



Pall Oil Conditioning System Reduces Combustion Gas Levels Significantly

Overview

With a capacity of 1,500 Megawatts of electricity and up to 1.5 million pounds per hour of process steam, Midland Cogeneration Venture Limited Partnership (MCV), located in Midland, Michigan, is the largest operating cogeneration plant in the United States, providing power for up to one million Michigan homes. In addition, MCV provides steam and electricity to Dow Chemical and steam to Dow Corning.

The Problem

The issue that the plant was having was related to the transformer. The plant previously used the standard process of gas removal, which means de-energizing the transformer, removing the oil for reclamation, and refilling. However, the plant began experiencing problems with one of its transformers. The

problematic transformer had a gassing problem that caused the bracketry in the high voltage winding to overheat to more than 500°C. When this occurs in the transformer, it can cause an "arcing" or faulting out. The manufacturer had no fix for this fault.

MCV considered its options. The plant had a spare transformer that could have been changed out at a cost of approximately \$3 million, but in addition to the prohibitive cost, the plant feared that they'd have the same problem with the new transformer. Off-load treatment was also an expensive option due to the lost revenue of electricity sales plus penalties applied by Consumers Energy, with whom MCV is contracted to have a certain amount of available power at all times. MCV turned to Pall for help in finding a cost-effective solution.



Pall Corporation's HTP070 combines mass transfer dehydration, degasification, and particulate control with comprehensive safety, monitoring and trending capability for the online/onload treatment of power transformers.

The Solution

After evaluating MCV's situation, Pall proposed its HTP070, an "online onload" oil conditioner designed to perform an oil treatment by removing moisture and gas from the oil and windings on a "live" transformer.

The HTP commissioning went very smoothly which allowed for re-energization of the transformer after three-and-a-half hours. Total outage time was around seven hours, which included the coordination of the switching by MCV.

The Benefits

- After treatment with the HTP070, MCV was able to lower the total combustible gas from +12,000 to <300ppm within a 10-day period.
- The level of combustible gas has remained at a satisfactory level following the treatment.
- Downtime was shortened from approximately eight days to seven hours. (This impressive time savings was possible because the HTP allows for the treatment to be done while the transformer is energized – the only downtime the customer has is during the connecting phase).

Since each hour of outage would cost MCV approximately \$28,000, the total amounted to \$196,000 for the seven hours. MCV's previous outage, which included some maintenance/inspection activities, ran eight days. Applying the same rate to this time frame would result in \$5,376,000 in lost revenue and contract penalties.



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