

Case Study 8

Gas Compressor Lube Oil Filter Element Upgrade

Background

Gas compressor booster stations are positioned along the natural gas pipelines throughout the United States. These stations generate the pressure necessary to move the gas from production fields to storage fields and end users. To generate this pressure, the reciprocating and stationary components inside the compressor operate within very tight tolerances so lube oil cleanliness is critical not only to the compressor, but to the entire pipeline. During the winter season a shale gas compressor station was experiencing frequent unscheduled outages due to contamination related failures of bearings and control valves. Operations suspected the problem was filter related because their filter life was very short, and their sock type depth cartridges were frequently collapsed when they changed them out. They had previously tried pleated filters with similar results. Northeast Filter was called to evaluate their system, identify the problem(s) and propose corrective actions necessary to eliminate these events.

Solution

Winter months in the northeastern US are known for their extreme conditions with subzero temperatures. These temperatures are not only taxing on people but on equipment as well. These very large gas compressors use a high grade (up to ISO VG150) lubricating oil and during cold temperatures, viscosities increase as temperature decreases. These “Cold Start” conditions are very challenging on filter elements since most of these filters were sized based on (hot) operating conditions. Pleated and sock type depth filters are notorious for collapsing, channeling and even tearing during cold start conditions and causing bypass. Northeast Filter recommended the use of stacked disc elements with built-in compression springs. These springs provide the necessary compression to seal the discs during normal operating conditions. During cold start, the flow restriction from high viscosity oil causes the discs to separate (like a pressure relieve valve) allowing enough bypass to allow flow (while still filtering) without damaging the elements until the oil heats up. This proprietary design maintains structural integrity during normal and cold start conditions. The station has operated at peak capacity with no contamination related outages for two years since making the change.



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