CASE STUDY

# Improved Turbine Durability Extends Inspection Intervals

**The Holden Power Plant in Missouri, which is owned by Associated Electric Cooperative Inc. (AECI), operates three Siemens V84.2 simple-cycle dual fuel combustion turbines that have a combined output of 321 MW. In order to maintain high reliability rates, it is necessary to perform periodic inspections and maintenance as specified by the original equipment manufacturer (OEM). However, thanks to a series of modification and upgrades from Sulzer, the plant was able to significantly increase the maintenance interval for its turbines and therefore reduce its maintenance costs.**

**Due to the fluctuating demand for power, the amount of time each gas turbine operates can vary greatly. Such units are unlikely to exhibit any great amounts of wear, but oxidation of the compressor is a much more likely issue and so it is important to enforce regular inspections, even on equipment that is used infrequently.**

**Field Services team getting ready to install a gas turbine rotor after overhaul**

> *"Projects such as this require a considerable level of expertise and technical knowledge in order to complete them successfully. Working with Sulzer, we have managed to significantly increase our inspection periods, improving the availability and durability of our plant."*
>
> Gabe Fleck, Manager of Gas Plant Operations at Associated Electric Cooperative Inc.

## The challenge

To investigate the possibility of extending the calendar-based inspection intervals without affecting the performance or reliability of the turbines:

- apply anti-fouling and anti-corrosion coatings to compressor sections.
- engineer and install new coatings for hot gas path (HGP) components.
- improve the cooling structure of the flame tube to increase durability by reducing erosion and oxidation.

## The solution

- The new compressor coatings greatly improved the corrosion resistance while reducing the reliance on the inlet dehumidification equipment.
- The flame tube F-ring was machined to allow an Inconel 82 overlay to be welded in place and machined to the required diameter.
- A full thermal barrier coating (TBC) was applied to the combustion section.
- Additional cooling holes were drilled in the flame tube to improve durability and minimize erosion and oxidation.

## The Sulzer difference

- The ability to deliver a true turnkey solution for the dual fuel turbine
- Creating engineered improvements that combine mechanical design changes and advanced coating technologies
- Providing precision, tailored engineering solutions supported by a wealth of gas turbine experience

**The experienced team at Sulzer proposed a range of modifications and enhancements to both the rotating and the stationary sections of the turbines**

## Customer benefit

The HGP inspection has been extended from a six-year interval to at least 10 years. The major inspection will now be carried out after 20 years, instead of the original 12 years.

Following the success of this project, the same improvements were also implemented on the other two gas turbines at the site.

In recognition of the improvements that have been implemented at the Holden site, the owner was presented with a Best Practices award for improved performance by the Combined Cycle Journal.

## Product data

- Three Siemens V84.2 simple-cycle dual fuel combustion turbines
- Combined output of 321 MW
- HGP Inspection every 25,000 equivalent operating hours (EOH) or 6 years
- Major inspection every 50,000 EOH or every 12 years

Inconel 82 is a nickel chromium alloy with high strength and an outstanding corrosion resistance.

A ceramic TBC was applied to the bezel rings and segment plates, mixing elbows and inner casing, in order to increase the resistance to thermal distress in the hottest areas of the unit. In addition, a chromium carbide coating was applied to all of the mating surfaces of the combustion section to minimize wear as the parts expand and contract.

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