



RESTORING CRITICAL POWER INFRASTRUCTURE UNDER EXTREME TIME PRESSURE

SUPPORTING AN EMERGENCY HIGH VOLTAGE RESTORATION PROJECT IN LIBYA

Restoring Critical Infrastructure When Every Day Matters

When a 245 kV termination failed at generation substation in Lybia, a critical 300 MVA asset faced being taken out of service just as summer temperatures approached 50°C. With limited documentation, decades of modifications, and a narrow window available for restoration, the utility needed more than a replacement component. The utility needed a partner capable of recreating a solution for infrastructure that no longer matched any available design standard.

The affected substation played an important role in supporting power generation for the surrounding region. Restoring service before peak summer demand became a priority to maintain system stability and electricity availability during a critical period, when disruptions could affect cooling, water access, and other essential services for local communities.

To support the project, TE Connectivity assembled a cross-functional team spanning engineering, product management, manufacturing, supply chain, customer service, and field services. Working across multiple countries and time zones, the team was tasked with reverse-engineering and delivering a custom high-voltage solution under exceptional time constraints.

4 Weeks

Emergency response from engineering to energization

Undocumented Legacy Installation

Recreated through reverse engineering

245 kV

Custom high-voltage solution designed for a legacy installation

300 MVA

Critical generation infrastructure restored

 Customer	Major Utility in Lybia
 Location	Libya
 Infrastructure	Generation Substation
 Capacity	300 MVA
 Voltage Class	245 kV
 Cable Type	630 mm ² J-Power Cable
 Response Timeline	Approximately 4 Weeks
 Solution	Custom 245 kV GIS Termination Solution

The Challenge

Restoring the failed installation required much more than replacing a component.

The affected infrastructure had been in service for decades and had undergone multiple modifications over its operational life. Documentation was incomplete, original drawings were unavailable, and previous retrofit activities had introduced non-standard design conditions that complicated engineering efforts.

The project timeline left little room for error. With summer demand approaching, the utility needed the substation returned to service as quickly as possible to maintain system stability and electricity availability during a critical period.

The combination of legacy equipment, non-standard interfaces, and limited technical information, meant that no available standard solution could meet the site requirements.

The Solution

The key challenge was not manufacturing replacement equipment. The key challenge was determining exactly what replacement equipment was required.

Decades of modifications and incomplete documentation meant the installation no longer aligned with any known design standard. Before a solution could be produced, engineers first had to reconstruct the installation using field measurements, photographs, video reviews, and on-site observations.

Working from field data collected in Libya, engineering teams recreated the installation environment, verified critical dimensions, and developed a customized 245 kV termination. The final design incorporated a GIS insulator, adaptors, and a project-specific joint configuration tailored to the requirements of the existing installation, which included a legacy 630 mm² J-Power cable system and older oil-tape termination technology.

Engineering, manufacturing, logistics, and installation activities progressed simultaneously throughout the project. TE and customer teams across Libya, Jordan, Germany, China, Latvia, and Tunisia collaborated continuously to validate requirements, complete the design, manufacture the solution, coordinate delivery, and support its safe installation.

Drawing on decades of Raychem engineering expertise, the project moved from problem identification to successful energization within the required timeframe.

The Results

In approximately four weeks, the team moved from an undocumented legacy installation to a customized, energized 245 kV solution.

By restoring critical infrastructure before temperatures reached their highest levels, the utility reduced the risk of service disruptions during a period of increased electricity demand.

More importantly, the project demonstrated TE's ability to combine application expertise, customized engineering, and coordinated execution. Rather than simply supplying products, the team reconstructed an undocumented installation, developed a customized engineering solution, and successfully returned a critical asset to service.

Key Outcomes

- 300 MVA generation substation restored and returned to service before peak summer demand
- Custom 245 kV solution reverse-engineered for a non-standard legacy installation, despite incomplete documentation
- Accelerated execution across engineering, manufacturing, logistics, and installation functions in approximately four weeks
- International collaboration involving teams from Libya, Germany, China, Jordan, Latvia, and Tunisia

Why It Matters

Utilities around the world face the challenge of maintaining aging infrastructure while managing decades of modifications, undocumented changes, and non-standard interfaces.

The project in Libya demonstrates how engineering-to-order capabilities, application expertise, and coordinated international execution can extend the life of critical infrastructure, even when no standard solution exists. Rather than adapting the installation to fit an available product, engineering teams reconstructed the installation itself, enabling the development of a solution tailored to the realities of a decades-old asset.

For utilities responsible for critical transmission and generation assets, this project provides a practical example of how complex legacy installations can be returned to service when reliability matters most.

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