Siemens tests 15 MVA transformer at extremely cold conditions

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In the first half year of 2016, a climatic test program was conducted on a Siemens 15 MVA transformer in OWI-Lab's large climatic test chamber.

The 15 ton transformer was tested for extremely cold conditions down to -50 °C in order to validate its cold start-up performance and the behaviour during operations in low ambient temperatures in general. 85 sensor parameters were measured during the 4-week test program in order to ensure reliable, save and optimal operations of such products in regions as Canada, Russia, China, Mongolia and Scandinavia, where freezing temperatures down to -40 °C or even -50 °C occur during winter.

Fluid flow

The transformer was filled with an environmentally friendly, but highly viscous synthetic ester fluid. Its high viscosity at low temperatures impedes natural fluid flow and thus leads to a change of thermal performance. This is especially relevant in case of cooling by external radiators, which is standard for power transformers. Fluid flow in the small radiator ducts is completely different from flow at the tank wall, even more so in case of high viscosity.

Due to the large dimensions and mainly the large weight of the test object, Siemens was in need of finding a partner with a large climate chamber and the associated services to conduct full functional tests in cold climate. The test specimen was tested by OWI-Lab's engineers in close collaboration with Siemens's Austrian transformer factory Linz, which has been able to remotely follow up every test sequence performed in the lab at their offices.

The details and outcome of this work will be presented at the upcoming Cigre 2017 colloquium for transformer research and asset management and at the Cigre session 2018.

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