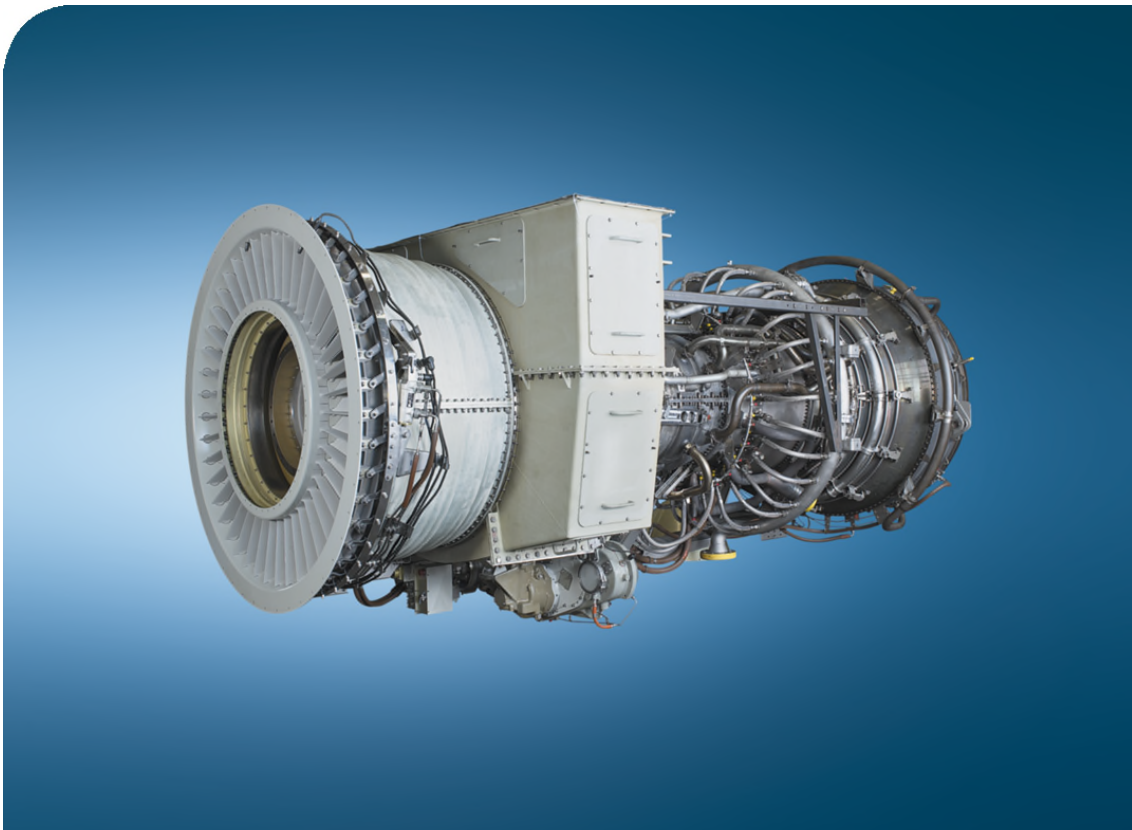


Field Service Report

Exchange of stage 1 HPC blades & HPC blades cleaning LM6000 PC SAC



MTU Representative: Markus Demko

Dennis Geissler

Serial Number: 191-557

Customer: UTE

Date of Visit: 14.11. - 06.12.2016



Field Service Report
Intervention
 LM6000 PC SAC

MTU Maintenance Berlin-Brandenburg
 An MTU Aero Engines Company

1. General

Date	12.12.2016		
PO	/		
MTU WBS Element	P.0464808.01		
Customer	UTE		
Location	Punte del Tigre; Onshore		
Customer Representative	Juan Pablo Ranz Pino	Tel: (+598) 29243927/31 e-Mail: jranz@ute.com.uy	
MTU Technician	M. Demko		
Field Service Engineer	Lorgio Batard	Tel: +493378-824-268 e-Mail: lorgio.batard@mtu.de	
Customer Account Manager	Sebastian Bernard	Tel: +493378-824-783 e-Mail: sebastian.bernard@mtu.de	
GT Model	LM6000-PC-NDWG13	GT S/N	191-557
Unit	1		
Packager	Stewart & Stevenson		
Control	Woodward MicroNet		
Driven equipment	Generator (Brush)		
GT TSN	30419 hrs	GT SSN	1276
GT TSLO	unknown	GT SSLO	unknown
Date last inspection	unknown		
Date last MTU-Visit	first visit		
Date unit out of service	unknown		
Date unit return to service	22.11.2016		
Type of Outage	Planned		
Type of Fuel	Dual Fuel		
NO _x -Reduction	Water		
Power-Enhancement	N/A		



Field Service Report
Intervention
LM6000 PC SAC

MTU Maintenance Berlin-Brandenburg
An MTU Aero Engines Company

2. History and Condition of Engine Operation

- First visit of MTU on site. Previously maintenance & service carried out by TCT.
- No abnormalities or damages in the past operation period according to UTE staff.
- The unit was encountered in a generally good condition.

3. Findings and Conclusions

- GT external overview: claret red, sticky discoloration around the HP compressor section, lube and scavenge pump, liquid fuel manifold as well as VBV duct is visible. This might be caused by a fuel leak previously. No abnormalities at leak check during test run to report.
- VBV duct: the bellow found slightly damaged but the function is given. No air leaks were visible. UTE staff is informed.
- All HPC Stage 3 - 5 washer / bushings were found in very worn condition (~25000 running hours)
- The HP section (rotor / stator) was found in slightly dirty condition
- Left hand side: master lever - stage igv clevis was found with a damaged viton boot (cracked) but the function is still given. On the right hand side stage igv clevis viton boot is missing and has been repaired temporary with rtv red silicone.

4. Work carried out

- Exchange of stage 1 blade set (mid span) including hand cleaning of compressor section as far as possible after top case removal in accordance with GEK 105059 / WP 241300
- Visual inspection of HP compressor section - serviceable
- HPC stage 2 - 4 blade chord length inspection (measurement) and documentation in accordance with GEK 105059 / WP 241300. This was performed on customer request and found within the specifications.
- HPC stage 3 - 5 washer / bushing replacement in accordance with GEK 105059 / WP 241200. This was performed on customer request with parts & tooling (fabricated on site) provided by UTE.
- VSV travel & monitor signal check carried out including leak check during start up. Customer request 1 hour test run at base load was successful and recorded GT parameter were found within the limits.

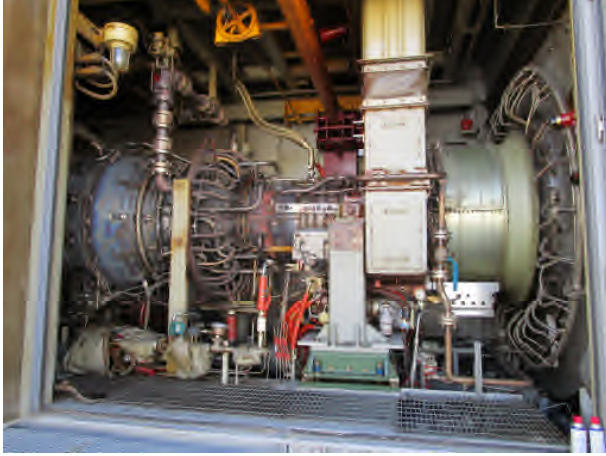
5. Open Items

- None.

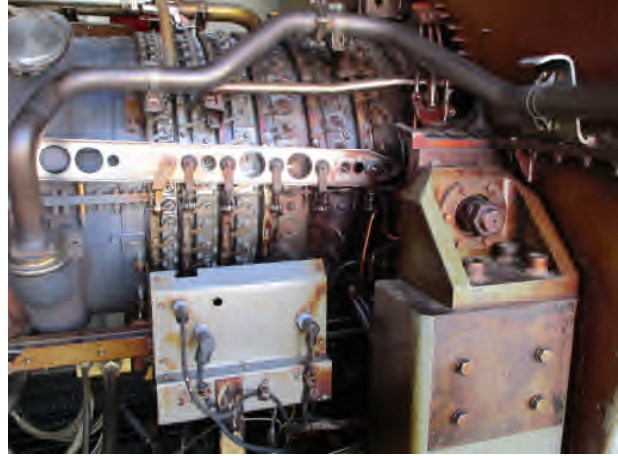
6. Recommendations

- Installation of new stage igv viton boots on both master lever and check of condition of the remaining boots during the next intervention.
- Inspection of HPC stage 3 - 5 washer / bushings during semi annual GT inspection is highly recommended as well as documentation of operation hours for LM 6000 sprint version (12500 scheduled replacement according to GE Manual).

7. Pictures – General Findings



Picture 1: Unit 1 overview



Picture 2: Discolorations on VBV duct



Picture 3: Discoloration on lube & scavenge pump



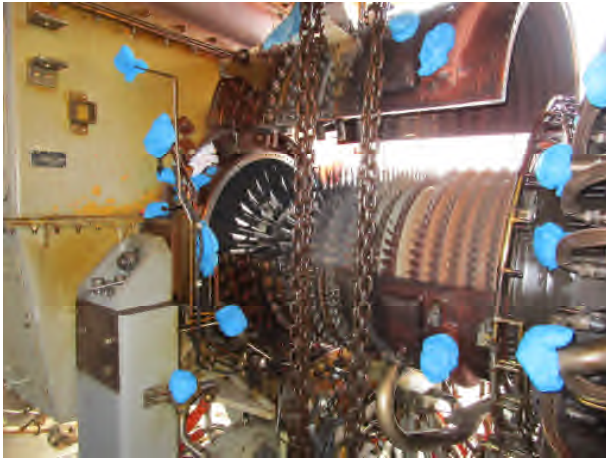
Picture 4: VBV duct bellow - damages



Picture 5: Viton boot left hand side with crack



Picture 6: missing viton boot right hand side



Picture 7: HPC top case using lift beam



Picture 8: upper case in UTE workshop



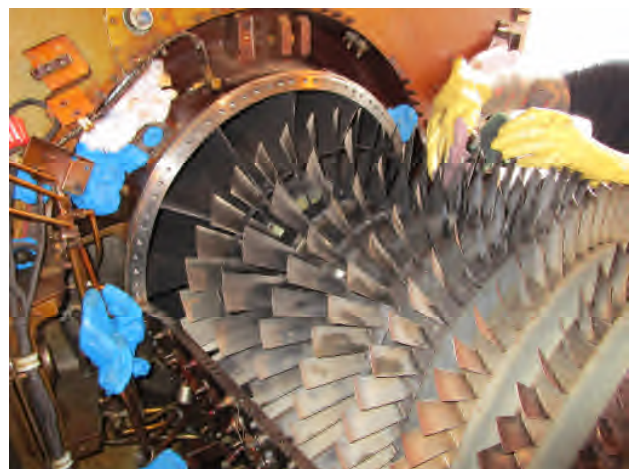
Picture 9: stage 3 - 5 removed bushing condition



Picture 10: missing washer material stage 5



Picture 11: washer / bushing kits provided by UTE



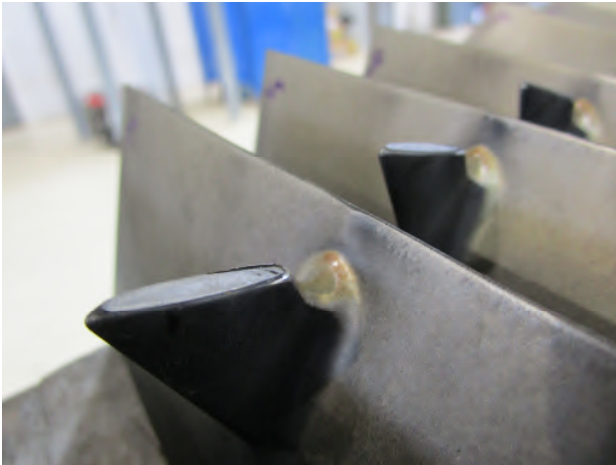
Picture 12: HP compressor section hand cleaning



Picture 13: stage 2 - 4 blade chord measurement



Picture 14: removed stage 1 blade set (36 ea)



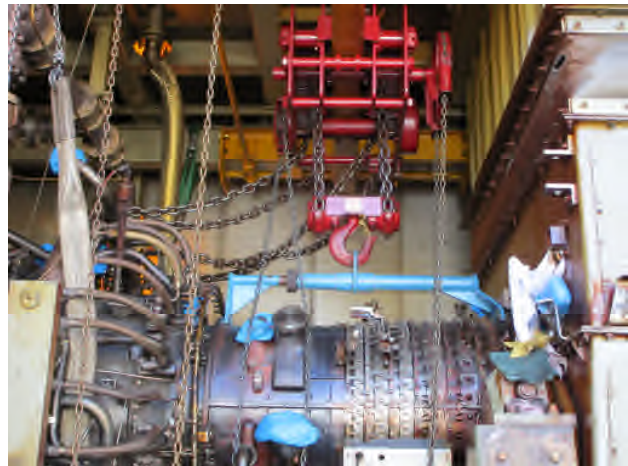
Picture 15: mid span pad condition after removal



Picture 16: new installed stage 1 blade set



Picture 17: HPC upper case installation



Picture 18: GT final assembly



Field Service Report
Intervention
 LM6000 PC SAC

MTU Maintenance Berlin-Brandenburg
 An MTU Aero Engines Company

8. Replaced Parts (provided by UTE)

No.	Description	Part No.	Removed	Serial No.	Removed	Qty.
			Installed		Installed	
1	HPC Stage 1, blade set	K024G02		various (see balance sheet)		36
		K024G02		various (see balance sheet)		36
2	HPC Stage 1, blade retainer	1854M45G02		without		36
		1854M45G02		without		36
3	Guide, VSV Actuator	9609M13P02		without		2
		9609M13P02		without		2
4	Spacer, VSV Master lever	1333M60P02		without		2
		1333M60P02		without		2
5	Kit, HPC Stg.3-5 washer / bushing	L694G02		without		1
		L694G02		without		1
6	Nut, Actuator	635E901P03		without		1
		635E901P03		without		1
7	Bolt, Actuator	9628M16P02		without		1
		9628M16P02		without		1
8	Gasket, triangle, B-sump vent	L46032P01		without		1
		L46032P01		without		1
9	Gasket	J219P05		without		2
		J219P05		without		2
10	Gasket	9057M92P11		without		1
		9057M92P11		without		1
11	Gasket	J219P08		without		1
		J219P08		without		1
12	Gasket	9294M61P03		without		1
		9294M61P03		without		1