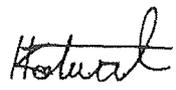


	SOW	Engineering
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Title	SCOPE OF WORK FOR SUPPLY OF TURBINE MECHANICAL SEALS SPARES AND SPARES REFURBISHMENT CONTRACT	Unique Identifier	*1037905
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Compiled by	Functional Responsibility	Authorised by
		
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1. INTRODUCTION

The purpose of this document is to provide scope for

- Workshop refurbishment and/or repair Turbine Plant Pumps Mechanical Seals equipment at Kendal Power Station
- Supply of Turbine Plant Pumps Mechanical Seals equipment at Kendal Power Station

The high level technical scope of work necessitates the following

- To refurbish and/or repair the Turbine Plant Pumps Mechanical Seals equipment at Kendal Power Station using approved OEM components, drawings, and specifications
- All spares required for refurbishment and/or repair will be free issued from the Eskom stores, depending on stock availability. In the event of the required spares not being available at the Eskom stores, the repair Contractor shall upon approval from the Power Station Contracts manager supply all relevant spares related to the respective refurbishment and/or repair

2. SUPPORTING CLAUSES

2.1.1 Purpose

The purpose of this document is to define the scope of work for workshop refurbishment and/or repair of Turbine Plant Pumps Mechanical Seals equipment at Kendal Power Station as listed in the Introduction

2.1.2 Applicability

This document shall apply to the Eskom Kendal Power Station Turbine Plant

2.2 NORMATIVE/INFORMATIVE REFERENCES

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs

2.2.1 Normative

- [1] ISO 9001 Quality Management Systems
- [2] QM-58 Quality Requirements for Quality Management
- [3] 32-727 SHEQ Policy

2.2.2 Informative

N/A

2.3 DEFINITIONS

Definition	Description
Mechanical Seal	Is a device that prevents leakage of pressurized fluid between a rotating shaft and a stationary housing. Mechanical seals are widely used in a range of power plant equipment applications, particularly on pumps of various sizes and pressure ratings.
Refurbishment	to renew or to restore to a new condition for better functionality

2.3.1 Disclosure Classification

Controlled Disclosure: Controlled Disclosure to external parties (either enforced by law or discretionary)

2.4 ABBREVIATIONS

Abbreviation	Description
BFP	Boiler Feed Pump
CW	Cooling Water
DE	Drive End
ISO	International Organisation for Standardisation
KPI	Key Performance Indicator
MCW	Main Cooling Water
NDE	Non-Drive End
NDT	Non-destructive Test
OEM	Original Equipment Manufacturer
OHS	Occupational Health & Safety
PSR	Plant Safety Regulations
QC	Quality Control
QCP	Quality Control Plan
SHEQ	Safety, Health, Environmental & Quality
SOW	Scope Of Work

3. TECHNICAL REQUIREMENTS

3.1 SERVICE REQUIREMENTS

The scope applicability and service requirement for each Kendal Power Station stated in the Introduction is listed below

3.1.1 Scope of work

Refer to Appendix A for the refurbishment scope of work breakdown

3.1.2 Workshop Services Required

On the plant identified in section 2 1 2 to the extent determined by the Eskom *Service Manager* or his delegate and the *Contractor*, the *Contractor* shall

- 1 Strip and assess the damage, determine spares requirement and refurbish and/or repair damaged components
- 2 Document all findings in a detailed assessment report which must include photographs to be presented to, and discussed with the relevant Kendal Power Station System Engineer
- 3 Provide an assessment report advising on the condition of the stripped components and state if the components are to be re-used or replaced. Either decision must be supported by technical justification based on specifications and condition
- 4 Provide the scope of work which shall be discussed and agreed upon between the Contractor and the relevant System Engineer, prior to proceeding with the repair or the refurbishment
- 5 Submit the scope of work based on reviewed assessment report, together with the Quality Control Plan (QCP), check sheets to the Power Station Contracts Manager, Power Station Technical Support, and Power Station Engineer for acceptance and signatures

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- 6 Refurbish and/or repair the Turbine Plant Mechanical Seals equipment in accordance to the agreed scope of work. Any changes to the scope of work must be formally communicated to the Power Station Contracts Manager, Power Station Technical Support, and Power Station Engineer, and agreed to in writing prior to commencing with the repair
- 7 All spares required for refurbishment and/or repair will be free issued from the Eskom stores, depending on stock availability. In the event of the required spares not being available at the Eskom stores, the repair Contractor shall upon approval from the Power Station Contracts manager supply all relevant spares related to the respective refurbishment and/or repair
- 8 Ensure that the refurbished and/or repaired pump/s and their associated auxiliary equipment achieve the performance levels as per original equipment design and specification
- 9 Ensure that the refurbished and/or repaired Turbine Plant Pumps Mechanical Seals equipment are delivered to Kendal Power Station stores with relevant documentation. The Kendal Power Station stores, Power Station System Engineer, and Power Station Contract Manager must be made aware of the delivery and furnished with a signed data book at the time of delivery
- 10 Ensure that the hard copy and an electronic copy of the data book are sent to Kendal Power Station System Engineer and the Power Station Contract Manager at the time of delivery to site
- 11 Transport the refurbished and/or repaired Turbine Plant Mechanical Seals equipment within 24 hours after removal, and notification from Kendal Power Station representative, in a suitable transportation cradle
- 12 Receive the Turbine Plant Mechanical Seals equipment from Kendal Power Station and record in a one pager the as found condition, supported by photographs
- 13 Ensure that all required tests are performed in accordance with the approved and signed QCP, taking into consideration the applicable latest standards in the list of standards, as a minimum
- 14 Ensure that all stripped components are marked with a unique job/project number and small parts are stored in a suitable container, also marked with the unique job/project number
- 15 Ensure that all parts or stripped components are stored in a manner not to incur environmental or unintended/accidental damage
- 16 Ensure that all scrapped components are returned to Kendal Power Station stores with a scrap certificate
- 17 Submit a comprehensive quotation to Kendal Power Station Contracts Manager for acceptance. The quotation must be submitted after the scope of work and QCP has been accepted and approved. The Power Station Contracts Manager will review the work to be done and the price, and then issue a Task Order for the work to be undertaken
- 18 Submit a comprehensive time schedule to the Kendal Power Station Service Contracts Manager for approval
- 19 The Contractor shall communicate in writing to Kendal Power Station Contracts Manager, 72 hours prior to any intervention point/s in the QCP which require client witnessing. In the event of an urgent job or catastrophic failure, the Contractor may send the request in writing, followed by a telephonic call to the Contracts manager or his delegate, requesting for a quicker turnaround time from the Power Station System Engineer and QC personnel
- 20 Ensure that the Kendal Power Station Engineer or his representative accepts and signs off the QCP and review relevant paperwork before the Turbine Plant Mechanical Seals leave the Contractors premises

3.2 EQUIPMENT REQUIRED

The Contractor and his sub-Contractor must possess the tools and equipment to fulfil the requirements of refurbishing and/or repairing the components listed in Appendix A

3.3 CONSUMABLES REQUIRED

The Contractor must supply the consumables, if applicable, to satisfy the requirements for components listed in Appendix A. These consumables should always be available.

3.4 WORKSHOP

The Contractor and his sub-Contractor are required to have suitable premises with the required tools, cranes, and equipment to be able to conduct the scope of work. Eskom reserves the right to inspect the workshop premises to make sure that it is suitable and is kept up to standard.

3.5 PLANNED KEY PERFORMANCE INDICATORS (KPI)

- The KPI's will be used to determine the successful performance of the scope. The Contractor is required to perform in order to meet these targets. The KPI's are to be agreed to between parties, and are subject to change on an annual basis based on the need. Below are the KPI's
 - Quality of repair or refurbishment. No re-work
 - Reliability of the repaired or refurbished component
 - First committed delivery date on the Purchase Order receipt is applicable
 - Non-compliance to the agreed Scope of Work, hold points and Quality Control Plans

4. AUTHORISATION

This document has been reviewed and accepted by

Name and Surname	Designation
Hoosein Kotwal	System Engineer
Kubashan Moodley	Turbine Engineering Manager
Johan Vos	Maintenance Technical Support
Tebogo Mojela	Outage Controller
Zanele Maleka	Outage Manager

5. REVISIONS

Date	Rev.	Compiler	Remarks
March 2022	3	H Kotwal	Final
April 2021	2	T Tshikovhi	Final after consolidated reviews
February 2021	1	T Tshikovhi	Comments from squad check
September 2020	0 1	T Tshikovhi	Comments after Senior Engineer Review
September 2020	0	T Tshikovhi	First Draft

6. DEVELOPMENT TEAM

The following people were involved in the development of this document

- Hoosein Kotwal
- Thinga Tshikovhi

7. ACKNOWLEDGEMENTS

- Thinga Tshikovhi – System Engineer
- Raymond Nkosi – System Engineer
- Siphon Mkhabela – Senior Engineer
- Siphon Nhlapo – Senior Engineer

APPENDIX A: SPARES LIST AND SPARES REFURBISHMENT REQUIREMENTS

Table 1: Spares List

MECHANICAL SEAL COMPONENT DESCRIPTION	Eskom SAP Number	Stock Levels	Installed-Base	Number of Category A Refurbishment for 18 Months	Number of Category B Refurbishment for 18 Months	Number of Category C Refurbishment for 18 Months	New Complete Spares required for 60 Months
KENDAL: MAIN COOLING WATER PUMP							
MCW (DE & NDE) - 12 1/4" T8B1 AR1X1/D OEM Drawing S-35017	178547	4	30	10	25	25	6
KENDAL: CONDENSATE MAKE-UP PUMP							
5% Make-up pumps (DE&NDE) - 33mm FFET GPN 81760793	Non-Stock	0	24	6	6	6	10
5% Make-up pumps (DE&NDE) - 32mm FFET GPN 81760793	Non-Stock	0	24	6	6	6	10

MECHANICAL SEAL COMPONENT DESCRIPTION	Eskom SAP Number	Stock Levels	Installed-Base	Number of Category A Refurbishment for 36 Months	Number of Category B Refurbishment for 36 Months	Number of Category C Refurbishment for 36 Months	New Complete Spares required for 60 Months
KENDAL: CLEAN DRAINS PUMP							
Clean Drains Pump (DE & NDE) - 45mm FFET GPN 81761248	Non-Stock	0	24	6	6	6	10

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KENDAL: LP DRAIN PUMPS							
LP Drain Pumps(DE & NDE) - 55mm FFET GPN 81761053	Non-Stock	0	24	6	6	6	18
KENDAL: CPP BOOSTER PUMPS							
CPP Booster Pumps – 70mm FFET	Non-Stock	0	24	6	6	6	18
KENDAL: SEAL OIL PUMP							
Seal Oil mechanical seal (35mm)	80001782	n/a	6				5
Seal Oil mechanical seal (45mm)	89719346	n/a	18				15
MECHANICAL SEAL COMPONENT DESCRIPTION	Eskom SAP Number	Stock Levels	Installed-Base	Number of Category A Refurbishment for 18 Months	Number of Category B Refurbishment for 18 Months	Number of Category C Refurbishment for 18 Months	New Complete Spares required for 18 Months
KENDAL: B.F.P. Main Pump HPT PK 300-350							
Main Feedpump (DE & NDE) - 6 3/4" T270 F OEM Drawing Z/08389/D	98630	4	18	15	30	20	6
KENDAL: BOOSTER PUMP HZB 303-720							
Booster Pump NDE - 5 1/2" 8B1 OEM Drawing Z/03497	98620	2	18	20	15	20	6
Booster Pump DE - 6 1/2" 8B1 Drawing Z/03379	98621	2	18	20	15	20	6

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Below is the refurbishment levels of the mechanical seals scope of work referred to on table 1 After the seal has been stripped, it will then be decided in what category the seal will be refurbished

Note: When the seal repair cost exceeds 75% of the new seal price, the seal will be scrap and a new seal should be supplied

Table 2: Scope of work

No.	SCOPE BREAKDOWN
Category A Scope	
	Strip and clean the seal
	Inspect all the components on the seal
	Measure all the parts to determine if it is still in the tolerances
	The following parts must be measured All the sealing faces, all the metal parts
	Lap and polish the sealing faces
	NDT the faces for any cracks
	Replace the following components Springs, "O-rings Gaskets and grub screws
	Assemble the seal and pressure test the seal
Category B Scope	
	Category A scope
	Replace one of the sealing faces
	Replace some hardware e g throttle bushes, thrust rings
	Grind lap and polish the other faces
	Assemble the seal and pressure test
Category C Scope	
	Category A Scope
	Category B Scope
	Replace all the sealing faces
	Replace some of the metal parts such as shaft sleeves and or clamp plates or retainers
	Assemble the seal and pressure test