CASE STUDY

[MIDEL®]
SAFETY INSIDE

PROJECT: **Offshore windpower transformers | UK**

ESTER TYPE: MIDEL 7131 synthetic ester fluid

PURPOSE: Support design innovation for new turbines

[OVERVIEW]

The Greater Gabbard offshore wind farm is located in the outer Thames estuary in the UK, approximately 14 miles from the coast. It boasts 140 wind turbines in two arrays, making it the world's largest offshore wind farm at the time of commissioning. The installation of the turbines commenced in 2010 and the whole windfarm was operational by September 2012.

Offshore wind farm operators are presented with a range of unique challenges, with dependability and safety being paramount. Potentially corrosive atmospheres challenge reliability, and failures can result in expensive unplanned maintenance.

The wind turbine chosen for the project was the Siemens SWT3.6-107, a 3.6MW turbine that incorporated a transformer in a transition piece in the tower. This particular design had some specific challenges that lead the designers to consider a more environmentally friendly choice of insulating fluid in the transformers.

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[SITUATION]

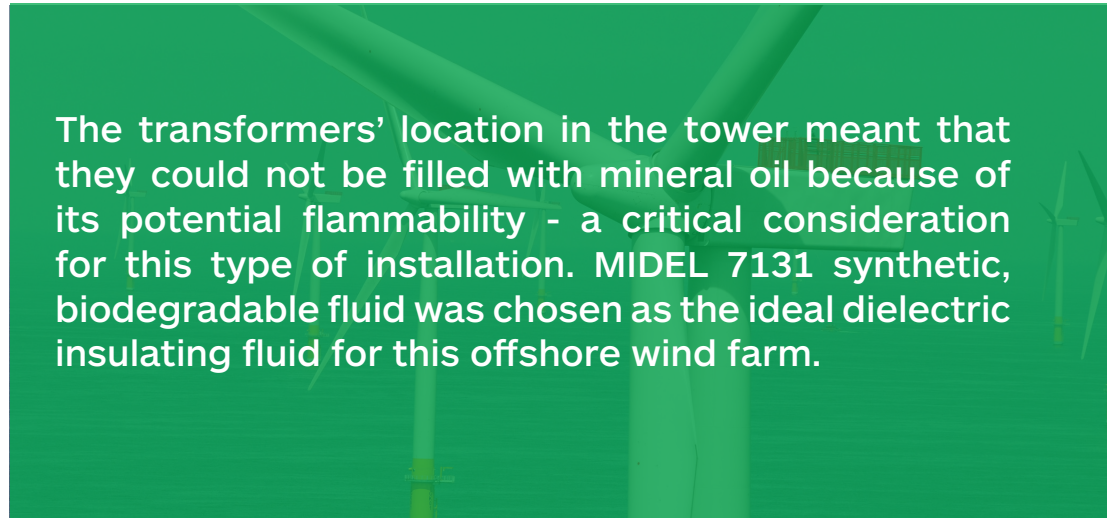
Using cast resin for these transformers was not suitable because the running temperature was too high and cooling would have been difficult to manage within the designed enclosure. Likewise, a compact high temperature fluid filled design was not appropriate for similar reasons. After careful analysis, a standard temperature rise transformer with fluid pumped to a remote cooler in the HV duct was chosen.

The transformers' location in the tower meant that they could not be filled with mineral oil because of its potential flammability - a critical consideration for this type of installation. MIDEL 7131 synthetic, biodegradable fluid was chosen as the ideal dielectric insulating fluid for this offshore wind farm.

[RESULT]

The transformers were manufactured by ABB Waterford, who had extensive experience of building MIDEL distribution transformers, but had not taken on a project such as this before. During the design and installation phase the MIDEL technical team provided support to ABB, advising on the handling of the fluid and correction impregnation of the solid insulation. Now the transformers are in operation the MIDEL technical team continue to provide support with DGA interpretation.

MIDEL 7131 was also used in the auxiliary transformers on the two offshore substations for Greater Gabbard - specifically to increase fire safety.



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The use of MIDEL ester fluids in this project supports the following UN Sustainable Development Goals: