

Section C

Scope of work – On Site

Steam Turbine & Associated Components

Content of Section C

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Works

The following scope of works does not absolve the CONTRACTOR from his responsibility to carry out all works required for the proper disassembly/reassembly of the scope according to good engineering practise. The CONTRACTOR shall advise their methodology during the technical negotiations for the required works to ensure an appropriate work quality.

Before starting work, it is to be assured that:

- The Permit-to-Work is in place and the working conditions are well prepared.
- All method statements and risk assessments for all works are in place.
- All safety precautions have been carried out in accordance with the risk assessment.
- All affected electrical components are inactive and free from electric current.
- All pressures, temperatures and residual energies (e.g. position, tension, motion and energy storage) are reduced to safe levels.

The CONTRACTOR shall at all-time carry out his works respecting the following requirements in all work phases.

The CONTRACTOR shall at least carry out the following works (which are not intended to be fully exhaustive nor limiting):

- Before decommissioning of the steam turbine set, the condition of the basement, piping system, pipeline routing and pipe hangers, instruments and isolation etc. shall be monitored/ inspected. Further the vicinity of the steam turbine set shall be examined for steam/ and oil leakages via a common inspection with the CLIENT. Potential additional works shall be recorded.
- All disassembled parts shall be marked clearly with their installation point and shall be stored properly in a safe and dry location. The parts shall not to be exposed to a corrosive or aggressive ambient. For adjustable parts all according data shall be recorded.
- The risk of component failure from stress corrosion can be significantly reduced by strict adherence to cleanliness during handling. Contamination with grease and cutting fluids should be avoided and only approved anti-seize, lubricant and NDT consumables should be used. Contractor shall advise what compounds are to be used and shall provide a statement to confirm their suitability for use on turbine components.
- When separating and loosening pipes and hoses, ensure that no particles/ items are ingested; pay attention to built-in orifices. Dismantled pipes, hoses and orifices shall be cleaned, inspected and closed in an appropriate manner immediately. With reassembly all removed pipes shall be connected according to the guidelines / requirements of the turbine manufacture.
- An immediate fact finding of all components in the as-found and cleaned condition by visual inspection for damage, corrosion, deposits, stains, wear and broken-out areas shall be conducted. The evaluation of the components shall be conducted by the CONTRACTOR before the common fact finding together with the CLIENT. Within this evaluation all relevant data and tolerances shall be recorded. The desired condition and the proposed tolerances shall be advised which must take into consideration the movement of these components during operation. The Contractor shall provide recommendations for component refurbishment, where appropriate.
- Compile component specific 'as-found' condition reports with recommendations for component refurbishment where appropriate.
- Wire wool must not be used for cleaning of parts; only clean, lint free non-abrasive rags are to be used. For the cleaning of components in the oil system (e.g. bearing casings, oil tanks and pipes, filters and coolers) silicone-free tools must be used. Without express permission from the CLIENT, cleaning agents must not be used except fresh oil corresponding to the turbine oil.
- Clean all flanges, tapped holes, contact surfaces, seal faces, shims, bolts and nuts, pins and all disassembled body and machine parts (remove dirt/ stains/ deposits), recondition them (smoothing of defective spots) and check them for usability.
- Prepare the component surfaces for non-destructive testing. If necessary, the bodies shall be abrasive blasted (dust-free or dust reduced). The testing points shall be agreed between the CONTRACTOR, CLIENT and the NDT Personnel.
- Opened components (e.g. tanks, casings, pipes) shall be suitably covered (e.g. by sheets and boards). All non-accessible areas must be examined for dust and foreign particle/items

immediately before reassembly. If necessary, the CONTRACTOR shall have a suitable, high flux borescope available and shall record the examination on a storage medium.

All necessary spare parts from the fixed and optional scope of works shall be offered separately. The delivery time and the place of installation of the spare parts shall be mentioned clearly in the separate spare part offer.

The spares from UNIPER warehouse RoCa needs to be checked for usability by the Contractor. If additional processing of the warehouse spares is necessary e.g. adjusting, finishing a finding report resp. a fact finding matrix record is required. The Contractor is responsible and accountable to perform the processing works.

Before and during the overhaul monitoring of the balance of available spare parts for adequate number and usability shall take place by the CONTRACTOR.

Please note: Within the specification optional machining works are described that only can be delivered with specific machining tools and employees. To avoid multiple valuation of these charges within the single options the Contractor is requested to name “mobilization fees” for these kinds of options.

Abbreviations:

CV	Control Valve	NDT	None Destructive Testing
ESV	Emergency Stop Valve	OEM	Original Equipment Manufacturer
NRV	Non-Return Valve	P	Protocol
H	Hold Point	PT	Penetration Test
HAZOP	Hazard and Operability Studies	QA/QC	Quality Assurance/Quality Control
HP	High Pressure	QM	Quality Management
I&C	Information and Control	SIL	Safety Integrity Level
IP	Intermediate Pressure	SIS	Safety Instrumented System
ITP	Inspection and Test Plan	UT	Ultrasonic (Examination) Test
LP	Low Pressure	VT	Visual Test
MT	Magnetic Particle Test	W	Witness Point
MW	Megawatt		

1 High Pressure Turbine

The CONTRACTOR shall be responsible and accountable for executing the following scope of work in accordance with the requirements described in the preceding section "Works" / Part C:

- Blocking and de-blocking of the entire Turbo- set shaft train including condenser.
- Disassembly of the High Pressure Turbine components, fact-finding, cleaning, nondestructive testing and repair. The equipment to fulfill the assembly works, transports, checks, assessments and repair works are inherent part of the contractor services and performances.
- Coordination and execution of internal and external transports including transport racks, low loaders and towing vehicles, other means of transport and necessary public/official approvals for the components of the turbine.
- To ensure the quality of work, it is necessary for the contractor to plan, prepare and document the sequence of work processes in detail.
- To ensure build quality it is imperative that a detailed check and reporting protocol is implemented in all phases of termination e.g. preparation, execution, assessment, documentation.
- Reassembling and installation ready for operation.

1.1 Blockage of the entire turbo-set shaft train

The following works shall be carried out:

Works	ITP	Client Point
Blocking the entire turbo-set shaft train • Blocking the entire shaft train (HP, IP, LP and Generator) under operating weight and remove the blockage after completion of the revision • Termination procedure of the turbine cooling and draining of the condensers vs. blocking of the turbo-set in close coordination with Uniper • Documentation of the distance dimensions of the individual spring elements before blocking and after unblocking • Block all supports and pipe hanger of the main steam valve to the HP-ESV and open coupling/flanged connection to the inlet piping. This bolting shall be cleaned, 10% NDT since they were exchanged in 2021 must not be exchanged	P	W

1.2 High Pressure Turbine

The following works shall be carried out:

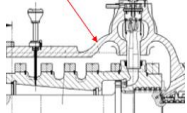
Works	ITP	Client Point
HP turbine temperature measurements - Disassembly and reassembly of the temperature measurements - MAA 10 CT 001/002/101 (Turbomax) - MAA 10 CT 003 (HP exhaust) - MAA 10 CT 005/006/106 (reference HP rotor) - MAA 10 CT 021/121 (HP outer casing) - Functional control and testing of temperature measurements during assembly inner and outer casing. - Replacement of seals, expansion bolts and nuts. Grooved packing ring seals are required. - All necessary spares for the scope of works shall be offered in a separate spare part offer. Please note: The contractor is responsible for the proper installation and the function of the temperature measurements. The assembly is to be recorded and secured by specific QA measures.	P	
HP turbine outer casing and HP turbine inner casing assembly works - All HP Turbine valves (MAA10/11/12) are to be deinstalled according to Chapter 5 of this document and must not be double priced - Draw up assembly report for the flanged connection- record hydraulic pressure and ITH cylinder used. - Remove the HP valve diffuser out of the HP turbine resp. HP valve casings Please note: The assembly works on HP valves is described in section C5 – please avoid multiple evaluation. - Measure and record the radial and axial position of the HP rotor in relation to the HP outer casing - Install the HP turbine auxiliary bearing (KIST2) and take up the HP rotor weight - do not change the position of the rotor. The turbine auxiliary bearing needs to be provided by the CONTRACTOR.	VT, P	

Works	ITP	Client Point
Please note: The assembly works on bearing housings, bearings, couplings and turning gear is described in section C4 – please avoid multiple evaluation. - Disassemble the axial fixing of the HP outer casing to the HP/IP bearing pedestal MAD21 and document the shim pack. Record the axial position of the HP front bearing pedestals MAD10, 11 and MAD12 and HP/IP bearing pedestal MAD21 in relation to the HP outer housing. - Move the HP turbine axially in the direction turbine side - monitor and record the shifting of the HP turbine with dial gauges - start up the lifting oil for this purpose. Do not change the axial position of the rotor in relation to the HP outer casing or HP inner casing. - Support the lower part of the HP outer casing with shim packs on the bearing housings - do not change the vertical position of the outer casing. - Remove the axial locking screws of the shaft seal housings and the conical pins of the HP outer casing partial joints. - Lift up (hydraulic jack) the upper part of the outer casing and lift it off, taking care to ensure that it is in a horizontal position. - Measure and record the radial and axial position of the HP rotor in relation to the HP inner casing and the HP outer casing. - Measure and record the radial and axial position of the HP inner casing and the HP outer casing. - Measure and record radial position of the shaft seals in relation to the rotor and record during dismantling and reassembly - Assemble the upper centric parts for fixing the inner casing to the rotor on the turbine and generator side. - Remove the upper parts of the shaft seal housings. - Lift out the HP inner block while maintaining the horizontal position. - Assemble the lower centring parts for fixing the inner casing to the rotor on the turbine and generator side. - Properly place the HP inner block on the transport rack. The transport rack is to be provided by the CONTRACTOR. Transport to CONTRACTORS Workshop - Carry out an incoming inspection of the transport at the power station on return delivery from the factory. Unload inner block and check for transport damage - Install the HP inner block or HP steam turbine in the turbine set - in reverse order when reassembling the HP inner block in the HP outer casing, record the axial and radial position of the inner block and the		

Works	ITP	Client Point
HP rotor in relation to the outer casing and compare these with the values obtained during disassembly. - Align the HP steam turbine and carry out and record concentricity and coupling checks. - Carry out axial and radial checks (Vergangkontrolle) record them and compare them with the data of the initial assembly. - All necessary spares for the scope of works shall be offered in a separate spare part offer. Please note: The disassembly and reassembly work on the HP turbine must be documented in a comprehensible manner and the dimensional recordings must be recorded in their entirety.		
HP outer casing - joint flange bolts - Draw up assembly report for the flanged connection- record hydraulic pressure and ITH cylinder used. - Disassembly of the joint flange bolts from the outer casing - increased disassembly effort is to be assumed. - NDT and dimensional inspection of the bolts and nuts for damage, crack indications and reusability. - Re-cut and clean the thread of the part joint screw in the lower part of the outer housing. - Perform a blue Ink test of split plane of outer casing - All necessary spares for the scope of works shall be offered in a separate spare part offer.	P VT, PT, P P	W
HP outer casing - basic works - Visual and functional check of the casing joints for damage, leak tightness, erosion and deformation immediately after disassembly of the outer casing upper part. - NDT testing of the inner and outer surfaces, especially at cross section transitions (small radii, drainage holes etc.), the supports for the outer and inner casing, radius transitions to flanged joints and connections. - Check ink imprint of the split joint in bolted and unbolted condition - Measure ovality and gapping of the outer casing in bolted and unbolted condition - Overhaul of the alignment components of the HP inner block in the HP outer casing	VT, P VT, PT, MT, P VT, P P	W W W

Works	ITP	Client Point
• Exchange the seals and expansion bolts and nuts of the steam seal flanged connections below the casing. Rework the casing threads and the flange faces. Grooved packing ring seals are required • All necessary spares for the scope of works shall be offered in a separate spare part offer		
HP outer casing - steam seal housing • Properly dismantle and extend the shaft seal housing upper and lower part from the HP outer casing • Remove segmented shaft seals including springs and locking screws from the shaft seal housings. Clean, visually inspect and measure the segmented shaft seals. Reinstallation with new springs and locking screws is required • Visual check of the inner and outer seal housing surfaces, especially at cross section transitions. Pay particular attention to deviations, tear and wear and erosion in the plane-parallelism and ovality of the contact and sealing surfaces of the shaft seal housings • Check ink imprint of the seal housing split joint • All necessary spares for the scope of works shall be offered in a separate spare part offer	VT, P	

1.3 High Pressure Turbine possible irregularities

Works	ITP	Client Point
2_OEM experiences are valid for the HP turbine: ○ Crack at shrink seat at HP-Inner casing OEM 2DE-SER00090B01) ○ Potential Crack in HP-Outer Casing in the transition area between valve inlet and horizontal part of casing OPTION 1.3 a: Crack removal and NDT of outside of inner casing according to 2DESER00090B01 OPTION 1.3 b: Crack removal of potential crack in transition area between valve inlet and horizontal part of outer casing 	P	

2 Intermediate Pressure Turbine

The CONTRACTOR shall be responsible and accountable for executing the following scope of work in accordance with the requirements described in the preceding section "Works" / Part C:

- Blocking and de-blocking of the entire Turbo- set shaft train including condenser.
- Disassembly of the Intermediate Pressure Turbine components, fact-finding, cleaning, nondestructive testing and repair. The equipment to fulfill the assembly works, transports, checks, assessments and repair works are inherent part of the contractor services and performances.
- Coordination and execution of internal and external transports including transport racks, low loaders and towing vehicles, other means of transport and necessary public/official approvals for the components of the turbine.
- To ensure the quality of work, it is necessary for the contractor to plan, prepare and document the sequence of work processes in detail.
- To ensure build quality it is imperative that a detailed check and reporting protocol is implemented in all phases of termination e.g. preparation, execution, assessment, documentation.
- Reassembling and installation ready for operation.

2.1 Blockage of the entire turbo-set shaft train

The following works shall be carried out:

Works	ITP	Client Point
Blocking the entire turbo-set shaft train (if not priced within HP Turbine separate scope) • Blocking the entire shaft train (HP, IP, LP and Generator) under operating weight and remove the blockage after completion of the revision • Termination procedure of the turbine cooling and draining of the condensers vs. blocking of the turbo-set in close coordination with Uniper • Documentation of the distance dimensions of the individual spring elements before blocking and after unblocking • Block all supports and pipe hanger of the main steam valve to the IP-ESVs and the IP-Admission valves and open coupling/flanged connection to the inlet piping. All nut/bolting must be 100% exchanged by the CONTRACTOR. The bolting shall be priced separately with the offer	P	W

The following works shall be carried out:

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- Support the lower part of the IP outer casing with shim packs on the bearing housings - do not change the vertical position of the outer IP casing. - Disassemble the axial bearing - Remove the axial locking screws of the shaft seal housings and the conical pins of the HP outer casing partial joints. - Disassemble all IP-LP Crossover piping. Further requirements for the crossover piping, see next page. - Lift up (hydraulic jack) the upper part of the outer casing and lift it off, taking care to ensure that it is in a horizontal position. - Measure and record the radial and axial position of the outer casing and inner casing in relation to the rotor during dismantling and reassembly - pay particular attention to the specific shape of the inner casing - Measure and record radial position of the shaft seals in relation to the rotor and record during dismantling and reassembly - Visual and functional inspection of the partial joints for damage, leak tightness, erosion and deformation immediately after disassembly of the outer casing upper part. - All necessary spares for the scope of works shall be offered in a separate spare part offer Please note: The disassembly and reassembly work on the IP turbine must be documented in a comprehensible manner and the dimensional recordings must be recorded in their entirety.		
IP outer casing - joint flange bolts - Draw up assembly report for the flanged connection- record hydraulic pressure and ITH cylinder used. - Disassembly of the joint flange bolts from the outer casing - increased disassembly effort is to be assumed. - NDT and dimensional inspection of the bolts and nuts for damage, crack indications and reusability. - Re-cut and clean the thread of the part joint screw in the lower part of the outer housing. - All necessary spares for the scope of works shall be offered in a separate spare part offer.	P VT, PT, P	W
IP outer casing - basic works Visual and functional inspection of the partial joints for damage, leak tightness, erosion and deformation immediately after disassembly of the outer casing upper part.	VT, P	W W

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Replace piston rings of one extraction. Machining, adjusting, finishing and fitting new piston rings of one extraction to size and drilling retaining rings and pinning them in the inner casing. In process dimensional and NDT checks. Delivery of the spare isn't included.		
IP-LP Crossover line • Check cross over pipe hanger eyes for wear and cracks. • Blockage compensators. The kind and execution of blocking needs to be described in the offer. • Ensure the integrity of the LPT inlet compensators during dis- and reassembling activities. • Disassembling of the cross over pipes and place them on the storage place. • Check of piping, welds, struts, reinforcements, deflectors and other internals for erosion, corrosion, defects and/or deformation and offset and cracks. • NDT Check of 10% of welds on each crossover line • Check of compensators for defects, deformation and offset. • Check of compensator bellows and welds for cracks. • All necessary spares for the scope of works shall be offered in a separate spare part offer. Please note: The storage place for the cross over pipes need to be selected carefully to ensure the foreseen compensators & cross over pipes work sequences. 2.2 OPTION b: Replace a compensator within the cross over line Replace one complete compensator within one crossover line including 100% NDT of all welds. The Works and the Compensator shall be priced separately by the bidder with the offer	VT, P VT, PT VT P PT, P VT PT, P	W W W W

2.3 Intermediate Pressure Turbine Inner Casing (4 vane carriers)

The following works shall be carried out:

Works	ITP	Client Point
IP inner casing (referred as 4 vane carriers) – assembly works - Disassembly the inner casing upper and lower part from the turbine - Check and record the radial and axial position of the inner casing in relation to the rotor and outer casing during dismantling and reassembly. - Visual and functional inspection of the partial joints for damage, tightness, erosion and deformation immediately after disassembly. - Carry out a visual inspection of the turbine blades and inserts immediately after dismantling at the RoCapower station - pay particular attention to protruding turbine blade inserts deformation and crack indications. Communicate these immediately. Please note: Possible findings on the turbine blade and vanes inserts needs to be communicated asap to CLIENT.	P VT,	W
- Properly place the IP inner casing upper and lower part on a transport rack and Transport to CONTRACTORS Workshop - Ensure optimum re-alignment of the inner casing on basis of data taken during De-assembly - All necessary spares for the scope of works shall be offered in a separate spare part offer	P	W
IP inner casing - joint flange bolts - Draw up assembly report for the flanged connection- record hydraulic pressure and ITH cylinder used - Disassembly of the joint flange bolts from the inner casing - increased disassembly effort is to be assumed	P	W

2.4 Intermediate Pressure Turbine Rotor

The following works shall be carried out:

Works	ITP	Client Point
IP rotor – balancing stubs Provision and installation of the balancing studs resp. auxiliary bearing stubs at turbine side and generator side for the IP rotor by the CONTRACTOR Please note: At UNIPER power stations and at the RoCapower station there are no balancing stubs for the IP rotor available. The balancing stubs can also be installed at the contractor's workshop. Suitability Transport frame must take this into account.	P	
IP rotor - Move rotor to prescribed axial position. - Check and record the radial and axial position of the rotor in relation to the inner casing and outer casing during dismantling and reassembly. - Check and record axial and radial blade clearance and sealing stripe clearances. - Install the IP turbine auxiliary bearing and take up the IP rotor weight - do not change the position of the rotor. Please note: The assembly works on bearing housings, bearings, couplings and turning gear is described in section C4 – please avoid multiple evaluation. - Remove the IP rotor from the steam turbine and properly place it in the transport rack and Transport to CONTRACTORS Workshop - Carry out a visual inspection of the rotor blades and shims immediately after dismantling at the RoCa power station - pay particular attention to protruding turbine blade inserts and turbine blade shroud displacements and gaps. Communicate these immediately. - Reassembly of the IP Rotor in accordance with De-assembly data taken - Carry out an incoming inspection of the transport at the power station on return delivery from the repair plant. Unload rotor and check for transport damage. - Install the rotor in the steam turbine, align it and carry out and record concentricity and coupling checks.	P P VT	W W W



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Carry out axial and radial checks (Vergangkontrolle) record them and compare them with the data of the initial assembly.		

3 Visual Inspection of Low Pressure Turbine Last Stage Blade (LSB)

The CONTRACTOR shall be responsible and accountable for executing the following scope of work in accordance with the requirements described in the preceding section "Works" / Part C:

- Visual Inspection of the Last Stage Blade with detailed photo documentation and protocol/report

3.1 Visual Inspection of the Last Stage Blade (LSB) of both LP turbine floods

The following works shall be carried out:

Works	ITP	Client Point
Visual Inspection of LSB Flood 11 and 12 • Perform a very detailed inspection with a wider foto documentation of each LSB (Tip, Snubber, Fillet, Footage) in each flood of the LP turbine • Inspect LSB for tight fit in footage within 2% of length bent test Please note: Access to the LSB will be via the condenser. The CLIENT will, on CONTRACTORS request, open manhole and provide scaffolding	VT, P	W

4 Bearings, Couplings and Turning Gear

The CONTRACTOR shall be responsible and accountable for executing the following scope of work in accordance with the requirements described in the preceding section "Works" / Part C:

- Disassembly of the Turbo-Set Bearings, Couplings and Turning Gears, fact-finding, cleaning, nondestructive testing and repair. The equipment to fulfill the assembly works, transports, checks, assessments and repair works are inherent part of the contractor services and performances.
- Coordination and execution of internal transports.
- To ensure the quality of work, it is necessary for the contractor to plan, prepare and document the sequence of work processes in detail.
- To ensure build quality it is imperative that a detailed check and reporting protocol is implemented in all phases of termination e.g. preparation, execution, assessment, documentation.
- Reassembling and installation ready for operation.

4.1 Turbo-Set bearings

Description	Number / KKS / AKZ	base scope	optional scope
Turbine bearing (HP front)	1 / MAD10	X	
Turbine bearing (HP front)	2 / MAD11	X	
Turbine bearing (HP/IP)	3 / MAD21	X	
Turbine bearing (LP front)	4 / MAD31	X	
Generator bearing (Gen. front)	5 / MKD11	X	
Generator bearing (Gen. back)	6 / MKD21	X	
Generator bearing (Exciter back)	7 / MK51	X	

The following works shall be carried out:

Works	ITP	Client Point
Bearing housings - Perform assembly works on bearing housings - Clean bearing housing base plate, bearing housing and environment - Check the foundation grouting for defects and cracks. - Check and protocol foundation bolts pre- stress - Perform alignment check of the bearing housings and turbine shaft with a bench level (Rahmenwasserwaage). Create an engineering report. - Exchange bearing housing slide plates, recondition/optimize the sliding key surfaces - Exchange turbine casing slide plates - Exchange hold down bar slide plates, protocol pre and post clearances - Ensure a proper and oil tight condition of the bearing housing - All necessary spares for the scope of works shall be offered in a separate spare part offer.	P	
Journal and Thrust bearing - Perform concentricity check (radial runout check) of the turbo-set couplings - Protocol the position of the turbine shaft within the bearing pedestal - Protocol of bearing components e.g. shims during assembling - Check of all bearing shells and pads for scratches, contact pattern and on surface quality - NDT of the babbitt metal surface and adhesion to base metal (surface quality and babbitt bond) - Dimension control of the shims / shim packs. Perform ink print of the shims / shim packs and rework them for a proper fixation of the bearing - Check the insulation of Generator and Exciter bearings. - Perform measurements, adjustment and documentation of the bearing clearances - Check the allocation and function of the bearing temperature measurement (babbitt temperature measurement). Protocol the reinstallation position - All necessary spares for the scope of works shall be offered in a separate spare part offer	VT, PT, UT, P	W
4.1 OPTION a: Rework one “oversized for machining” spare bearing accuracy to size.	P	

Works	ITP	Client Point
Rework an “oversize for machining” spare bearing (nominal diameter 400mm) accuracy to size in a bearing workshop. Measure bearing journal size and produce drawing before sending off site for rework. Machining in a bearing workshop to ensure the bearing diameter and the correct position and shape of the lift oil areas. Perform VT, PT and UT check. Re-shim and fit bearing pads. Refit bearing in machine and check bedding. 4.1 OPTION b: Babbitt metal replacement of one journal bearing. Re- metaling and machining of one journal bearing (nominal diameter 400mm) in a bearing workshop. Measure bearing journal size and produce drawing before sending off site for rework. Machining in a bearing workshop to ensure the bearing diameter and the correct position and shape of the lift oil areas. Perform VT, PT and UT check. Re-shim and fit bearing pads. Refit bearing in machine and check bedding.	P	
Shaft lift measurement - Prior to shutting down the system carry out a visual inspection for leaks, mark them and check for rubbing marks - Check the connections of the lift oil supply pipework within the bearing pedestal and functioning of the check valves. Check the functioning of all pressure gauges. Replace defect gauges - Overhaul and adjust the pressure maintaining valves and the start-up valves of the high pressure lift oil circuit bearing 2,3,4,5 and 6. Repair and adjustment protocols are required. Record function of the hydraulic components on a test bench .Demonstrate and protocol tightness and functioning during commissioning. - Measure and record shaft lift on all bearings as well as the corresponding lift oil pressures before and after revision works - All necessary spares for the scope of works shall be offered in a separate spare part offer	P P	W W
Oil sealing labyrinth / wiper - Visual and dimensional check (clearances, wear and tear, alignment) of the bearing sealing labyrinth / wiper. - Make sure and protocol that a proper alignment of the sealing labyrinths / wipers is given - All necessary spares for the scope of works shall be offered in a separate spare part offer 4.1 OPTION c: Replacement of oil sealing labyrinths / wiper of one journal bearing on turbine and generator end.	P	



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Delivery, replacement and operational assembly of the oil sealing labyrinths accuracy to size for one bearing pedestal on turbine and generator end.	P	

4.2 Turbo-Set Couplings

Description	Number / KKS / AKZ	base scope	optional scope
Coupling HP/IP	MAD 21	X	
Coupling IP/LP	MAD 31	X	
Coupling LP/Generator	MKD 11	X	
Coupling Generator/Exciter	MKD 21	X	

The following works shall be carried out:

Works	ITP	Client Point
Turbo-Set Couplings - Dis- and reassembly of one turbine coupling. - Draw up assembly protocol for coupling screws during decoupling and coupling. - Carry out coupling check and concentricity check when decoupling and coupling the steam turbine. - Document the bearing housing to the shaft position during disassembly and reassembly. - Check the actual alignment of the turboset and compare the actual alignment with the nominal alignment of the turboset. Derive and present the necessary measures for alignment correction. - Visual and dimensional inspection of the coupling surfaces Coupling bores, coupling pins and coupling sleeves for damage and corrosion. Record dimensional checks - Overhaul of the clutch contact surfaces - Non-destructive testing of the clutch surfaces / clutch process - All necessary spares for the scope of works shall be offered in a separate spare part offer	VT, P P P P PT/P	

The following works shall be carried out:

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5 Turbine Valves

The CONTRACTOR shall be responsible and accountable for executing the following scope of work in accordance with the requirements described in the preceding section "Works" / Part C:

- Dis- and reassembling of their hydraulic actuators ensure proper coupling including the application of specific coupling work instructions
- Disassembly of the Turbine Valves components, fact-finding, cleaning, nondestructive testing and repair. The equipment to fulfill the assembly works, transports, checks, assessments and repair works are inherent part of the contractor services and performances
- Coordination and execution of internal and external transports including transport racks
- To ensure the quality of work, it is necessary for the contractor to plan, prepare and document the sequence of work processes in detail
- To ensure build quality it is imperative that a detailed check and reporting protocol is implemented in all phases of termination e.g. preparation, execution, assessment, documentation
- Reassembling and installation ready for operation

Please note: Thermal spray coating will not be accepted as repair or material building up solution.

5.1 HP Turbine Inlet Valves

Description	Number / KKS / AKZ	base scope	optional scope
HP emergency stop valve	MAA 10 AA 001	X	
HP control valve 1	MAA 11 AA 001	X	
HP control valve 2	MAA 12 AA 001	X	

The following works shall be carried out:

Works	ITP	Client point
Valve bodies - Visual and surface crack testing of steam strainers - Blueing mark of valve body flanges - Dimensional record (diameter / out-of-roundness) of the valve body contact surfaces - Visual inspection of interior/ exterior surfaces of the valve body for cracks, erosion and wear and tear - Surface crack testing of interior/ exterior surfaces of the valve body - Surface crack testing of structural weld seams - Surface crack testing of stud bolts - Replacement, mechanical adjustment and installation of the spare steel seal between valve body and closing piece - All necessary spares for the scope of works shall be offered in a separate spare part offer	VT, PT, P	W
5.1 OPTION a: Machining of one valve body. Machining of the valve body to repair of sealing, supporting and the centring surfaces. In-process visual and PT/MT NDT.	P	
5.1 OPTION b: Machining of one valve seat Machine rework (mobile lathe turning, grinding and lapping) of one valve seat resp. diffuser. In- process visual and PT/MT NDT.	P	
5.1 OPTION c: Exchange of one HP ESV diffuser. Exchange of one HP ESV diffuser, re-machining of the valve body bore. In-process visual and PT/MT NDT. Recondition the valve body threads. Adjusting, finishing and installation of the spare diffuser. Delivery of the spare isn't included.	P	
5.1 OPTION d: Exchange of one HP CV diffuser.	P	

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completely. Machining of the required outer diameter and shape to ensure the correct functioning of the area. In- process NDT.		
Couplings between valve and hydraulic actuator • Check dimensions and clearances. • Check for crack indications. • Check for proper assembly, free of clearances. • All necessary spares for the scope of works shall be offered in a separate spare part offer Please note: The bidder is requested to describe within the offer his technical references and procedures for coupling the hydraulic actuators for the ESV and CV in terms of, ➤ What kind of procedures are known / in place? ➤ What kind of information are necessary to fulfil the procedure?	P	W

5.2 IP Turbine Inlet Valves as well as additional steam admission valves (Drittdampfventile)

Description	Number / KKS / AKZ	base scope	optional scope
IP emergency stop valve (left)	MAB 11 AA 001	X	
IP emergency stop valve (right)	MAB 12 AA 001	X	
IP control valve (left)	MAB 11 AA 002	X	
IP control valve (right)	MAB 12 AA 002	X	
IP additional steam ad stop valve	MAB 30 AA 001	X	
IP additional steam ad control valve	MAB30 AA 002	X	

The following works shall be carried out:

Works	ITP	Client point
Valve body - Visual and surface crack testing of steam strainers - Blueing mark of valve body flanges - Dimensional record (diameter / out-of-roundness) of the valve body contact surfaces - Visual inspection of interior/ exterior surfaces of the valve body for cracks, erosion and wear and tear - Surface crack testing of interior/ exterior surfaces of the valve body - Surface crack testing of structural weld seams - Surface crack testing of stud bolts - Replacement, mechanical adjustment and installation of the spare steel seal between valve body and closing piece - All necessary spares for the scope of works shall be offered in a separate spare part offer	VT, PT, P	W
5.2 OPTION a: Machining of one valve body side. Machining of one valve body side to repair of sealing, supporting and the centring surfaces on ESV or CV site. In-process visual and PT/MT NDT.	P	
5.2 OPTION b: Machining of one diffuser ESV and CV seat face. Machine rework (mobile lathe turning, grinding and lapping) of one diffuser ESV and CV seat. In- process visual and PT/MT NDT.	P	
5.2 OPTION c1: Exchange of one diffuser. Exchange of one HP CV diffuser, re-machining of the valve body bore. In-process visual and PT/MT NDT. Recondition the valve body threads.	P	

Adjusting, finishing and installation of the spare diffuser. Delivery of the spare isn't included. 5.2 OPTION c2: Machining out of one diffuser. Machining out of one HP CV diffuser, re-machining of the valve body bore. In- process visual and PT/MT NDT. Recondition the valve body threads. Adjusting, finishing and installation of the spare diffuser. Delivery of the spare isn't included. 5.2 OPTION d: Boring out of twelve (12) diffuser fixation bolts of one diffuser. Boring out of twelve (12) diffuser fixation bolts. Delivery of the spares isn't included. Spares to be included on a separate spare parts list. Please note: The bidder is requested to describe within the offer his technical approaches regarding the required optional reworks.	P P	
IP ESV and CV components e.g., intermediate piece, spindle carrier, closing piece, steam strainer • Mobility and functional check of the valve stroke after disassembling and before reassembling of the hydraulic actuator. Record functioning and dimensions of the valve stroke • Visual inspection and dimensional record of components • Surface crack testing at transitions between different cross sections (e.g., edges, smaller radii, welding's, coating and sealing areas) • Protocol the installation (tightening torque) of the closing piece and ensure the retightening of the closing piece during hot commissioning of the valve • All necessary spares for the scope of works shall be offered in a separate spare part offer 5.2 OPTION e: Repair work of one IP Valve intermediate piece. Repair work of the intermediate piece for reconditioning of sealing and supporting faces at the outer diameter. Level out the supporting faces by welding of levelling pieces (at least 8 levelling pieces equally distributed 50% of the contact surface possible with the given design). Machining of required diameter. In- process NDT. 5.2 OPTION f: Repair work of one IP Valve closing piece. Repair work of the closing piece for reconditioning of supporting and sealing faces to the wide valve body diameter and smaller intermediate piece diameter. Material building-up by welding - weld seam all around / completely. Machining of the required outer diameter and shape to ensure the correct functioning of the area. In- process NDT.	VT, PT, P P P	W

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Replace one valve head / cone guide bushing including the machining, welding and finishing works. In- process NDT. Delivery of the spare isn't included. 5.2 OPTION i: Repair work of one cold end guide bushing. Repair work of one cold end guide bushing for reconditioning of supporting and sealing faces. Material building-up by welding - weld seam all around / completely. Machining of the required outer diameter and shape to ensure the correct functioning of the area. In- process NDT.	P	
Couplings between valve and hydraulic actuator • Check dimensions and clearances. • Check for crack indications. • Check for proper assembly, free of clearances. • All necessary spares for the scope of works shall be offered in a separate spare part offer Please note: The bidder is requested to describe within the offer his technical references and procedures for coupling the hydraulic actuators for the ESV and CV in terms of, ➤ What kind of procedures are known / in place? ➤ What kind of information are necessary to fulfil the procedure?	P	

5.3 Other Valves, Flap and non return valves

Description	Number / KKS / AKZ	base scope	optional scope
Cold reheat non-return valve (CRNRV) 1	LBC 50 AA300	X	
IP Extraction Flap 1 (A4)	NAA31AA300	X	
IP Extraction Flap 2 (A3)	NAA32AA300	X	
IP Extraction Flap 3 (A2)	NAA20AA300	X	
IP Extraction Control Flap 1 (A4)	NAA31AA001	X	
IP Extraction Control Flap 2 (A3)	NAA30AA001	X	
IP Extraction Control Flap 3 (A2)	NAA20AA002	X	
IP/LP Crossover Flap 1	MAC11AA001	X	
IP/LP Crossover Flap 2	MAC12AA001	X	
IP/LP Crossover Flap 3	MAC13AA001	X	
LP Extraction Flap 1	NAA11AA002	X	
LP Extraction Flap 2	NAA12AA002	X	

The following works shall be carried out:

Works	ITP	Client point
Check valve body / valve cover - Visual inspection of interior and outer surfaces of the valve body / valve cover for cracks, erosion and wear and tear. - Visual inspection of the expansion stud bolts. - Surface crack testing of interior surfaces of the valve body and the valve cover - Manually rework (grinding/polishing) of casing sealing and contact faces. - Exchange the body / cover gasket	VT, PT, P	W

Works	ITP	Client point
All necessary spares for the scope of works shall be offered in a separate spare part offer		
Check valve seat and valve disc - Visual inspection of wear and tear, contact pattern, damages and erosion / abrasion. - Surface crack testing of the seat surface (valve seat remaining in situ) - Surface crack testing of the complete disc and the disc seat surface - Lapping (manually) of the check valve seat and the disc seat - Bluing mark of the seating face to check the condition of the / disc-to-seat contact. - All necessary spares for the scope of works shall be offered in a separate spare part offer 5.3 OPTION a: Mechanical grinding of cold reheat non return valve seat. Mechanical grinding (grinding/lapping machine) of the CRH-NRV seat. Surface crack test of the seat area. Bluing mark of the seating face to check the condition of the disc / disc-to-seat contact. 5.3 OPTION b: Mechanical grinding of one extraction valve seat IP. Mechanical grinding (grinding/lapping machine) of one IP valve seat. Surface crack test of the seat area. Bluing mark of the seating face to check the condition of the disc / disc-to-seat contact. 5.3 OPTION c: Mechanical grinding of one crossover valve seat Mechanical grinding (grinding/lapping machine) of one Cross Over valve seat. Surface crack test of the seat area. Bluing mark of the seating face to check the condition of the disc / disc-to-seat contact. 5.3 OPTION d: Mechanical grinding of one extraction valve seat LP. Mechanical grinding (grinding/lapping machine) of one extraction valve seat. Surface crack test of the seat area. Bluing mark of the seating face to check the condition of the disc / disc-to-seat contact.	VT, PT, P P	W

Works	ITP	Client point
Check valve subassemblies (e.g. shaft, disc lever, bushings/sleeves, key, bolt and gland packings) • Mobility and functional check after disassembling and before reassembling. • Out of roundness check for the disc shaft • Visual inspection of components for wear and tear, scratches and reusability of components. • Visual inspection of connection / coupling between drive shaft and auxiliary actuator for wear and tear and reusability. • Surface crack testing of the disc shaft, the disk lever and bolted connection • Exchange packing rings and gaskets • All necessary spares for the scope of works shall be offered in a separate spare part offer	VT, PT. P	W

5.4 Bypass valves

Description	Number / KKS / AKZ	base scope	optional scope
IP Bypass control valve 1	MAN10AA002	X	
IP Bypass emergency stop valve 1	MAN10AA001	X	
IP Bypass control valve 2	MAN20AA002	X	
IP Bypass emergency stop valve 2	MAN20AA001	X	
LP Bypass control valve 3	MAN30AA002	X	
LP Bypass emergency stop valve 3	MAN30AA0021	X	

The following works shall be carried out:

Works	ITP	Client point
Check valve body / valve cover - Visual inspection of interior and outer surfaces of the valve body / valve cover for cracks, erosion and wear and tear. - Visual inspection of the expansion stud bolts. - Surface crack testing of interior surfaces of the valve body and the valve cover - Manually rework (grinding/polishing) of casing sealing and contact faces. - Exchange the body / cover gasket - All necessary spares for the scope of works shall be offered in a separate spare part offer	VT, PT, P	W
Check valve seat and valve disc - Visual inspection of wear and tear, contact pattern, damages and erosion / abrasion. - Surface crack testing of the seat surface (valve seat remaining in situ) - Surface crack testing of the complete disc and the disc seat surface - Lapping (manually) of the check valve seat and the disc seat - Bluing mark of the seating face to check the condition of the / disc-to-seat contact.	VT, PT, P	W

Works	ITP	Client point
All necessary spares for the scope of works shall be offered in a separate spare part offer 5.4 OPTION a: Mechanical grinding of bypass emergency stop valve seat Mechanical grinding (grinding/lapping machine) of seat. Surface crack test of the seat area. Bluing mark of the seating face to check the condition of the disc / disc-to-seat contact. 5.4 OPTION b: Mechanical grinding of one bypass control valve seat Mechanical grinding (grinding/lapping machine) of one CRNRV seat. Surface crack test of the seat area. Bluing mark of the seating face to check the condition of the disc / disc-to-seat contact.	P	
Check valve subassemblies (e.g. shaft, disc lever, bushings/sleeves, key, bolt and gland packings) - Mobility and functional check after disassembling and before reassembling. - Out of roundness check for the disc shaft - Visual inspection of components for wear and tear, scratches and reusability of components. - Visual inspection of connection / coupling between drive shaft and auxiliary actuator for wear and tear and reusability. - Surface crack testing of the disc shaft, the disk lever and bolted connection - Exchange packing rings and gaskets - All necessary spares for the scope of works shall be offered in a separate spare part offer	VT, PT. P	W
Couplings between valve and hydraulic actuator - Check dimensions and clearances. - Check for crack indications. - Check for proper assembly, free of clearances. - All necessary spares for the scope of works shall be offered in a separate spare part offer		



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Works	ITP	Client point
Please note: The bidder is requested to describe within the offer his technical references and procedures for coupling the hydraulic actuators for the ESV and CV in terms of, ➤ What kind of procedures are known / in place? ➤ What kind of information are necessary to fulfil the procedure?		

5.5 Valves of sealing steam supply system

Description	Number / KKS / AKZ	base scope	optional scope
Seal steam control valve	MAW 10 AA 002	X	
Seal steam exhaust valve	MAW 20 AA 001	X	
Seal steam water injection control valve	LCE 30 AA 001	X	

The following works shall be carried out:

Works	ITP	Client point
Valve body - Visual inspection of interior/ exterior surfaces of the valve body for cracks, erosion and wear and tear - Mechanical rework of the valve seat - All necessary spares for the scope of works shall be offered in a separate spare part offer	VT, P	W
Valve internals e.g., spindle, bushing, spindle carrier, - Mobility and functional check of the valve stroke after disassembling and before reassembling of the actuator. Record functioning and dimensions of the valve stroke - Visual inspection and dimensional record of components - Surface crack testing at transitions between different cross sections (e.g., edges, smaller radii, welding's, coating and sealing areas) - Mechanical rework of the valve cone and spindle bushings - All necessary spares for the scope of works shall be offered in a separate spare part offer	VT, PT, P	W
Couplings between valve and hydraulic actuator - Check dimensions and clearances. - Check for proper assembly, free of clearances. - All necessary spares for the scope of works shall be offered in a separate spare part offer	P	

6 Turbine Oil- System and hydraulic components

The CONTRACTOR shall be responsible and accountable for executing the following scope of work in accordance with the requirements described in the preceding section "Works" / Part C:

- Disassembly of the described components, fact-finding, cleaning, nondestructive testing and repair. The equipment to fulfill the assembly works, transports, checks, assessments and repair works are inherent part of the contractor services and performances.
- Coordination and execution of internal and external transports including transport racks.
- To ensure the quality of work, it is necessary for the contractor to plan, prepare and document the sequence of work processes in detail.
- To ensure build quality it is imperative that a detailed check and reporting protocol is implemented in all phases of termination e.g. preparation, execution, assessment, documentation.
- Reassembling and installation ready for operation.

6.1 Oil system MAV and MAX

The following works shall be carried out:

Arbeiten	ITP	Client point
Main and control oil system • Prior to shutting down the unit, carry out a visual inspection for leaks, mark them and check for rubbing marks. • Check of piping connections for leakage freeness at all flanged connections. Check for wear and tear especially in the area of pipe clamps. • Check the bearing oil inlets (ball connections) for leakage • Inspection and maintenance of the temperature control valves MAV 22 DT 001 • Visual inspection and cleaning of the return oil filter upfront the oil tank after cold commissioning phase of the turbo set. • Visual inspection and cleaning of the bearing oil filter (MAV) and the control oil filter (MAX) after cold commissioning phase of the turbo set. • Check and cleaning of the tank ventilation system. • All necessary spares for the scope of works shall be offered in a separate spare part offer	VT, P	

6.2 Hydraulic actuators

The overhaul work (hydraulic workshop condition) of the “hydraulic actuators” shall be carried out in a specialized workshop for these kind of devices. The workshop must have a sufficient stock of spare parts.

The availability, delivery and assembling of spares must be included in these workpackage under 6. 2 and must not be priced seperately.

Turbine valve possible irregularities

Works	ITP	Client Point
From outage 2019 some minor irregularities are known: - Spring back pressure on HP turbine valves too low. For example: MAA10AA001 should open at 17bar (+2,5 / -0,85) and is opening at 14,5bar - Spring back pressure on IP turbine valves too low. For example MAB30AA001 should open at 10,8bar (1,6 /-0,5) and is currently opening at 7,0bar - Solenoids on turbine valves are not of 2 coil type	P	

Description	Number / KKS / AKZ	base scope	optional scope
HP ESV actuator 1	MAA 11 AA 001	X	
IP ESV actuator 1	MAB 11 AA 001	X	
IP ESV actuator 2	MAB 12 AA 001	X	
Admission Steam ESV actuator 1	MAB 30 AA 001	X	
Bypass ESV actuator 1	MAN 10 AA 001	X	
Bypass ESV actuator 2	MAN 20 AA 001	X	
Bypass ESV actuator 3	MAN 30 AA 001	X	
HP CV actuator 1	MAA 11 AA 001	X	
HP CV actuator 2	MAA 12 AA 001	X	
IP CV actuator 1	MAB 11 AA 002	X	
IP CV actuator	MAB 12 AA 002	X	
Admission Steam CV actuator 1	MAB 30 AA 002	X	

Bypass CV actuator 1	MAN 10 AA 001	X	
Bypass CV actuator 2	MAN 20 AA 002	X	
Bypass CV actuator 3	MAN 30 AA 002	X	

The following works shall be carried out:

Works	ITP	Client point
Hydraulic actuators De- and Reassemble the hydraulic actuators and check couplings. Please Note: The overwhelming majority of hydraulic actuators will be de- and reassembled within the base scope works on the turbine valves – please check section 5 of this spec.	P	W
Maintenance and inspection of the hydraulic actuators - Disassemble the actuator completely (casing spring package, stem, piston, control block, mechanics) and examine the subassemblies/parts for damages, wear and tear. Clean and refurbish the subassemblies/parts. - Disassemble the “Rexroth” partial stroke governing valves of the ESV actuators and refurbish the subassemblies/parts - Disassemble the “Voith” governing valves (functionality valve test) of the CV actuators and refurbish the subassemblies/parts - Check the following subassemblies for dimensions, defects, cracks, wear and tear, corrosion/erosion and functioning, - spring package, springs - casing of the spring package - mechanics, control block and control valves - piston stem, piston and piston casing - position and limit sensors - Exchange the following spare parts, - filter elements - sealings of the hydraulic piston - sealings of the control block - sealings at the hydraulic pipe connections - Record function of the actuator on a test bench (factory test bench). Demonstrate and protocol tightness and functioning of the actuator.	VT, P	W

Works	ITP	Client point
• Prepare actuator for shipment. • All spare parts needed must be separately offered • The supplier shall offer separately the exchange of: 6.2 OPTION a: Replace Spring package HP ESV 6.2 OPTION b: Replace Spring package IP ESV 6.2 OPTION c: Replace Spring package admission ESV 6.2 OPTION d1: Replace solenoid on any ESV/CV with a 2 Coil Solenoid version (price per solenoid) 6.2 OPTION d2: Replace solenoid on any ESV/CV with a 2 Coil Solenoid version (price per work) Please note: The suppliers repair workshop, must be stated in the offer. Uniper will visit the repair workshop as part of the quality assurance inspection.		

6.4 Electro Hydraulic Converter Works

The availability, delivery and assembling of spares must be included in these workpackage under 6.4 and must not be priced separately.

Description	Number / KKS / AKZ	base scope	
EH Converter for HP CV (MAA)	MAX 26 AU 001	X	
EH Converter for IP CV (MAB)	MAX 28 AU 001	X	
EH Converter for Bypass CV (MAN)	MAX 71 AU 001	X	

The following works shall be carried out:

Works	ITP	Client point
Electro Hydraulic Converter - Disassemble the EHW completely and examine the parts for damages, fouling and wear - Clean the subassemblies and oil ducts - Carry out dimensional and visual checking of the subassemblies (control piston, solenoid valves, etc.) - Check the threaded joints for condition of sealing faces/sealing cones - Reassembling with new sealing elements - Record function and characteristic curve of the EHW on a test bench (factory test bench) Please note: The he supplier's repair workshop, must be stated in the offer. Uniper will visit the repair workshop as part of the quality assurance inspection.	VT, P	W

6.5 Pneumatic actuators Works

The overhaul work (hydraulic workshop condition) of the “Pneumatic actuators” shall be carried out in a specialized workshop for these kind of devices. The workshop must have a sufficient stock of spare parts

The availability, delivery and assembling of spares must be included in these workpackage under 6.2 and must not be priced separately.

Description	Number / KKS / AKZ	base scope	optional scope
Cold reheat non-return valve (CRNRV) 1	LBC 10	X	
Cold reheat non-return valve (CRNRV) 2	LBC 20	X	
Seal steam control valve	MAW10AA051	X	
Seal steam exhaust valve	MAW10AA055	X	
Seal steam water injection control valve	LCE20AA051	X	

The following works shall be carried out:

Works	ITP	Client point
Pneumatic actuators De- and Reassemble the pneumatic actuators and check couplings.	P	W
Maintenance and inspection of the pneumatic actuators - Disassemble the actuator completely (casing spring package, stem, piston, control block, mechanics) and examine the subassemblies/parts for damages, wear and tear. Clean and refurbish the subassemblies/parts. - Check the following subassemblies for dimensions, defects, cracks, wear and tear, corrosion/erosion and functioning, - spring package, springs - casing of the spring package - mechanics, control block and control valves - piston stem, piston and piston casing - position and limit sensors - Exchange the following spare parts,	VT, P	W



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○ pneumatic filter elements ○ sealing/hose of the pneumatic piston ○ sealings of the control block ○ sealings at the pneumatic pipe connections • Prepare actuator for shipment. Please note: The he supplier's repair workshop, must be stated in the offer. Uniper will visit the repair workshop as part of the quality assurance inspection.		

7 Decommissioning- and Commissioning

The CONTRACTOR shall be responsible and accountable supporting the decommissioning and commissioning by qualified commissioning engineers.

- The equipment to fulfill the commissioning works is inherent part of the contractor services and performances.
- The commissioning of the Steam Turbine and the individual checks and tests shall be upfront discussed and agreed with the Plant Operation and Maintenance departments of the CLIENT. Therefore the following described sequence is to be read as a minimum requirement.

Sequence	ITP	Client point
Decommissioning • Visual inspection for oil and steam leakages • Check turbine drain system for mal functions • Check functioning of the seal steam system including steam supplier and condenser and record switch over point • Protocol turbo-set shut down sequence ○ anti-motoring ○ controlled turbine vacuum reduction ○ turbo set vibration ○ switching of oil pumps (auxiliary, lifting, etc.) ○ turbine drains ○ run down time and turning gear operation • Turbine control system "S74" ○ Protocol setting of the turbine control system "S74" ○ Protocol the characteristic curves of the hydraulic control system ○ Check the functioning of the electro hydraulic converters	VT, P	W
Cold and hot commissioning Scope of "commissioning works" according to Annex 1 called "commissioning protocol" of this specification.	P	W