

EXCESS TURBINE BEARING TEMPERATURES RESOLVED WITH CLEANING & CONVERSION DURING PLANNED TURNAROUND PERFORMED BY THE MOBIL SERV | RIG TEAM AT THE HUMMEL POWER STATION

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Case Study

SYNOPSIS

The Hummel Power Station noticed high thrust bearing temperatures in several Siemens SGT[^] 5000F Turbines, but each came back with acceptable range MPC scores. To identify the issue, Hummel worked with Mobil Serv and RIG.

Testing performed by Mobil Serv uncovered sodium phosphate contaminates, and cleaning by RIG removed those deposits and excess varnish. After cleaning was complete, the Mobil Serv | RIG team converted the turbines to Mobil DTE 732 G for improved future performance. Since the conversion, bearing temperatures have stabilized.

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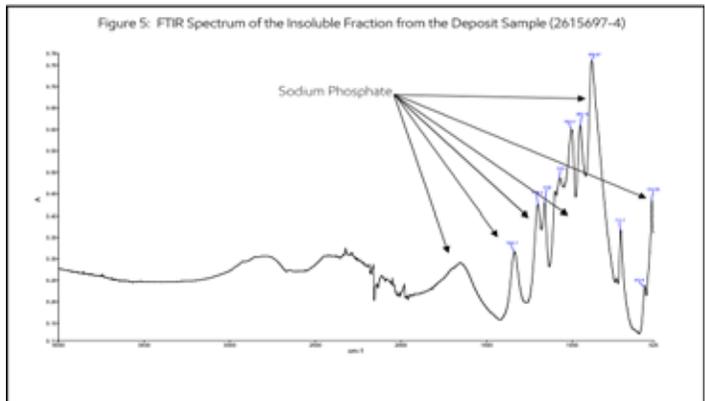
INTRODUCTION

Even though Membrane Patch Colorimetry (MPC) tests for turbines at the Hummel Station power facility returned results within the normal range, the station was seeing excess temperatures and varnish buildup in some thrust bearings.

Unsure what this meant, the station reached out to Exxon Mobil for further investigation. Samples were collected and sent to the Mobil Serv advanced analysis laboratory, along with the MPC results for each turbine: Unit 11 (MPC 6), Unit 12 (MPC 7), and Unit 13 (MPC 15). Deposit analysis identified sodium phosphate, indicating contamination.

Mobil Serv and RIG reviewed the analysis of all three Siemens SGT6 5000 F Gas Turbines. With an upcoming turnaround in mind, the following plan was presented to the facility:

- Convert the contaminated lubricant to Mobil DTE 732 G for better future performance
- Clean and flush Units 11 and 12
- Remove varnish from and convert Unit 13, which was showing elevated bearing temperatures



Lab tests showed probable sodium phosphate deposits



Unit #11 - MPC - 6



Digital Microscope Image of the Insoluble Fraction from the Deposit Sample

SOLUTION

Working with the Mobil Serv engineer, RIG developed and submitted formal procedures to the Hummel Station for approval prior to starting any work. Once the procedures were approved by all parties, the RIG team mobilized.

STAGE ONE: Deposit Cleanup Prior to Conversion

One month prior to the planned turnaround, RIG arrived onsite and blended in 5% Fluitec Decon into Unit #13 to attack and remove the sodium phosphate deposits over the next 30 days. After adding the Decon, RIG circulated the already-in-use DTE 832 through the reservoir to achieve proper blending.

STAGE TWO: Cleaning Procedures

For the scheduled turnaround RIG arrived with a crew and equipment to facilitate the cleaning & conversion

The RIG team followed the approved procedure steps:

- Starting with Unit 11, a vacuum truck pumped the reservoir and low point out to waste.
- The unit was then filled with Mobil Serv approved Mobiltherm 603 to purge any residual DTE 832 from the Siemens GT lube oil piping.
- The oil reservoir was filled to the minimum circulation run level.
- Mobiltherm 603 was circulated and filtered for eight hours. The Mobiltherm was then pumped to storage for use in Units 12 and 13.
- The RIG team performed a manual cleaning of Unit 11's reservoir using confined space entry / lock out / tag out procedures.
- The site team inspected the reservoir
- The system filters were replaced with new filters. RIG utilizes [easy-to-see flushing screens](#) during flushes to ensure no filters are left behind post-flush.

STAGE 3: Lube Oil Conversion

After cleaning was complete, Exxon Mobil delivered 6,000 gallons of Mobil DTE 732 G. RIG filled the unit and circulated the oil until an ISO Cleanliness Level of 16/14/11 or better was achieved on site via laser particle counter.

This process was then repeated for Units 12 and 13. Samples were taken from each unit and sent to a third-party laboratory to verify the on-site particle counter.

FINAL RESULTS

RIG was able to execute the service of all (3) units during the planned outage and on-budget while coordinating the removal of waste oil and deliveries of virgin product.

The third-party analysis of the final fill of each unit came back well-under the targeted ISO Cleanliness Levels:

- Unit #11 – ISO 14/13/09
- Unit #12 – ISO 14/13/09
- Unit #13 – ISO 13/12/08

In the two months following the successful execution of the service, Hummel Station has reported the temperatures of the bearings have normalized and remained within system operating parameters.



Reservoir Before Cleaning



Reservoir After Cleaning

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