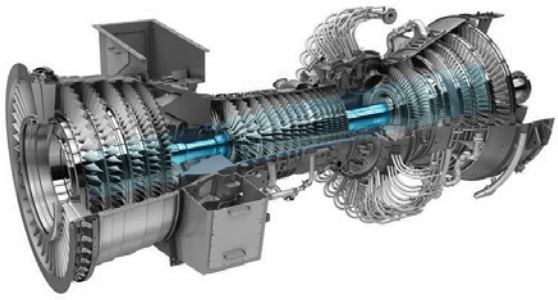
gastops

CASE STUDY

GE LM6000 1B BEARING FAILURE

There was no other indication of a problem from vibration, temperature or the chip detector in the 44 days of early warning from the MetalSCAN.



User Application

GE LM6000 Aeroderivative Gas Turbine with MetalSCAN real-time condition indication sensors monitoring A, B, C, D, E and AGB-Sumps providing baseload power generation.

Timeline

Day 1: Initial Debris Detected

The engine had been operating continuously for 12,500 hours since last overhaul when the A-Sump MetalSCAN sensor began to detect ferrous debris in late September.

Day 3: Warning Triggered

As the engine continued running, the counts reached the warning limit and increased slowly over the month of October. The Gastops' ECA (Equipment Condition Analytics) Team was in contact with the operator throughout the event, reviewing MetalSCAN data and advising on estimated Remaining Useful Life (RUL). The operator continued operation with close monitoring and small load reduction was advised. A filter analysis was performed without a shutdown and pointed to #1B Bearing material.

Day 40: Alarm Triggered

In early November, the particle count rate began to increase and the alarm limit was reached 40 days after the initial detection. A lease engine was ordered while operation continued.

Day 44: Lease Engine Replacement

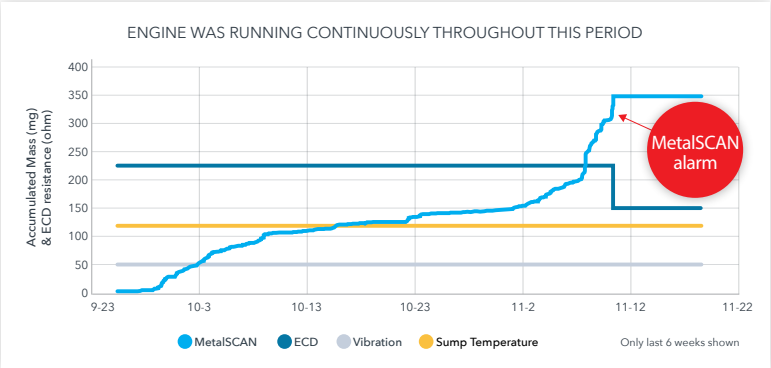
The operator was able to schedule the engine replacement to coincide with the arrival of the lease engine. Engine teardown at the depot confirmed that the 1B Bearing damage correlated very well with the MetalSCAN damage alarm indicator.

Benefits

- MetalSCAN helps gas turbine operators maximize equipment availability by providing the industry's earliest advance warning of potential damage events.
- With over 700 million operational hours over 40 years, MetalSCAN has been approved and validated by engine manufacturers, advanced research organizations, bearing companies and internationally recognized certification authorities.
- Chip detectors, vibration and temperature sensors have proven to be ineffective health indicators of equipment often leading to false, late, or missed bearing damage detection and unplanned shutdowns.
- MetalSCAN provides data once debris counts start trending upwards allowing for planned maintenance – predictively and proactively.
- MetalSCAN and Gastops' ECA Team advise operators on the real-time condition of their equipment, provide proactive actions for the condition, and predict Remaining Useful Life.

Conclusion

The operator was able to begin planning for the eventual engine shutdown and replacement at this very early stage, with an estimated 96 hours of forced outage avoided.



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