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|  <b>Eskom</b><br>Rotek Industries | <b>Hendrina LP Rotor Full Refurbishment<br/> (discs REMOVAL and INSTALLATION)<br/> SCOPE OF WORK</b> | <b>Turbo Gen Services</b> |
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Title: **Hendrina LP Rotor Full Refurbishment (Coupling, Balance Collar etc. discs REMOVAL and INSTALLATION)**

Document Identifier:

Alternative Reference Number: Not Applicable

Area of Applicability: Eskom Rotek Industries SOC Ltd

Functional Area: Turbo Gen Services

Revision: 0

Total Pages: 7

Next Review Date:

Disclosure Classification: Controlled Disclosure

| Compiled by                                                                                                                 | Functional Responsibility                                                                                                        | Functional Responsibility                                                                                                    |
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| Date: 22/05/2023                                                                                                            | Date:                                                                                                                            | Date:                                                                                                                        |

## **1. PURPOSE**

This document is aimed to ensure adequate full refurbishment of Hendrina LP rotor (inspections, disassembly and assembly of LP rotor Couplings, Balance Collars, TS & GS Blade disc 1, 2, 3, 4 etc.) to restore and LP rotor to a serviceable condition, thereby restoring design tolerance and maintaining desired machine efficiency. All defects observed during assessments to be adequately addressed through parallel engineering principles whilst maintaining design requirements. All activities carried out on Hendrina LP rotor to be of great quality with no rework and completed within stipulated duration.

## **2. BACKGROUND**

There is currently no serviceable LP rotor to support future outages including breakdown for Hendrina PS, ERI was therefore given a task to assess and support with refurbishment of spare LP rotor through in-house capability or subcontractor to local companies with capability and proven experience in turbine refurbishment including removal and fitment of shrunk-on discs into rotor shaft. The outsourcing of the LP rotor refurbishment will include site visit and clarification meeting for various subcontractor to understand requirements thereof.

## **3. SUBCONTRACTOR REQUIREMENTS**

The facility to execute inspections and refurbishment of the Hendrina LP rotors must have necessary crange for rigging purpose and all accessories / equipment to execute task on couplings, balance collar and discs removal including re-fitment into LP rotor shaft. No equipment may be loaned or taken away from ERI workshop as such are utilized on other production requirements. In addition, subcontractor will be expected to develop and have specialized rigging process and equipment for upending to facilitate removal and refitment of discs. The consumables required for LP rotor refurbishment must be provided by the subcontractor and detail QCP including relevant procedures to be approved by ERI works engineering. In addition, subcontractor expected to source material for locking mechanism on couplings, stage 4 discs, drive pin holes and cup. ERI will share relevant detail to enable manufacturing of these spare parts in accordance with the PQP.

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#### **4. BILL OF MATERIAL**

Below list will be provided by ERI to the subcontractor once all commercial processes are concluded and tender awarded to the successful bidder.

1. Ex U4 LP rotor, ONLY TS coupling and balance collar removed refer to photo on Appendix
2. Ex U10 LP rotor, TS&GS couplings removed refer to photo on Appendix
3. Stages 1, 2 TS&GS new discs full re-bladed
4. Stage 3 TS&GS full re-bladed
5. New GS coupling
6. Stage 4 discs will be removed from Ex U4 LP rotor and refurbished in preparation for use on Ex U10 LP rotor during refitment of discs.

#### **5. SCOPE OF WORK**

The subcontractor expected to prepare and provide detail QCP for discs removal on both LP's, shaft refurbishment as well as refitment of the new and replacement discs, balance collar and couplings including locking. ERI works engineering is responsible to approve and witness various activities at the subcontractor. Below are the key activities throughout this project.

- a) Removal of GS coupling as well as stage 4 TS&GS couplings from Ex U4 LP rotor
- b) Removal of couplings, balance collars, stages 4, 3, 2 & 1 TS&GS discs from Ex U10 LP rotor
- c) Inspect and prepare for shipment back to ERI Rosherville workshop the Ex U4 LP rotor as well as all removed discs from Ex U10 LP rotor
- d) Inspections of the complete shaft after removal of all components e.g.: visual, dimensional, truth check, surface and volumetric NDT inspects.
- e) Re-introduce drive pin holes and perform roller burnishing
- f) Fitment of stages 1, 2, 3 & 4 TS&GS discs, ensure truth check after each disc is in position and manufacture drive pins and sleeves / cup to suit. Lifting holes will require to be plugs
- g) Manufacture and install locks on stage 4 GS&TS discs
- h) Install the balance collar, ream, re-dowel, and lock
- i) Fit the couplings as per ERI procedure and confirm runouts
- j) Manufacture and locking mechanism to suit for TS&GS couplings and instal in position
- k) Inspect and record frequency test on stages 3&4TS&GS blades after fitment of the discs

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- l) UT all disc bores and drive pin holes, and stages 1, 2, 3 and 4 blade roots
- m) Final inspections load for dispatch back to ERI Rosherville workshop

## **6. PROOF OF COMPLIANCE WITH THE LAW**

### **The contractor shall ensure that:**

1. All employees are registered with the Workmen's Compensation Commissioner in a manner which is acceptable to the Department of Labour and which satisfies the requirement of the compensation for occupational injuries and diseases act.
2. All employees are registered for unemployment.
3. All unskilled/casual staff must be paid in accordance with the Labour Act. The contractor will be responsible for their training.
4. All personnel shall wear the necessary protective clothing in accordance with Occupational Health and Safety Act No.85 / 1993 and the Construction Regulations of 2003.

## **7. HEALTH AND SAFETY**

The Contractor shall at all times comply with the requirements of the Occupational Health & Safety Act (1993), Construction Regulations (2003) and the Employer's Pre-construction Health and Safety Specification. In pursuit of the aforementioned, the Contractor shall allow for:

- Carrying out and documenting risk assessments of all work to be carried out under the contract.
- Preparation of safe work procedures for all work to be carried out under the contract.
- Preparation of an H&S plan, discussing it with the Employer, and then amending it as agreed.
- Preparation for and conducting "toolbox talks" with relevant employees.
- Induction and training as and where required.
- Preparation of a Project H&S File.
- Regular updating of all of the foregoing.
- Provision of PPE and protective clothing for employees
- Complying with all H&S requirements for the duration of the contract
- Storage of cleaning material / equipment

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## 8. REPORTING

Reporting shall be done in writing at the end of every shift. Major finding on the machines during maintenance and refurbishment shall be communicated to the Project/Contract Manager. All contact information will be provided. Service/Maintenance report must be generated and submitted to the Contract manager for all the maintenance work that will be carried out.

## 9. SUPPORTING DOCUMENTS

**NB: The following documentation must be returned for the purpose of technical evaluation:**

- Service report with recommendations
- Weekly Reports

## 10. DOCUMENT SUPPORTED BY:

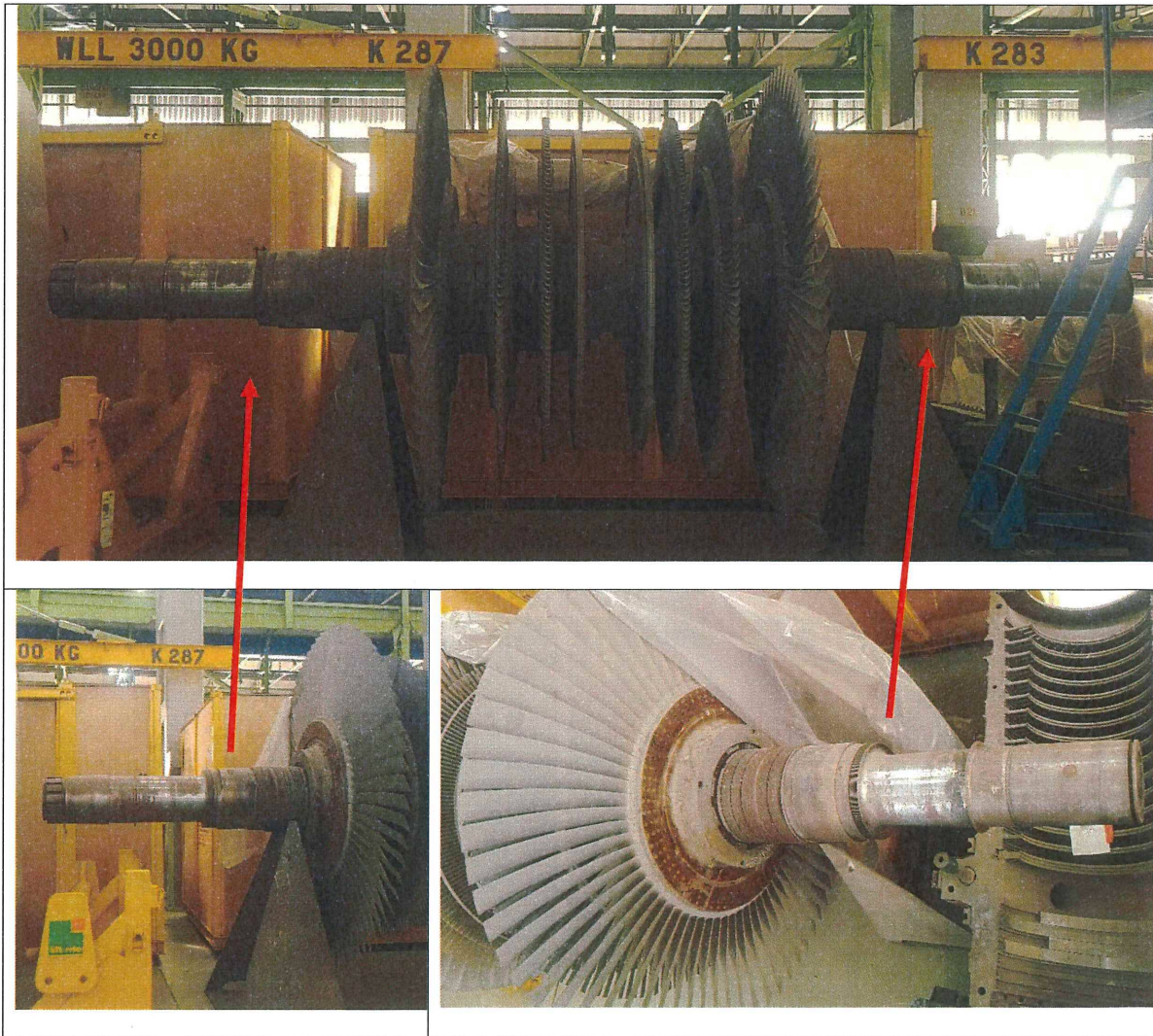
| NAME              | POSITION                  | SIGNATURE                                                                            | DATE       |
|-------------------|---------------------------|--------------------------------------------------------------------------------------|------------|
| Tshepo Ramalebana | Project Manager           |  | 22/05/23   |
| Buti Khanye       | Senior Works Engineer     |  | 22/05/2023 |
| Xolani Ngidi      | Works Engineering Manager |  | 22/05/23   |

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## APPENDIX A: EX-U10 LP rotor OVERVIEW

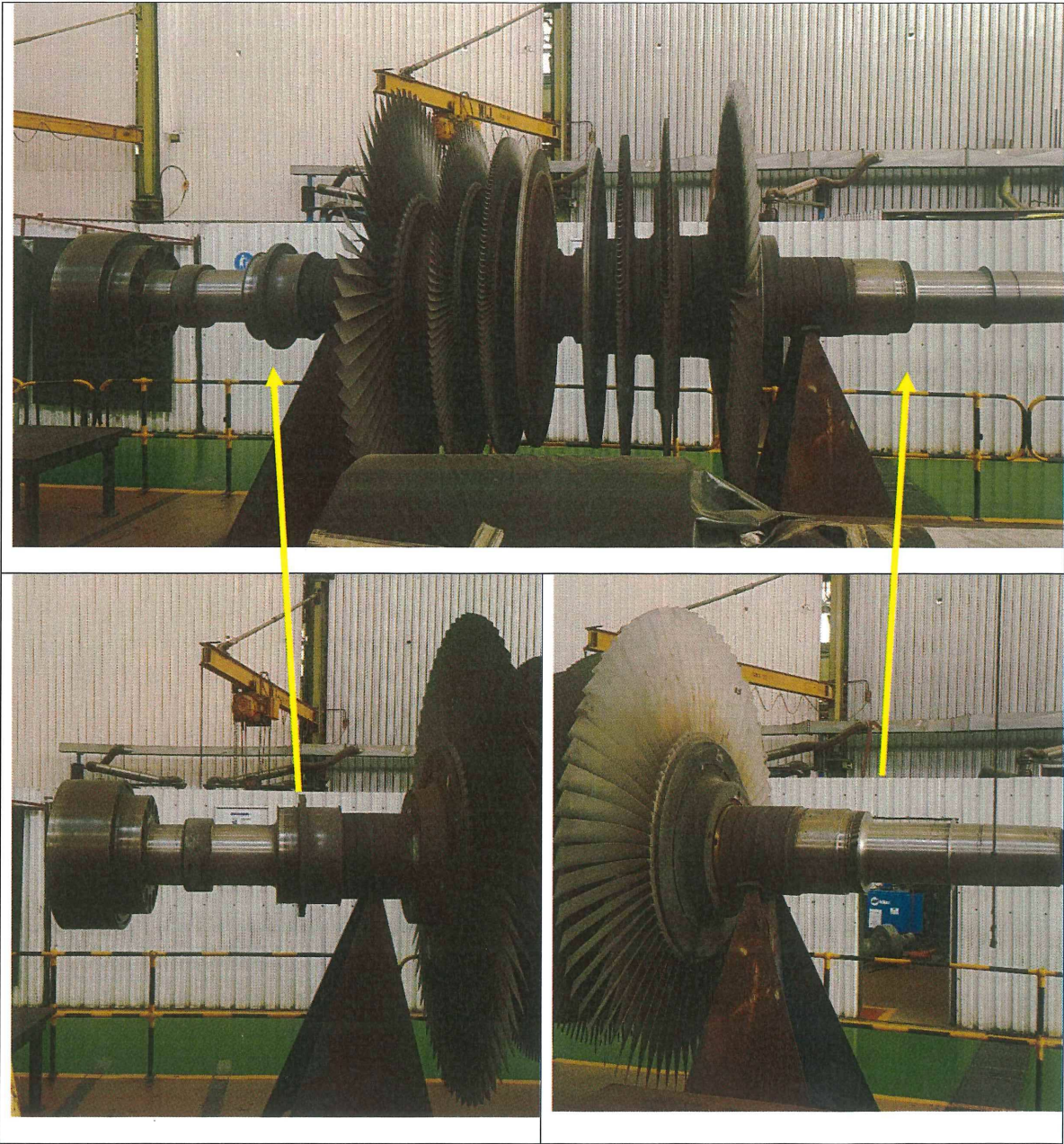


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APPENDIX A: EX-U4 LP rotor OVERVIEW



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