



**CLEAN OIL
BRIGHT IDEAS**

Turbine Lube Oil Electric Power Plant, Gas Turbine

CJC™ Application Study

Application Study
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CUSTOMER

Major North American Electric Power Plant.

THE SYSTEM

General Electric 7FA Gas Turbine.

Peaking/Cycling Power Plant.

Oil Type: MOBIL DTE 832 (ISO VG 32)

Oil Volume: 6,000 gallons (approx. 22,712 L)

THE PROBLEM

Excessive varnish formation causes sticking valves. Varnish typically develops by two thermal degradation mechanisms; pressure induced dieseling caused by air entrainment and static discharge in the main lube oil filters. The Group II base stock oil used further contributes to varnish formation due to a poor ability to maintain degradation products in solution. Varnish contamination leads to unit trips that cost from \$ 25,000 to \$ 250,000 in lost production, downtime, and repairs.

THE SOLUTION

A CJC™ Fine Filter HDU 2 x 27/108 MZ-DE, processing 10 gpm (approx. 38 L/min). This system was selected for mitigation and prevention of varnish. The system features 8 CJC™ Filter Inserts B 27/27 that utilize strong attractive forces (adsorption) to remove varnish, as well as particle contamination.

THE TEST

Oil samples were taken prior to installation and sent to an independent oil analysis laboratory for testing. Regular samples were taken and the results compared. A sub micron particle count was the key test since varnish particles are typically 0.2 - 2 µm.

The turbine operated 9 hours from December through May. The minimal run time allowed the CJC™ Fine Filter to clean the oil in the reservoir many times over, polishing the oil. During the month of June the turbine run time increased by 250 hours allowing the ultra clean oil in the reservoir to circulate throughout the turbine lube oil system. As a result, the ultra clean oil acted as a solvent, removing oxidation deposits from internal surfaces. This caused a surge in sub micron particles. Continuous filtration with the CJC™ Fine Filter significantly lowered the high level of particles before the end of June.

THE RESULT

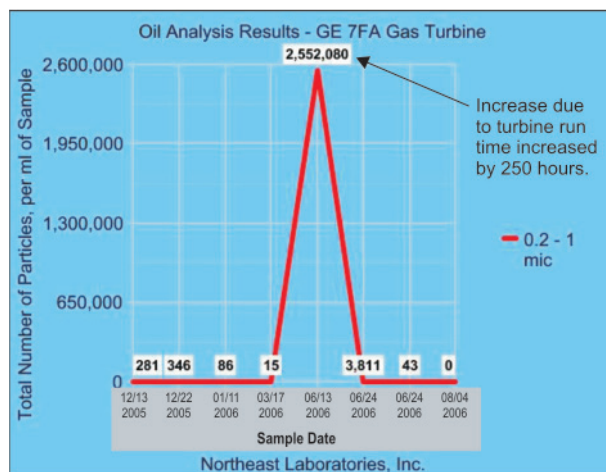
The varnish level was reduced as observed in the sub micron particle count and the entire lube system was cleaned. More importantly, a reduction in unit trips was observed and recorded.

COMMENTS

Acc. to the Power Plant Maintenance Manager:
"Finally got a dispatch of several of our units. Unit 3 (the one the CJC™ Filter is on) worked beautifully. When we checked Unit 3 the IGV servo looked completely free of varnish and the last change of filter insert had absolutely no evidence of varnishing."



OIL SAMPLES



Varnish Potential Test



Before: 40 Color Value



After: 8 Color Value