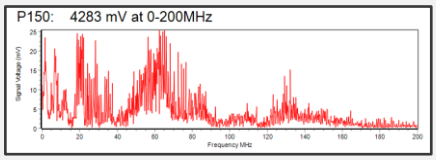
Martec conducted a visual inspection of the motor terminations due to the high PD activity detected during the on-line assessment. The inspection revealed deviations from required MV installation standards. Corrective actions were administered by Martec to prevent zorc leads from touching the metal casing. Physical damage and overbending of termination leads could not be rectified during the inspection. It was strongly recommended that the terminations be periodic trended until re-installed under quality assurance processes.



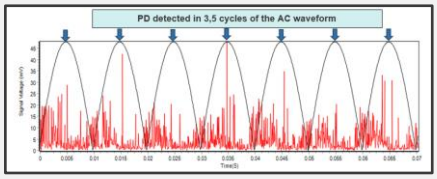
Value Add

- The cost-effective PDFSA technology can identify defects before they turn into failure.
- The PDFSA system is a complete analysis system. The process employs patented data acquisition equipment and analysis techniques that provide much more information than simply the existence, the absence or the magnitude of partial discharges.
- An online condition assessment complements a proactive maintenance tactic.
- High PD signals detected during on-line condition assessment prompted further investigation by visual inspection.
- Findings from the inspection were used to assess the condition of the terminations to enable selective intervention prior to complete failure.

PDFSA Signals



Frequency Domain



128MHz – Terminal Box Area:

Tools and Technology used

- Partial Discharge Frequency System Analyser (PDFSA)
- Ultra Sound Scanning
- Visual Inspections
- Investigations

+27 11 848 6940
Info@martec.co.za