CASE STUDY

[MIDEL®]
SAFETY INSIDE

PROJECT: **MIDEL 7131 success in extreme cold | Arctic Circle**

ESTER TYPE: MIDEL 7131 synthetic ester

PURPOSE: Ensure safe transformer operations in Arctic environment

[OVERVIEW]

Yamal LNG is a liquefied natural gas plant located in Sabetta at the north-east point of the Yamal Peninsula inside the Arctic Circle. The facility is located in a permafrost region where temperatures can reach -50°C or lower. Multiple engineering challenges had to be addressed in order to build the processing facility in such extreme arctic conditions. One critical challenge was how to ensure the safety and reliability of the 26 distribution and power transformers required to keep the Yamal project running.

Transformers are critical pieces of equipment, required to reliably operate in some of the world's most extreme environments. This has led to engineering innovations to help them operate safely and effectively under a wider range of operating situations, such as the use of synthetic ester fluids in place of mineral oil (the usual insulating medium).

Photo: TotalEnergies

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[SITUATION]

The 26 transformers were manufactured by Siemens, with ratings from 35 kV to 110 kV. Testing carried out at the Siemens laboratory provided the necessary data to optimize the transformers' design for operation in the harsh Arctic environment. The units were installed during the plant's 2014-2018 construction period.

MIDEL 7131 synthetic ester fluid was identified as the key to running transformers in such an extreme environment. The fluid was chosen in order to mitigate freezing and fire risks at the Yamal site. Due to MIDEL 7131's high fire point of >300°C, an external fault would be far less likely to lead to a failure or fire. This is especially important in a plant where liquefaction of natural gas is performed - the consequences of a fire at the facility would be catastrophic. The fluid's extremely low pour point of -56°C was also a critical factor in ensuring the Yamal transformer fleet's reliable operation in the Arctic environment.

Because MIDEL 7131 synthetic fluid is readily/fully biodegradable, its use at Yamal also delivered a high degree of environmental protection in the event of leakage from any of the transformers, compared to the damage that would be caused by toxic mineral oil insulating fluid.

[RESULT]

MIDEL 7131 synthetic ester fluid delivered the ultimate solution for the Yamal transformers, furthering its proven track record of being the premium transformer insulating fluid for increased fire safety and reliable operation in extreme climate conditions.

Looking ahead, transformer operators may find the lessons learned in the harsh extremes of Yamal become increasingly applicable to more and more assets around the world. As extreme weather events become more commonplace, today's best practice may well become tomorrow's standard operating procedure.

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