Eskom Rotek Industries	SCOPE OF WORK (SOW)	TURBO GEN SERVICES (TGS)

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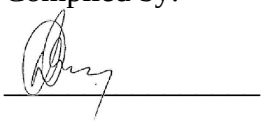

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1 Objectives

The objective of this document is to outline the services that are required from turbo generator bearing metaling companies to service the white metal bearings on all Eskom Power Stations . The contract seeks to ensure that the proposed services required are executed in a planned and structured manner, and that all quality requirements during inspection, refurbishment and final testing are met. This contract should ensure that the project is completed within the specified timeframe, consumables are readily available and the refurbishment scope is executed efficiently. All scope needs to be executed in a way that supports the project duration.

2 Scope of services

The scope of responsibility includes the complete or partial refurbishment of white metal bearings. The complete refurbishment process includes as received inspections, removal of the old white metal, remetalling, final machining and conducting inspections before dispatch of the bearing.

3 General Requirements

3.1 Quality

- Inspections to be carried out in accordance with check sheets and master quality plan provided by ERI in line with the Eskom requirements, which should be compiled from the Scope of Work (SOW) and approved by Engineering (Eskom and ERI TGS). The document must contain all the Product Quality Plans (PQP's) of work that will be done. Inspection values to be recorded for all check sheets. Damaged sustained to components resulting in an out of specification must be manged by a concession obtained from engineering staff. All abnormalities to be recorded and reported with Technical Notifications (TNs).
- All work carried out will be in line with the applicable Eskom, ERI or OEM standards. Where nothing exists, IEC, SABS standards and good engineering practise will be followed. This includes but is not limited to the covering of all openings and the use of approved chemicals.
- NDT to comply to ERI standards for PT and UT
- All quality documents, procedures, check-sheets and PQP to be supplied by ERI TGS

3.2 Experience of staff

- The service requested will determine the skill levels and number of specific skills that will be required to execute the service.
- The service provider will work together with the ERI TGS personnel to ensure the KPIs are achieved.
- All staff shall be adequately qualified and competent of performing all work within safe and correct technical specifications.
- Short CV's of all staff, stating qualifications and relevant experience must be provided at least four weeks before commencement of project.

3.3 Spares and Consumables

- All spares that would have been pre identified in the pre planning of the project will be sourced and supplied by the respective clients to ERI.
- All consumables that would have been pre identified in the pre planning of the project will be sourced and supplied by the service provider.
- The transport of any spares and consumables remains the responsibility of the contractor.

3.4 Documentation

- A full service report will be compiled and provided to TGS, to the ERI TGS standard. The report will contain a high level description of the work done during the project. It will contain the approved PQP of all work and all related check sheets. All technical notifications will be shown as well. It will contain a section on spares used report.
- PQP to be compiled and presented to Engineering (TGS) for approval before start of project. Report to be accepted by ERI TGS Engineering.

4 Scope of Work (SOW)

4.1 Pre – Project Activities

- Upon receipt of the scope of work, it is the service provider's responsibility to ensure that the scope is clear and executable within the specified durations. The ERI TGS project management will share durations of activities expected to support whole project durations.
- Identify critical spares requirements and incorporate into the scope of works.
- Verify scope execution methods against ERI prescribed methods for inclusion in the scope of work.
- Advice and guide on best practises to refurbish bearings to meet the project deadlines.
- Active involvement in the compilation of Project Plans in Primavera
- Develop and review project plans for logics and detail as per scope of work for approval

4.2 Service Provider Service

4.2.1 Bearing Refurbishment

- Perform as received inspection of bearings (visual and dimensional)
- Remove all white material and inspect the shell
- Blast clean the bearing
- Apply a tin layer on the bearing
- White metal the bearing
- Butt, peen, scrape and rough machine the bearing
- Deburr and clean
- Perform NDT (UT and PT) and submit report to engineering (third party to have required accreditation and accepted by Eskom Rotek Industries / Eskom)
- Dimensional inspect after rough machining
- Butt, peen and scrape the bearing ensuring critical dimensions are maintained
- Supply or manufacture dowels, bolts and nuts when instructed by ERI when required
- Engineering to issue final machining sizes
- Final machine the bearing to specified size
- Reintroduce all critical features (oil ways, jacking oil ports, thermocouple holes etc)
- Dimensional inspect after final machining
- Perform NDT (UT and PT) and submit report to engineering
- Deburr and clean
- Package bearing to avoid damages on white metal circumference, butt faces and bearing body
- Verify all documentation for dispatch

- **NB: Final machining of specific bearings to be done in conjunction with the final machining instructions from ERI which must include reference to the bearing setup and were need be the specific housings in which the shells must be installed before machining.**
- **NB: All work must completed under the supervision of an ERI bearing services supervisor**

Instructions, Rule, Roles and Responsibilities to be complied by Service Provider

- Compile and Share program with ERI Project Manager before commencement of work
- Share third party certification for NDT and any quality related work as required by ERI standards
- Report directly to the allocated ERI Bearing Services Supervisor.
- Receive their daily SOW from their supervisor and execute as per quality requirements and documentation in the production package
- Attend to daily toolbox talks on topics related to daily activities and ensure that Hazard Identifications and Risk Assessments (HIRA's) are in place, adhered to, and ensure compliance to Personal Protective Equipment (PPE) requirements and always wear protective glasses or googles when in the workshop
- Adhere to workshop ERI Life Saving rules and observe safety habits attiqute and compliance there of
- Ensure the work areas are safe in terms of housekeeping, storage, stacking, machine guarding. Area been worked on must at all times be clean, free of cluster and congestion
- Do Plan Job Observation, Near Miss reporting and Behavioural Based Safety Observation (BBSO) on employees during the period of work and submit reports to ERI Works Safety Department
- Seek advice if required before continuance with an activity which needs clarification
- They will ensure total compliance to the access-controlled areas around the machines
- Ensure that plant safety regulations, quality standards & procedures, work instructions are always adhered to.

4.2.3 Comply with Safety Health Environment and Quality Requirements

- Comply with the Occupational Health and Safety Act and Rotek Engineering SHE System requirements
- **Report all incidents and incident to ERI Supervisors, Project Manager and Safety Officer immediately as they occur**
- Comply with the Eskom Plant Safety Regulations and Life Savings Rules
- Stop unsafe work activities and report to the Project / Site Manager for rectification
- Control and maintenance of ISO Quality system in accordance with the Business Management System in relation to this Job Function.
- Comply with policies, procedures and instructions.

5 Minimum qualification requirements

Resources assigned to the project are to comply with the minimum qualification requirements below:

Quality Control / Inspectors	• At least 10 years relevant experience • Must be fully literate in English, in reading, writing and speaking, and able to communicate in English at all times • Strong & sound relevant trade skills with the ability to utilize and read measuring and test instruments within the tolerance requirements • Conversant with Quality and Safety system requirements • The ability to function effectively in a team environment
Quality Assurance	• At least 10 years relevant experience • Must be fully literate in English, in reading, writing and speaking, and able to communicate in English at all times • Strong & sound relevant trade skills with the ability to utilize and read measuring and test instruments within the tolerance requirements • Conversant with Quality and Safety system requirements • The ability to function effectively in a team environment
Mech /Elec Service / Engineers	• 10 years relevant experience • Must be fully literate in English, in reading, writing and speaking, with technical report writing skills and able to communicate in English at all times • Above average interpersonal, communication and leadership skills • Strong customer orientation • Conversant with ISO 9002 and Occupational Health and Safety Act • Computer skills, in MS Office, Windows, and MS Projects • Diploma, or Degree in relevant Engineering field
Machinist	• At least 10 years relevant experience • Must be fully literate in English, in reading, writing and speaking, and able to communicate in English at all times • Strong & sound relevant trade skills with the ability to utilize and read measuring and test instruments within the tolerance requirements • Conversant with Quality and Safety system requirements • The ability to function effectively in a team environment
Boiler Makers and Welders	• Welders Trade Test • Equivalent Welders Qualification registered and recognised by the Government of RSA • Planning skill, good communication and interpersonal skills • Be able to do all type of Welding Processes • In depth knowledge of Welding Techniques • Able to work under pressure • Problem solving and meet set Deadlines • Knowledge on Quality Systems and OSHACT 85 of 1993 • 10 years of turbine related experienced including PWHT process
NDT Services	• 10 Years of NDT related experience with strong interpersonal and communication skills • Setup and verify equipment settings

	• Translate NDT codes, standards, specifications, and procedures into NDT instruction adapted to the actual working condition • Prepare NDT Work Instruction / Technique sheets • Perform and supervise inspections NDT Level 1, 2 and 3 • Evaluate and interpret NDT results and provide credible results. • Select the NDT Technique for the test method to be used • Train and Develop and NDT Technicians

6 SHEQ requirements

All service providers are expected to comply with, but not limited to the following:

- Compliance with the Occupational Health and Safety Act 85 of 1993 is compulsory.
- Adherence to Quality Management System Policies, Procedures and related requirements of ISO 9001.
- Adherence to Occupational Health and Safety Policies, Procedures and related requirements of the OHSAS 18001.
- Adherence to environmental aspects, related impacts and legal requirements associated with work activities in accordance with ISO 14001.
- Adherence to Life Saving Rules.
- Compliance with the Eskom Plant Safety Regulations.
- Only authorised documents and processes are to be used in the execution of duties.
- Continuously seek methods for improvements from a process, quality and safety perspective.
- Obey all instructions.
- Familiarize with:
    - The applicable work instructions and procedures in place.
    - Safe working conditions and procedures.
    - All legal and contractual requirements.
    - Discipline and integrity.
- Compliance to all ERI Work Instructions, processes, procedures, and standards
- Adherence to ERI's disciplinary code or practice.
- Set example to co-workers and others.
- Participate in Risk Assessments.
- Responsible for own safety.
- Responsible for Personal Protective Equipment issued.
- Execute duties promptly and safely.
- Safeguard tools and safety equipment issued.
- Keep good relationship with all personnel.
- Compile a HIRA for each and every activity that needs to be performed.
- Ensure the activities are carried out following a Works Instructions and Procedure.
- Adhere to clean condition policy where required.

- All activities to be carried out as per the documented processes and comply with the requirements of ISO and OHSAS certification
- Service provider to comply to Eskom PPE (Personal Protective Equipment) Policy with regards to issuing of PPE to resources
- Proper use of PPE to be followed
- Ensure that tools and equipment are stored correctly in a safe place.

7 Key deliverables

The following deliverables are to be met by the service provider:

During the project duration:

- Program and contract agreement detailing start and end date of project signed by both parties
- Daily updated program
- No customer complaints
- Compliance to all ERI Work Instructions, processes, procedures, and standards
- No SHEQ incidents
- Project Milestones are to be achieved on time, or earlier

8 Procedure adherence requirements

The ERI TGS Quality Management System consists of various procedures and processes that are utilized to manage and control the level of quality of maintenance activities during an outage to an acceptable standard. These procedures and processes are employed during the planning and execution of maintenance activities with a focus of meeting the customer's requirements and enhancing their satisfaction. These procedures shall be adhered to by the service provider and will be made available on request by the service provider.

- Quality Control
- PQP Workflow Assessment and Tracking for Outages (F-198)
- Technical Notification Work Instruction (240-94067868)
- Control of Blanks and Foreign Material Exclusion Covers (T-03)
- Hydraulic Equipment Specifications, Operation and Maintenance Requirements (F-465)
- Compilation of Service Reports and Data Books (F-737)
- Lifting Machines and Lifting Tackle Safe Working Practices (E-19)
- Correcting of Checksheets Engineering Instruction (X-1384391-033)
- Project Management Product/Process Quality Plan (240-130329202)
- Control of Non-Conforming Product/Service, Corrective and Preventive Action (240-103649507)
- Business Management System Audit (240-94027195)
- Coding of Business Management System Documentation (240-94027233)
- Development and Management of the Product/Process Quality Plan for Outages (240-142892057)

- Turbo Gen Services Rework Work Instruction (240-147200671)
- Flogging procedure(E-60)
- Safe operation of electrical equipment (TT-A-01)
- Latest revision of ERI PT (240 – 136514971 R3) and UT (240 – 136619126) NDT criteria
- Plant Safety Regulations
- Latest revision of acceptance criteria for white metal bearings (TT-T-46)

9 Key Performance Indicators

The performance of the contractor will be evaluated on the KPIs in the table below:

Objective	**Key Performance Indicator**	**Measure**	**Unit of Measure**	**Source of Evidence**
Safety Sustainability	LTI Free days	LTI Free days	Days	To be provided by supplier
Due Date Performance (DDP)	Due Date Performance	Average contracted outage days Days earlier reward *Supplier still charges full contracted value for earlier finish* Days late penalty *2% of payable on late per day*	Days	To be provided by supplier
Reduce the Number of Rework Incidents	No of Rework Incidents	Number of Rework Incidents Rework at supplier cost including spares and consumables and recovery plan if there are contractual dates impacts (penalty will be as per DDP)	Nr	To be provided by supplier
Reduce the Rework Duration	Rework Duration (Days additional to planned outage duration)	Number of Days Rework Duration Impacts Outage Due Date	Days	To be provided by supplier
No of Legal & Environmental Contraventions	No of Legal & Environmental Contraventions	Number of contraventions	Nr	To be provided by supplier
Zero Fatalities Excl 3rd party at fault	Zero Fatalities Excl 3rd party at fault	Number of fatalities	Nr	To be provided by supplier

- The service provider will be responsible for the successful completion of the scope
- Any defects that are noted after the scope execution will be corrected by the service provider at own cost.