Unit #3 LM6000 Depot Maintenance and Oil Leak Investigation Work Scope

1 Scope of Work:

OMPA LM6000 PC Unit Depot Level Work Scope		
Engine Serial # 191-398		
Engine Fired Hours		
Engine Attempted Starts		
Engine Fired Starts		
Last Borescope performed	November 18, 2023	Performed by GE
External inspection and photograph. Flow Check Sumps, BSI and take Oil Samples Disassembly of GT Into module form3. For all components and modules, perform inspections, and advice of any repairs or replacements required as non-conformance with OEM specification. Inform OMPA as soon as practical and provide quote for repair or replacement. Work scope per IRM GEK 98492 and/or OEM Engineering standard shop procedures		
Engine Induction and Dis-Assembly		
A set of incoming pictures shall be taken to document condition of receipt. Pictures shall be provided to OMPA as part of the final report.		
AIR COLLECTOR ASSEMBLY		
Visual inspect Perform any NDE inspections per GE guidelines		
VARIABLE BYPASS VALVES		
Visual inspect Inspect VBV Doors/seals and re-quote as required Inspect linkages, hardware, and test associated actuators. Reassemble using new consumable hardware as required		
LOW PRESSURE COMPRESSOR ROTOR		
Disassemble to remove cases for check balance of rotor Clean and inspect Balance rotor		
LP Sprint Nozzles		
Remove and ship nozzles to service center Perform flow test on each nozzles and compare spray pattern and flow		

rates to GE guidelines provide replacement and /or refurbishment quote Ship to site and install
LOW PRESSURE COMPRESSOR STATORS 0 - 2
Clean and visual inspect all components, perform SB 212
COMPRESSOR FRONT FRAME
Disassemble to remove IGB and perform SBs SB209, 237, 249 Clean, NDI and visual inspect all components as needed Perform inspections on the Unit #3 bearing housing and advice of any wear. Quote Replacement of Unit #3 Bearing
FAN FWD / MIDSHAFT ASSEMBLY
Perform SB 240 Clean and visual inspect all components Perform all applicable NDE inspections per GE guidelines
HIGH PRESSURE COMPRESSOR ROTOR
Disassemble to perform SB 225 and 310 Clean, Visual inspect components Perform all applicable NDE inspections per GE guidelines Perform inspection of Stage 1 mid-span platform per GE guidelines for interlock wear, shingling, gap or missing pad. Perform inspections on platforms per GE guidelines for platform shingling, bowing, distortion or cracks Final Balance Rotor
HIGH PRESSURE COMPRESSOR STATOR
Disassemble to perform SBs 203 and 315 Clean, Visual inspect components Inspect bushings and replace as required per GEK 119192 Perform all applicable NDE inspections per GE guidelines
COMPESSOR REAR FRAME
Disassemble to perform SB 307 Clean, NDI and visually inspect all components as required Perform sump pressure checks Inspect and perform NDE inspections on #4B, #4R, and #5R bearings and seals Replacement of #4B Bearings
COMBUSTION CHAMBER
Perform inspections per GE guidelines and provide inspection report Provide Overhaul cost Provide proposal to overhaul fuel nozzles and comply with any applicable SB e.g. SB 284
STAGE ONE NOZZLE ASSEMBLY
Disassemble into piece part level Clean, NDI and visually inspect all components Route vanes for Overhaul

Reassemble using new consumable hardware
STAGE TWO NOZZLE ASSEMBLY
Disassemble into piece part level Clean, NDI and visually inspect all components as required Route nozzles for Overhaul Route shrouds for Overhaul Route inter stage air seals for Overhaul Reassemble using new consumable hardware Grind shrouds and Interstage air seals to specified dimensions
HIGH PRESSURE TURBINE ROTOR
Disassemble into piece part level Clean, NDI and visually inspect as required Dimensional inspect major components Eddy Current inspect stage 1 & 2 disk Route rotating seals for Overhaul Reassemble using all new hardware Grind blade tips to specified dimensions Final balance rotor assembly
INLET GEARBOX
Visually Inspect and perform SB 220 Perform all applicable NDE inspections per GE guidelines
ACCESSORY GEAR BOX
Visual inspect Perform all applicable NDE inspections per GE guidelines
HYDRAULIC SYSTEM
Perform SB 250 on actuators Perform all applicable inspections per GE guidelines
LOW PRESSURE TURBINE MODULE
External inspection and photograph Disassembly to remove TRF Perform all applicable NDE inspections per GE guidelines Inspect PCC System for Wear and re-quote to repair system
TURBINE REAR FRAME
Disassemble to perform SB 323 Clean, NDT & Inspect as required Inspect D and E Sump packing per GE guidelines and advice Quote replacement of #7R Bearing
CORE MODULE ASSEMBLY
Reassemble the core module per GEK 98492 Incorporate all new consumable hardware on all flanges Incorporate all new consumable hardware on all piping
FINAL ENGINE ASSEMBLY
Reassemble engine per GEK 98492 and/or OEM Engineering standard shop procedures

Incorporate all new consumable hardware on all split lines
Incorporate all new consumable hardware on all piping
Prep unit for test cell
Perform full load test of unit, cost to include fuel charges. OMPA will witness the test
Perform Post Test Borescope inspection
Prep to Ship

Vendor to provide firm fixed price for Hot Section Overhaul.

Vendor to provide Optional cost for hot Section rotable swap

Service Department

Provide manpower, tools, and services to remove unit, package, and ship turbine to service provider depot. Please note this is a turnkey service with shipping container and special tools such as turbine dolly is provided by the service provider.
Provide manpower, tools, and services to install unit, align, and perform on site functional test of unit

Service Bulletin Number	Service Bulletin Description
177	HPT Rotor Stage 1 Disk Inspection
179	Fan Mid Shaft Pilot Diameter Rework
185	HPT stage 2 shroud coating chage
188	TBC on High Pressure Turbine Stator Stage 1 Nozzles
187	Thrust Balance Valve Elimination
189	Improved VSV & Variable IGV Actuator Intro (PA, PB, PC, PD Models)
191	Stage 1 High Pressure Turbine Rotor Blades Replacement
203	Stage 5 VSV Lever Arm Improvement - High Boss Stator
204	Lube & Scavenge Pump - Product Improvement
209	Compressor Front Frame Bolt Change
210	HPT Rotor Stage 1 disk Rework
211	Stage 8 LPT Cooling Air Tube

212	LPC Stage 3 Bushing Replacement
215	High Pressure Turbine Rotor Stage 1 Blade Replacement
216	High Pressure Turbine Rotor Diffuser Vane Ring
219/222	Igniter Plug Replacement
223	Introduction of new N5 Stage 1 HPT Nozzles
225	Introduction of new spline adapter.
229	Stages 3-5 HPC Rotor Blade Replacement
230	T4 Thermocouple probe reinforcement
236	CRF Oil Manifold Hardware
237	VBV door clevis bolt length increase
238	HPT Stage 2 Nozzle Outer Platform Improved Cooling
240	Improved Forward Fan Shaft Coupling Nut
241	HPT Rotor Stage 1 Disk Enhanced Inspection
243	Combustor primary swirler retention
246	Stage 1 HPT Rotor Disk Forward Cavity Erosion
248	LPT Stator Stage 1 and 2 Shroud Replacement
249	Introduction of self locking VBV linkage clevis lock nuts
250	Introduction of VBV Actuator without Lockwire
252	LPT Shaft XNSD Speed Sensor Inspection
254	No. 3 Bearing Stationary Oil Seal Replacement
255	LPT Stator Stage 1 and 2 Nozzle Internal Cavity Coating Addition
256	No. 1 Bearing Stationary Air/Oil Seal Replacement

258	Air collector aft flange bolt replacement
261	High Pressure Turbine Cooling Air Tube and 11th Stage Check Valve Replacement
262	LPT Shaft XNSD Speed Sensor and LPT Speed Electrical Harness Replacement
267	Stage 1 High Pressure Turbine Stator Nozzles with Thermal Barrier
273	Improved LPT Stator Stage 1 Nozzle
286	Improved LPT Shaft XNSD Speed Sensor Spring Retainer
292	Introduction of New T25 Sensor PN L443745P04
294	Stage 8 Air Manifold Orifice Plate Replacement for G/TS with
295	Redesigned LPT Rotor Stage 5 Blade with Improved Durability
301	Combustor and fuel nozzle hardware coating
303	Pneumatic starter
305	Improved LPT PCC System
306	Stage 1 High Pressure Turbine Stator Nozzles - Leaf Seal Improvement
307	CRF Oil Manifold Hardware Improvement (PA, PA Uprate, PC, and PG)
310	High Pressure Compressor Rotor Stages 3-5 Blades Dovetail
311	Chip Detector Replacement
313	Improved radial drive shaft housing and hose clamps
315	Stage 11 Compressor Stator Vanes Part Number Identification and

	Replacement
317	LPT Cooling Air Orifice Plates Inspection and Replacement
322	HPT Stage 2 Nozzle Cooling Air Tube Internal Retaining Rig
323	TRF D- and E-Sump Preformed Packing Material Change
324	Introduction of new ignition exciter
325	Introduction of VSV Harness Support Brackets for Improved electrical Cable Support

2 Submittals:

2.1 Bidder shall submit a list of Service Bulletins applicable for the unit serial number along with the bid.

2.2 A complete list of deliverables will be agreed upon between the successful bidder and OMPA, and these deliverables will be used in the final checkout.

3 Field Support:

3.1 This is a turnkey project and the bidder is responsible for all tasks, however not limited to turbine removal, shipment to and from the depot facility, tasks as indentified in the work scope, installation, alignment, startup testing and resolving any issues that arise during these efforts.

3.2 Bidder will provide test cell testing procedures for approval prior to commencement of testing.

3.3 Bidder shall provide checkout of all circuits and shall conduct all functional tests including, but not limited to:

1 Calibration of VSV, VBV, fuel gas, and water injection control valves.

2 Calibration of critical instrumentation

3 Startup and operational checks of the following systems:

3.3.3.1 Hydraulic System

3.3.3.2 Turbine and generator Lube oil system

4 Division of Responsibilities: Division of responsibilities will be based on a mutual agreement between the successful bidder and OMPA.

5 Warranty: Bidder shall identify in detail the type of warranty being provided on parts being supplied, labor, and any work performed during upgrade.

6 Project Schedule:

Issue Bid for Unit #3 Work per Scope:	T B D
Intention to Bid:	T B D
Receipt of Bids:	T B D
Award Contract:	T B D
Completion of Installation, Startup and Testing:	T B D

7 Milestone Payment Schedule:

Contract payment to the winning bidder will be based on the following recommended milestone payment schedule:

Award of contract	10%
Turbine Induction and Dis-Assembly	25%
Completion of Assembly and Load test	30%
Completion of Installation, startup, commissioning and provisional acceptance	20%
Receive documentation/drawings and final report acceptance by OMPA	15%

Milestone payments shall be made in accordance with Special Conditions Section 4.

8 **Terms and Conditions:** Refer to Attachment ‘a” and “b”.

Attachment 1
Proposal Pricing

Description	Estimated Man-hours	Cost
ENGINE INDUCTION AND DIS-ASSEMBLY		
AIR COLLECTOR ASSEMBLY		
VARIABLE BYPASS VALVES		
LOW PRESSURE COMPRESSOR ROTOR		
LP SPRINT NOZZLES		
LOW PRESSURE COMPRESSOR STATORS		
COMPRESSOR FRONT FRAME		
FAN FWD / MIDSHAFT ASSEMBLY		
HIGH PRESSURE COMPRESSOR ROTOR		
HIGH PRESSURE COMPRESSOR STATOR		
COMPESSOR REAR FRAME		
COMBUSTION CHAMBER		
STAGE ONE NOZZLE ASSEMBLY		
STAGE TWO NOZZLE ASSEMBLY		
HIGH PRESSURE TURBINE ROTOR		
INLET GEARBOX		
ACCESSORY GEAR BOX		
HYDRAULIC SYSTEM		
LOW PRESSURE TURBINE MODULE		
CORE MODULE ASSEMBLY		
FINAL ENGINE ASSEMBLY		
UNIT TESTING AT THE TEST CELL		
POST TEST BOROSCOPE INSPECTION		
VENDOR TO PROVIDE FIRM FIXED PRICE FOR HOT SECTION OVERHUAL		
VENDOR TO PROVIDE OPTIONAL COST FOR HOT SECTION ROTABLE SWAP		
SERVICES-TURBINE REMOVAL, SHIPMENT TO DEPOT, RETURN TO SITE, INSTALLATION, ALIGNMENT,AND TESTING		
COST TO PERFORM ALL APPLICABLE/APPROVED SERVIVCE BULLETINS		