

TVO Nuclear Power Plant Monitors Transformer Condition Real-Time and 24/7 to Notice Maintenance Needs at an Early Stage



Finnish nuclear power company Teollisuuden Voima implemented Vaisala's online hydrogen, moisture and temperature monitor to constantly follow the condition of their transformers. The continuous monitoring gives information on the transformer oil 24/7, helping to plan maintenance actions.

Teollisuuden Voima Oyj (TVO) is a Finnish nuclear power company with almost 40 years of experience in the safe and reliable production of reasonably priced electricity. The net output of its two nuclear plant units currently in operation, is 880 MW. Together, these units produce one sixth of all the electricity consumed in Finland.

For its own electricity needs, the utility has high-voltage transformers for stepping down the energy from a 400 or 110 kV network. One of these is a stand-by transformer, which

turns on automatically if any of the other transformers suddenly stop operating.

Reliable transformer functionality is critical for the power plant to operate in a planned manner; thus TVO has a well thought out maintenance and monitoring plan for their transformers. For example, the plan includes regular manual oil sampling of the transformers. The industry recommendation is to take samples once a year, and TVO has implemented strict controls to all safety and reliability related matters.

Cost Efficient Hydrogen Monitoring with Vaisala's MHT410

TVO has decided to start monitoring their transformers in real-time. After a thorough evaluation, they selected Vaisala's MHT410: Moisture, Hydrogen and Temperature Transmitter for Online Transformer Condition Monitoring. The monitor provides continuous, real-time data of moisture, hydrogen and temperature. Of these, the rising hydrogen gas concentration in the transformer oil is an indication of

a fault in the transformer, while moisture monitoring is important to know e.g. the insulation ability of the oil. The online data allows the transformer operators, for example, to apply real-time trending to analyze the condition of the transformer.

“When selecting the hydrogen monitor, we compared several products, and the features of Vaisala MHT410 convinced us,” say TVO’s System Engineer Janne Jurkola and Maintenance Engineer Pasi Pietilä.

“The MHT410 is suitable for this purpose, and it is simple to install. It has all we need, but nothing extra we don’t need. Also the price and the cost of ownership are on the right level”, they continue. That the online monitor is made by a Finnish company with long roots in the measurement business in general, and in oil measurement in particular, also factored in the decision-making.

Easy Installation and Reliable Results

TVO installed the MHT410 monitor to their stand-by transformer, as it was conveniently next in line for a regular maintenance. The device sends alarms to the utility’s 24/7 control room, according to pre-defined limits set by the maintenance team.

TVO has used the MHT410 now for 12 months. “When comparing online results from the MHT410 to the manual samplings we’ve taken, they



have been well aligned. The results are credible,” says Pasi Pietilä, who is responsible for the maintenance of the transformers.

Both of the gentlemen believe online monitoring will be part of the future picture in the industry. “Failures with large and long-standing financial consequences can be mitigated with relatively small investments to online monitoring, as it gives information when to take proactive maintenance steps,” says Janne Jurkola of TVO.



Installation of Vaisala DGA takes only two hours. Picture source: Vaisala.

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