Compressor Updates
6B User Conference

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Summary of Topics

Field Learnings
Maintenance
Blade Health Monitoring
Robustness Enhancements
Field Learnings
Fleet compressor finding updates

Very limited compressor findings over 30+ years since introduction of E class

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6B compressor cross section with highlighted areas of interest
Stator Vane 1 – Clashing

- A handful of units in North America & Middle East have seen Stator Vane 1 (S1) leading edge (LE) clashing damage
- Clashing damage characterized with minor missing material in the leading edge tip of the stator vane, touching the root of the Rotor Blade 1 (R1) Trailing Edge (TE)
- Occurs typically at 6 o’clock position and seen in 3 to 4 vanes; no forced outage till date due to clashing damage alone
- Typically due to vane - ring corrosion lock up
6B R1 Liberation failures

- **HCF Driven Failures**
- **Aggravating Factors Include:**
  - Corrosive Environments
  - Poor Inlet Filtration (Erosion)
  - Use of Inlet Foggers/Evap Coolers
Maintenance
Regular standardized maintenance is important to compressor health

Maintenance advice for availability and reliability – Inlet

• PSIB20170428A published in April 2017 to re-emphasize the importance of maintaining and regular inspections of the inlet systems, wet operations, and the overall gas turbine
• Installing appropriate filtration system for the site environment per GEK116269
• Performing Inlet system inspection and maintenance per the guidelines PSIB20130813A
• Replacing inlet filters regularly
• Ensuring water quality of all the wet operations (water wash, foggers, evap coolers, etc.) meeting specifications per GEK101944

Findings captured from the proposed inspections

Regular standardized maintenance is important to compressor health
Maintenance advice for availability and reliability – Gas Turbine

- Performing borescope inspections of gas turbine internal components as per GER3620 – Focus the inspection to look for corrosion pitting, impact damages, any abnormalities
- If wet operations such as fogging are being utilized, inspect R1 leading edge roots via BI for any significant erosion progression
- Ensure IGV’s are calibrated properly
- Ensure the inspections pertaining to inlet guide vanes are performed regularly – backlash, inner bushing clearances

Contact GE for Site Specific Guidelines
Blade Health Monitoring
Blade Health Monitoring System Overview – NEW!

- R1 Liberation
- R2 Tip Loss
- R3 Tip Loss

[Diagram showing Blade Health Monitoring System with 2 probes/stage, R1 Blades, R2 Blades, R3 Blades, A/D converter, Blade tip timing calculation, Blade Vibration Analysis, Deflections of blades measured, Amplitude, Volts vs. Time, Milliseconds, Compressor Blade Health Monitoring data, R1 Liberation, R2 Tip Loss, R3 Tip Loss images]
Robustness Enhancements
Stainless steel rings for Stator Vane 1 – Hardware upgrade

- GE has introduced new SS stator vane ring segments for the Stage 1 stator
- Ring material changed from carbon steel to stainless steel
- SS rings have better resistance to corrosion and oxidation between the vane/ring and the ring/casing interface
- Increased the number of ring segments from 6 to 12 → Easier to remove during maintenance
- Direct replacement to the existing ring segments
- Shimless configuration
- No vane lock up seen in the F and 7EA stainless steel ring segments to-date

Hardware replacement can be done during planned maintenance activity
Blade Undercut and GECC1 Coating

- R1 Blades available with Under-cut to Increase Robustness
- Replacement airfoils are now fully shot peened
- GECC1 Coating available and recommended on Rotor Blades and Stator Vanes in corrosive environments

Hardware replacement can be done during planned maintenance activity
Questions?