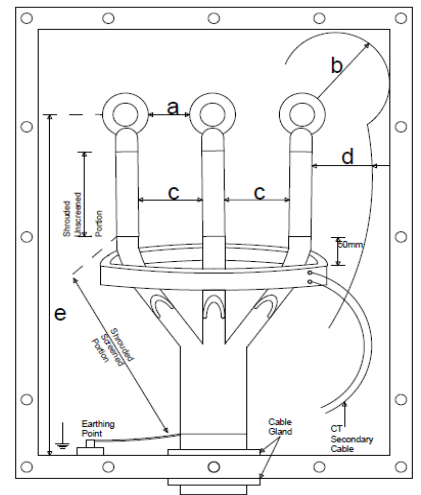


Client Reference

Condition Monitoring | Partial Discharge | MV Terminations

“Medium voltage terminations can be locations for partial discharge activity due to poor workmanship during installation. Comprehensive online PD assessments have proven beneficial in detecting PD-related defects before they become failures.”



Client Background

The client is one of the leading coal export terminals in the world. It was established in 1976 with an original capacity of 12 million tons per annum (“Mt/a”).

It has grown into an advanced 24-hour operation with a design capacity of 91 Mt/a and provides South Africa’s Coal Exporting Parties (CEPs) with a world-class logistics service that facilitates coal exports.

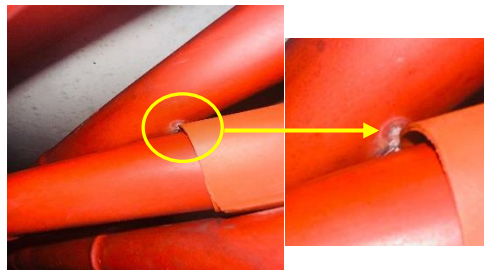
Operations occur at one of the world’s deep-sea ports, which handles large volumes of coal and vessels. The 276-hectare site currently boasts a 2.2-kilometer-long quay, six berths, and four ship loaders, with a stockyard capacity of 8.2 Mt.

It is able to handle large vessels and volumes and has gained a reputation for operating efficiently and reliably to prevent demurrages.

Key Challenges

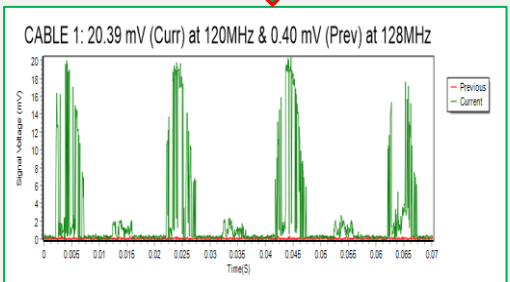
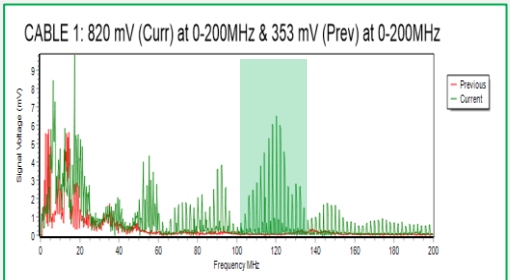
The challenge with MV terminations is that they must be installed in the field where conditions are less controlled than in the factory environment. It is of utmost importance that the terminations are installed correctly to avoid partial discharge.

Martec conducted the annual online PD assessment at the client site and detected high PD activity from the terminations of one specific panel. Upon investigation, we identified clear visible signs of PD on the termination. This was due to different phase leads making contact with each other on the unscreened sections.



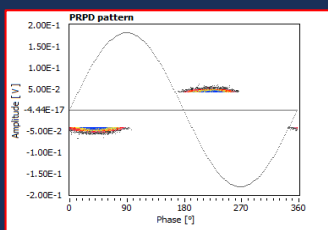
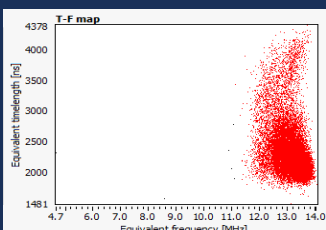
Value Add Online Assessment – Aquila and PDFSA

- An online assessment using the advanced Aquila and PDFSA technologies.
- Frequency domain analysis was utilised to identify the possible location of the PD activity within the system.
- The type and intensity of the PD activity on the terminations were obtained from the time domains and were risk-ranked accordingly.
- Based on the findings from the online assessment, the PD activity on the terminations was deemed highly concerning, prompting further investigation.



Martec Intervention

- Martec conducted a comprehensive online PD assessment using the PDFSA and Aquila technologies.
- High PD activity was detected from the termination area of one panel. The client was notified, and further investigation was carried out through visual inspection.
- The inspection identified signs of PD activity on the terminations due to different phase leads crossing in the unscreened sections.



Positive	Parameter	Negative
0.045	Alfa [V]	0.046
11.564	Beta	14.025
0.066	QMax [V]	0.061
0.050	QMax95% [V]	0.050
0.045	QMean [V]	0.045
0.041	QMin [V]	0.042
0.011	NQN	0.005
237.362	N/s [1/s]	154.888
6254	N	4081
4.745	Nw	3.096

Tools and Technology used

- Aquila PD assessment technology
- Partial Discharge Frequency System Analyser (PDFSA)
- Ultrasound
- Visual inspections
- Investigations
- Corrective actions