

	Project Name GE Frame 9/E RoCa 3	Document N°. WS600217008TS
Technical Specification for Major Inspection Frame9/E gas turbine		

On our Uniper Benelux (UBX) location RoCa3 at Rotterdam we have stationed a Frame9/E gas turbine with generator.

In 2022 there is a HGP planned for the unit. In hours it is a HGP but in activities it is a Major Inspection. In this document we will further on call it a MI (Major Inspection)

A. Planning dates activities

The completions of all activities are according planning UBX which will be finalized after awarding the order. Temporary planning dates are:

Start date MI	:	Monday 16 May 2022
End date MI	:	Wednesday 06 July 2022
Commissioning end date	:	Friday 08 July 2022

Your lump sum tender will include the design and presentation of a working plan and quality plan.

During the Major inspection UBX will have a representative to sign on a daily basis the quality assurance hold-, witness- and review points.

The contractor must, after awarding of this contract, present and discuss for approval the following planning's:

- Overall planning based on the specified planning dates
- Manpower planning including subcontractors
- Organization plan
- Floor plan
- Overall estimated progress curve of the work
- After approval of the overall planning
 - Detailed implementation schedule
 - Safety, health & quality plan

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B. Scope of work to be carried out

1. Major Inspection GT3 RoCa, gas turbine Frame9/E included the hereunder mentioned innovations.

With this overhaul we want to bring the engine in such a condition that we can run for another 75.000 hours. The running regime changed from continues running on base load into start/stop with 5000 hours and 100 starts per year and part load conditions with a higher exhaust temperature.

This mean that we have to renew:

1. Exhaust frame due to: bad internal insulation, cooling air leakage on the horizontal flange, cracking of the material, bad bolt connection on the flanges and there for high tunnel temperature
2. Diffusor due to: bad bolt connection on the exhaust frame, deformation on roundness, cracking of the material, leakage on the flexplate connection.

This mean that we have to remove the gas turbine rotor. This will be the first time. Because of the weight of the rotor we cannot place it on floor. After removing it has to be placed on a lorry and stored on another facility.

To bring the engine back to it original base load condition we have to renew:

- 3 first row of compressor blades: the installed blade are cropped due icing problems in the past.

The rotor, blades compressor casings and vanes have to be cleaned.

To meet the low load conditions we have to install:

4. new shrouded S17s, EGV1s and EGV2s and a new modified inner barrel. The compressor discharge casing has to be repaired on the grooves.

Removal of the rotor means extra work. The gas heater system on the roof of the gas turbine enclosure has to be removed.

If one of the above option has a consequence of changing the control system then this must be stated in the offer with a complete price of changing the system.

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A Major overhaul on gas turbine GT3 RoCa as specified below. Scope of services to be preformed is summarized in exhibit nr1.

Maintenance and records are to be executed according to the latest standard protocols and technical information letters of manufacturers.

After performing the Major Inspection (MI) the installation must be commissioned and ready for commercial operation.

Gas turbine type : PG9171E with combustion extendor and uprates:
High Pressure Brush Seal
2 Bearing Brush Seal
Turbine Inter stage Brush Seal
Haynes HR-120 One Piece Stage 1 Shroud)
Bleed heat valve with 7 % passage instead of 5

Design memo no. : RA9006
Model list no. : 9A1PE61
Manufacturer : Thomassen (license General Electric)
Year of built : 1996
Number of running hours : ca. 175.000 OH

Control system : MarkV

Generator : ABB, WY21 Z-092
Power : 168,75 MVA,
Reactive load : Cosφ 0,8
Rotational speed : 3000 rpm
Voltage : 15KV
Frequency : 50Hz

Exciter : ABB, WTB95
Power : 380 KW
Frequency : 200 Hz

2. Capital parts and consumables

Uniper has consumables and capital parts on stock. The contractor must check in advance whether all spare parts are complete, usable, tailored and available to carry out all required activities. The contractor must be able to supply or complete all necessary parts and consumables to carry out the Major overhaul.

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3. Disassembly and assembly of gas piping, piping, inlet duct and exhaust duct gas turbine.
In general activities that are to be carried out:

- 3.1. Disassemble and move inlet duct to "parking space"
- 3.2. Disassemble connecting ducting, gas piping, valves and construction of gasheating and remove gas heater complete.
- 3.3. Disassemble enclosure gas turbine.
- 3.4. Disassemble upper half exhaust compartment and necessary casings
- 3.5. After overhaul re-assemble mentioned items
- 3.6. Commissioning assistance re-assembled gas system (leak tests and repair leaks)

4. Instrumentation inspections

According to the latest standard inspection protocols the instrumentation has to be maintained. Scope of services to be performed is summarized in exhibit nr 1.
Specification of the device list has to be revised before the start of the outage but after awarding this order.

5. Generator inspections

Generator inspections are not a part of this specification.

6. Specification Quotation

The quotation must be specified in lump sum and duration of the following items:

- 1. Gas turbine
- 2. Rotor works at another facility
- 3. Capital (new) parts and consumables
- 4. Activities ducting and enclosure
- 5. Instrumentation and Speedtronic

Lump sum prices are including necessary tools, rental of tools, lifting tools (hoist and slings), air hoses/tools with matching connectors EBX, workshop containers, cranes, transport, housekeeping and cleaning.

Well before the overhaul but after possible awarding of this contract the contractor must list and check all the necessary tools to be present on site.

Your lump sum must also include all necessary specialists and professionals that you will deploy, gate access, safety instructions, any other day/week/travel and hotel allowances.

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Contractor shall provide a separate quotation for each extra activity that is not a part of this specification. Extra activities are to be approved in writing by a representative of UBX. Contractor must provide a separate hourly rates list for subsequent calculation of the extra activities.

Your lump sum quotation is in compliance with this document specification.

Any deviation has to be mentioned in a separate deviations list.

Unless otherwise stated awarding the quotation will be based on the "general conditions of Uniper Benelux uniper en 2018-01" and general safety regulation of Uniper Benelux uniper en 2020-01".

7. General activities

1. One week before the start of the Major overhaul all preliminary activities have to be finished.
2. All equipment and piping which are to be disassembled in- and outside the casing in order to make your overhaul activities and working site accessible must be performed by contractor and forms a part of your lump sum. Temporary sealing of all flanges to be disconnected are provided by contractor and forms a part of your lump sum.
3. During the commissioning sufficient personnel must be on site to repair any failure of installation parts where contractor have worked on during the overhaul.
4. The commissioning end date will be provided 1 day in advance at the latest 1 week after completing the activities.
5. All cleaning activities and housekeeping of working space has to be arranged by contractor.
6. Contractor carries out any required realignment activities of the gas turbine –gearbox - generator. The check of the alignment of the complete turbine-generator set is a part of the contractual lump sum scope.
7. Eon Benelux will provide for
 - Electric power supply (24V)
 - Air supply (6bar)
 - Accommodations such as office-, lunch- and changing room-shower-toilet facilities

B. Reports after awarding of contract

Your lump sum includes all standard required verbal and written preliminary, interim and final reports in accordance with the guidelines given in the Inspection & Maintenance manual of the manufacturer.

In advance, but after awarding of this contract, you must prepare and provide an action plan concerning reports.

Rights are reserved to add additional reports, hold points and witness points.

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As part of your lump sum, you must prepare, present and discuss for approval a complete quality plan in accordance with the current gas turbine guidelines.

A complete commissioning plan must be part of this.

The quality plan must be approved well before the start of the Major overhaul but after awarding of this contract to you.

☐ Reports during work

- Daily, progress of work
- Weekly a specification of manpower for the next week and the progress in relation to the overall estimated progress curve

C. General preconditions

Contractor must include any missing, incomplete or incorrect description of the scope with the tender, including financial and completion time consequences.

Contractor's specified tender is an all-in lump sum.

If items which are relevant to you are missing, please specify them during the tender.

Changing and replacing employees must be kept to a minimum. Replacement may only occur after consultation and approval.

At least 70% of the core manpower shall consist of a standing team of employees, depending on workload. These employees shall be in the permanent employment of vendor.

Sub-contracting of the work, or part of it, shall only be permitted if prior consent thereto has given in writing.

If work is sub-contracted, vendor shall remain fully responsible for the coordination and execution of the work outsourced to sub-contractor(s). For sub-contracting purposes, Vendor shall make use of approved contractors.

Uniper statement: **We work safely...or not at all!!**

Safety records on Lost Time Injury Frequency Rate (LTIFR) must be accompanied with your quotation.

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Exhibit 1