

# Cable diagnostics customer case study

**Asset Management & Services**  
Preventive Maintenance







# Power grid operators and industrial enterprises manage grid complexity

Power grid operators and industrial customers with their own high-voltage grid infrastructure are facing ever-increasing challenges in the operation and maintenance of power cable systems. The systems date from different decades, include different cable technologies (e.g. GASA, oil, XLPE, etc.) and were installed by different manufacturers.

## Brugg Cables' approach

The specialists at Brugg Cables support their customers in the operation and maintenance of high-voltage cable systems with a specialised cable diagnostics set. The aim is to determine the condition, risks and recommendations for action, perform crucial repairs and, if necessary, schedule further inspections.

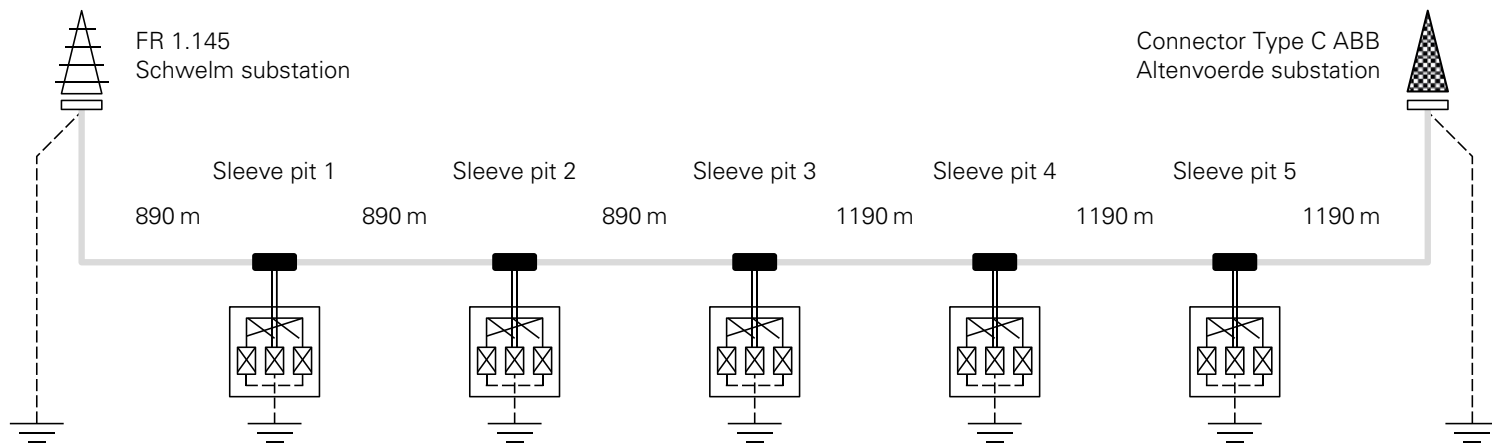
## A combination of various diagnostics methods (diagnostics mix) can include:

- Comprehensive, visual inspections of the complete cable system
- Sheath testing
- Thermographic investigations (temperature analyses)
- High-voltage testing
- Detailed material analyses
- Detection and analysis of partial discharges
- Quality measurement of fibre optic cables

# Case study on cable diagnostics 110kV VPE cable at AVU Netz GmbH

## The company and the challenge

AVU Netz GmbH owns and operates electricity, natural gas and water networks in the Ennepe-Ruhr district. The line networks comprise 3,513 km of electricity, 991 km of gas and 1,249 km of water pipes. The assignment was to inspect an approx. 6.3-km-long XLPE cable route dating back to 2014, the utility company's longest cable section within the grid. The section is connected by 5 joints with link boxes. The cable start consists of outdoor terminations on a switch panel and the cable end of dry GIS terminations.



## Brugg Cables' diagnostics approach and results

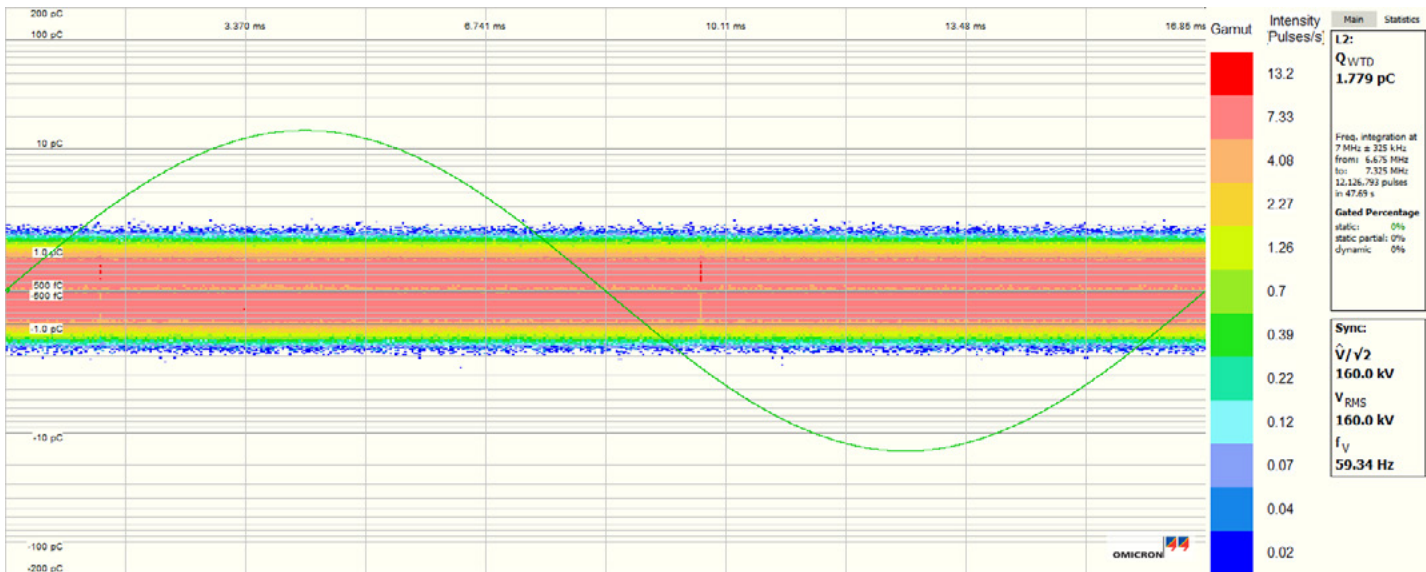
The cable diagnostics package for this system comprised:

- A complete visual inspection of the terminations as well as the link boxes (it was not possible to inspect the joints due to their installation)
- Sheath testing of the system's three phases

- Partial discharge (PD) measurement over the entire cable section
  - Thermographic investigation of the terminations on both ends
- AVU Netz GmbH employees attended and supported the work. The system was shut down for the inspection period.



A PD-free section was reported to the customer as a result of the partial discharge measurement. Here is an example graphic for the measurement and evaluation of phase 2:



Example of an infrared examination of an outdoor termination showing no abnormalities.



Example of a defective insulator below the adapter base plate of the outdoor termination discovered during the visual inspection.

The sheath inspection revealed what was presumed to be sheath fault, but this turned out to be earth fault on the outdoor termination of one phase. Brugg Cables recommended that the fibre optic cable outlets and hood sleeves causing the problem be repaired as a precaution.

The visual inspection revealed defective insulators on the outdoor termination, which were replaced immediately. The thermographic examination of the terminations on both ends of the system shows no abnormalities.

Brugg Cables provided the results and assessments of the diagnostics to the customer in a detailed document and supported repair implementation as well as further monitoring of the cable system.

## The customer's feedback

“The diagnostics mix enabled us to determine the operating status of the cable system and identify any potential risks.”

Volker Jost, Project Manager HVT systems,  
AVU Netz GmbH





## Brugg Cables

Brugg Cables is an innovative cable manufacturer from Switzerland that offers an extensive range of power transmission and distribution services. Established by Gottlieb Suhner more than 120 years ago, Brugg Cables is now one of the world's leading cable manufacturers. Throughout our history, our defining characteristics have been our strong customer focus and a highly skilled and professional workforce. Our emphasis has been on innovation and outstanding Swiss quality – since 1896.

### Cable projects

Brugg Cables is the high-performance partner for high-voltage cable projects. From planning, production and logistics to installation and commissioning. As a general contractor, we coordinate all trades, monitor all phases and, with our experts, are the central point of contact for the customer on site.

### Asset Management & Services

Our Asset Management & Services package is specifically designed for the demands of energy suppliers, transmission system operators and electricity customers in the high and extra-high voltage sector. This encompasses diverse services to ensure that the planning, construction, operation and maintenance of high-voltage cable systems is safe, efficient and cost-effective.

