	<p style="text-align: center;">Works Instruction</p>	<p style="text-align: center;">Medupi Power Station</p>
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Title: Medupi Power Station Scope of Work for Supply and Refurbishment of Turbine Centreline Hydraulic Pumps

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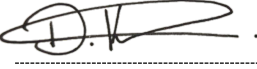
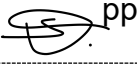
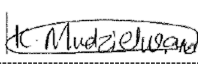

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1. Introduction

The hydraulic system for the HP and IP turbine control and stop valves at Medupi Power Station relies on two rotary screw pumps, MAX11AP001 and MAX11AP002, which operate in a 2x100% configuration. One pump remains in operation while the other is on standby. The system operates at a pressure approximately 4.0 MPa, maintained by the pressure control valve MAX11AA601, using lubricating oil as the operating medium.

This scope of work (SOW) outlines the requirements for the 5-year supply of spare pumps and refurbishment of the existing hydraulic pumps to ensure continued operational reliability and efficiency.

2. Supporting Clauses

2.1 Scope

This SOW defines the necessary requirements for the procurement and refurbishment of hydraulic pumps utilised in turbine operations at Medupi Power Station. It establishes the technical criteria, quality assurance measures, and logistics associated with ensuring the continued reliability and performance of these critical components.

2.1.1 Purpose

- Supply of replacement hydraulic pumps of type L3MF-060 as per OEM specifications.
- Refurbishment of existing hydraulic pumps, including disassembly, inspection, repairs, and testing.
- Compliance with OEM standards and Eskom technical requirements.

2.1.2 Applicability

This document shall apply to Medupi Power Station Turbine hydraulic pumps Materials Management.

2.1.3 Effective date

This document becomes effective immediately upon authorisation.

2.2 Normative/Informative References

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

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2.2.1 Key Standards

Document Title	Document Number
[1] Occupational Health and Safety Act of 1993	OSHACT
[2] Quality Standard	SABS-ISO 9000 - 2000

2.2.2 Applicable Codes and Standards

Document Title	Document Number
[3] Mechanical Vibration – Measurements and evaluation of machine vibration – Part 1: general guidelines.	ISO 20816-1:2016

2.2.3 Applicable Eskom Documents

Document Title	Document Number
[4] Requirements for Non-Destructive Testing (NDT) on Eskom Plant Standard	240-83540088
[5] Engineering Drawing Standard-Common Requirements	240-86973501
[6] Supplier Quality Management Specification	240-105658000
[7] Standard for the External Corrosion Protection of Plant, Equipment and Associated Piping with Coatings	240-1063656933
[8] Turbine Centreline Material Procurement Standard	240-95144948
[9] Medupi Power Station Turbine Preservation Procedure	240-137308230

2.3 Definitions

Definition	Explanation
<i>Supplier</i>	Service provider contracted for the supply and refurbishment of the Rotary Screw Hydraulic pumps at Medupi Power Station. Referred to as the Supplier on this document.
<i>Employer</i>	Medupi Power Station

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2.4 Abbreviations

Abbreviation	Explanation
BOM	Bill of material
EoMR	End of Manufacture Report
ITP	Inspection and Test Plan
NCR	Non-Conformance Report
NDT	Non-Destructive Test
OEM	Original Equipment Manufacturer
QCP	Quality Control Plan
RACI	Responsible Accountable Consult Inform
SOW	Scope of Work

2.5 Roles and Responsibilities

Responsibility and accountability as per RACI

Responsible	Accountable	Consult	Inform
Contract Manager	Contract Manager	Buyer	Turbine Maintenance and Turbine Engineering
Assurance that all actions listed in this SOW are undertaken (follow up, advice, consultation).	Implementation of this SOW, random reviews and audits for adherence, assure that any deviations will be corrected.	Provide support, advice and communication with outside stakeholders where needed.	Planning and advice. Engineering – technically accountable for SOW.

2.6 Process for Monitoring

A QCP will be used to monitor the procurement of the components listed in this document. This includes scheduled site visits, review of refurbishment documentation, and verification of compliance with technical and safety standards.

2.7 Related/Supporting Documents

[1] Operation, Maintenance, Mounting and Disassembly Instructions: E185 5319

[2] Sectional drawing with spare parts list: C160.7547

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3. Design Operational Requirements for Hydraulic Pump

This section provides an overview of the key operating parameters and identifies the design parameters to be used by the *Supplier*. The L3MF-060 rotary screw pumps at Medupi Power Station must meet the following design and operational requirements:

3.1 Key Operating Parameters

3.1.1 General Pump Function

- The hydraulic pumps supply hydraulic oil to the HP and IP turbine control and stop valves.
- The hydraulic system is critical for turbine safety and control, ensuring proper valve actuation under various operating conditions.

3.1.2 Pressure and Flow Parameters

- System Operating Pressure: 4.0 MPa (40 bar)
- Pump Flow Rate: As per specifications, ensuring adequate oil supply at all load conditions.

3.1.3 Oil Type

- The system uses lubricating oil as the operating medium.

3.1.4 Start-Up and Operation

- Only one pump runs at a time: the second pump acts as a backup in case of failure or maintenance needs.
- Pumps must operate with low vibration levels, adhering to ISO 20816-1:2016 for machine vibration monitoring.
- Pumps are started and stopped via the turbine control system, ensuring synchronised operation with other auxiliary systems.

3.2 Design Parameters for *Supplier*

The Supplier must ensure that the hydraulic pumps comply with the following operating and performance criteria:

3.2.1 Hydraulic and Mechanical Requirements

- Pump Type: L3MF-060 rotary screw or equivalent with identical performance characteristics.
- Capacity: Must match existing system flow rate requirements.
- Sealing System: Must have a robust sealing system to prevent leaks and oil loss.
- Pressure Control: Pump must maintain a stable discharge pressure of 4.0 MPa without excessive fluctuations.

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3.2.2 Reliability and Redundancy

- Pump must be capable of continuous operation while ensuring seamless switchover to the standby pump in case of failure.
- Built-in protection features to prevent damage due to cavitation, overheating, or excessive pressure.
- Compliance with ISO 20816-1:2016 for vibration limits to prevent mechanical failures.

4. Works Information

4.1 Scope

1. The *Supplier* is responsible for the overall assessment, design, detailed engineering, manufacture, testing (at *Supplier's* works, in storage and on site, as applicable), supply, delivery in good order to site or ex-works as per contract data, off-loading as per contract data, safe and preserved for storage up to a possible 10 years and remedy of any defects in accordance with and subject to the terms and conditions of the contract for the refurbishment and supply of the rotary screw pumps.
2. The scope is such that the additional spare components included in this specification will allow for the use of existing spares as applicable to maintain the hydraulic pump system, ensuring continued operational reliability.
3. All requirements in this document also apply to any subcontractor appointed by the *Supplier* if applicable.
4. All supplied components will be according to the latest as-installed design; any proposed deviation is to be applied for and motivated in writing to the Project Manager and agreed to by the *Employer's* engineer.
5. Visits by the *Employer's* representative or *Employer's* third-party representative to the *Supplier's* or subcontractor's facilities will be conducted based on need and mutual agreement to witness milestones, quality inspections, technical verification, or other important activities during the manufacture or refurbishment of components.

4.2 General Requirements

- The *Supplier* shall ensure all rotary screw pumps and components comply with relevant internal and Eskom standards.
- All supplied pumps must be new, unused, and conform to OEM specifications.
- Proper documentation, including engineering drawings, material certificates, and quality control records, must be provided.
- The *Supplier* shall be responsible for all required inspections and testing to validate conformance before delivery.
- All work shall be performed in accordance with approved safety and environmental regulations.

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4.3 Supply of New Pumps

- The *Supplier* shall provide the rotary screw type pumps that confirm to the OEM specifications and technical requirements.
- Documentation, including datasheets, performance curves, and material certificates, must be supplied with each unit.
- All supplied pumps must be packaged to prevent damage during transport and storage.

4.4 Refurbishment Process

4.4.1 Collection and Delivery

Supplier shall safely collect the pumps from Medupi Power Station and deliver them after refurbishment. No refurbishment work shall commence until a QCP has been submitted to the *Employer* and received formal approval.

4.4.2 Disassembly and Inspection

- Complete disassembly of the pump components.
- Detailed assessment including visual, dimensional, and NDT to identify wear and damage.

4.4.3 Repairs and Replacement

- Replacement of worn-out parts with OEM-approved components.
- Repair or replacement of seals, bearings, and spindle packs as per OEM recommendations.

4.4.4 Reassembly and Testing

- Reassembly in compliance with OEM procedures.
- Functional and pressure testing at rated conditions to ensure performance compliance.
- Submission of test reports and compliance certificates.

4.5 NDT Requirements

1. The *Supplier* is responsible for performing all Non-destructive Testing (NDT) as specified in this document and as required by law or applicable health and safety standards.
2. NDT shall only be performed by an *Employer*-approved NDT company. The Eskom NDT standard to be followed is 240-83539994 Standard for Non-Destructive Testing (NDT) on Eskom Plant.

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4.6 Material Requirements

1. The *Supplier* is responsible for supplying all materials and consumables required for the completion of the works.
2. Material procurement and certification shall be in accordance with 240-84513751. Unless otherwise specified, EN 10204 “3.1” material certificates are required as a minimum.
3. In terms of EN 13480, materials not in an EN-harmonised standard require pressure equipment manufacturer (the *Supplier*) to supply a Particular Material Appraisal (PMA).
4. This PMA shall form part of the Works documentation.
5. All costs relating to PMA production (including testing) are for the *Supplier*.

4.7 Quality Requirements

1. The Eskom Supplier Quality Management: Specification 240-105658000 shall be followed for all quality requirements.
2. No work shall be done without a QCP and/or ITPL that is accepted by the *Employer*.
3. Intervention points must be signed as work progresses – non backdating allowed.
4. Notifications for interventions must be in writing and done at least 4 weeks in advance for interventions outside Medupi Power Station.
5. Minimum hold points for *Employer* Quality Control:
 - Initial acceptance of QCPs
 - Final inspection
 - Review of NDT reports
 - Conformity checks on material certificates and heat numbers
 - PMA reviews (if applicable)
 - Final data book review
6. A QCP (ITPL) shall be developed and sent to the *Employer* for review before any work commences.

4.8 Acceptance of Purchased Goods

The *Supplier* shall deliver purchased components with an End of Manufacturing Report (EoMR), including:

- Material certificate (EN 1024:2004 Type 3.2)
- Material test certificates for castings
- NDT test reports and acceptance criteria
- Charts/graphs for all heat treatment

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- QCPs/ITPL, signed off by all relevant parties
- Check sheets
- Defect list and repair certificates
- NCRs, completed and closed off
- Certificates of Conformance
- Inspection and review before acceptance or rejection.

4.9 Testing Requirements

All testing must comply with Eskom and OEM specifications, including:

- Functional and performance testing at 4.0 MPa
- Vibration testing as per ISO 20816-1:2026
- Factory Acceptance Testing (FAT) before shipment
- Site Acceptance Testing (SAT) upon installation.

4.10 Documentation Requirements

1. All documents shall be subject to *Employer* acceptance.
2. QCPs, Method Statements, and other documents shall be accepted at least 1 week before work commencement.
3. Each revision of documents must include a record of *Employer* comments and corrective actions.
4. A complete data book shall be compiled, including:
 - Inspection reports
 - Detailed design drawings
 - NDT procedures and reports
 - Weld procedures (WPS, PQR) and summary
 - Material traceability summary
 - Personnel qualifications
 - NCRs/CARs documentation.

4.11 Engineering Services

1. Assessment of previous modifications and compatibility with new components.
2. Proposal of design enhancements and updates.

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3. Development of work instructions for manufacture, storage, installation, and maintenance.
4. Supply of lifting drawings, FEA analysis, and strength/stress calculations.
5. QC/QA documentation for full traceability.
6. O&M manual updates and training proposals.
7. Manufacturing schedules and monthly status reports.

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5. Spare Contract Bill of Materials (BOM)

KKS	Type Of Spare	Description	Material number	OEM Part No	5 Year Supply Estimated Quantity
OMAX11AP001/2	PUMP	PUMP, ROTARY: TYPE: HYDRAULIC, SCREW; PORT SIZE: DN80; CAPACITY: 92 DM3/S; SPEED: 2900 RPM; RATING: 40 BAR; SPECIFICATION: L3MF60/120;	645239	L3MF-060/120-IFOKTI-O	6

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6. Acceptance

Full Name and Surname	Designation
Pontsho Letsholonyane	Manager, Contract Management
Titus Ndlovu	Engineer, Turbine Engineering
Tebogo Mokoena	Senior Engineer, Turbine Engineering
Duduzile Ramasimong	Corp Specialist, Engineering

7. Revisions

Date	Rev.	Compiler	Remarks
February 2025	1	Dino Kharivhe	First draft

8. Development Team

Dino Kharivhe

9. Acknowledgements

None

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