

Case Study 4

Steam Turbine Lube Oil Anti Static Filter

Background

A major problem plaguing the PowerGen industry today is electrostatic discharge and varnish formation in turbine lube oil systems. Modern Group II lubricating and hydraulic oils are highly refined with little or no metallic anti-wear additives resulting in non-conducting fluids which contribute to this problem. Furthermore the need for smaller filtration skid footprints, higher fluid velocities and finer filtration all set-up a perfect storm for generating electrostatic potential in the turbine lube oil reservoir. Voltage potential builds (like a liquid battery) and eventually a spark (electrostatic discharge) occurs between two points of differing potential. An ideal location for this occurrence is the lube oil filter. Northeast Filter was contacted by one of our base load coal burning power plants with concerns that they were hearing a “popping” noise inside their steam turbine lube oil filters and wanted us to investigate the cause and eliminate it if possible.

Solution

A visit to the site confirmed the noise and recognized it as an indication of static discharge. Knowing that varnish formation is a byproduct of static discharge, our VAS services performed a colorimetric fluid analysis and found a high incidence of varnish formation in the oil. NFC recommended replacing the standard lube oil filter elements with “drop-in” anti-static elements which have a conductive co-pleat layer withing the media. This allows charge potential to dissipate as the fluid passes through the media and relaxing the charge potential. We also instituted a varnish mitigation program (see Case Study 5) to address the varnish already built-up in the system. The noise was immediately eliminated upon installation of the anti-static filters and after 30 days of implementing varnish mitigation, varnish potential was back to normal.



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