 Eskom	Specification	Majuba Power Station
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Title: **Majuba Power Station Old Stacker to Cross 01 Conveyor Project Execution Scope of Work** Document Identifier:

Alternative Reference Number:

Area of Applicability: **Majuba Power Station**

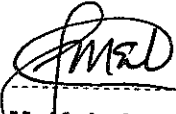
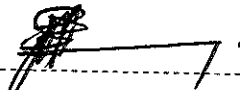
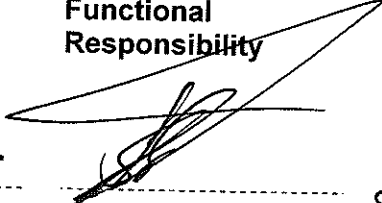

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1. Introduction

This document describes the detail of the applicable plant areas, scope of work, standards, quality requirements, specifications, and terms & conditions as well as the criteria to qualify for the tender.

The mixed ash handling system at Majuba Power station comprises conveyor belts that evacuate fly ash from the ash conditioning silos and coarse ash from transverse conveyors to the ash dump. These belts are ash overland conveyor belts. Ash that is conveyed by ash overland conveyors goes to the ash dump via three (3) streams, i.e., Stream 01, Stream 02 and an Emergency stream. The streams comprise conveyor belts and ash stacking equipment. The scope of this project is limited to emergency ashing facility new infrastructure.

The emergency stream is situated at Transfer House E, where a radial/Old stacker is situated. This stream is used on emergency, where stream 01 and 02 are not available.

Ash at this emergency stacking area is to be taken to the ash dump using the yellow plant (Dozers, trucks and Front-End loaders. Majuba Power Station has spent sizable amount of money through double ash handling happening at the Old Ash Stacker area.

This costs the station a lot of money for use of these machinery in terms of diesel, hourly rate of the machine and operators. It is therefore required that a contingency plan is devised to minimise usage of the yellow plant, thereby minimising the total expenditure of the station on this section of plant. A solution to resolve this issue is to install ash reclaiming facility on the emergency dump

The Works Information hereinafter referred to as the *Works* include but not limited to uninstallation of CSY conveyor SY3 from Komati Power Station, transportation of the conveyor from Komati Power Station to Majuba Power Station, preparation of foundations and plinths as per design (SEP to be employed); Installation at Majuba Power Station and commissioning of the conveyor belt. High level tasks include:

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- 1) Dismantling of Komati SY3 conveyor structure, electrical and C&I components
- 2) Transportation of the dismantled components to Majuba Power station
- 3) Construction of plinths and slab
- 4) Reconditioning, galvanizing or approximately 80% sections of the structure and installation of conveyor structure and its ancillaries
- 5) Supply all new idlers, scrapers and skirtings
- 6) Installation of mechanical components and their ancillaries
- 7) Installation of electrical systems
- 8) Refurbishment of drivetrain
- 9) Installation of control systems
- 10) Installation of walkways and platforms
- 11) Testing and Commissioning
- 12) Supply of design information (1 X Electronic copy and 1 X Hard Copy)
- 13) Training to be provided on Operating, Maintenance And Engineering staff

2. Supporting Clauses

2.1 Scope

Relocation of SY3 Conveyor Belt from Komati Power Station to Majuba Power Station, including dismantling, transportation to Majuba, installation and commissioning.

2.1.1 Purpose

The purpose of the document is to outline services to be provided by the Contractor for Majuba Power Station Old stacker to Cross 01 conveyor belt project execution.

2.1.2 Applicability

This Document is applicable to Eskom Majuba Power Station, Ash Plant System.

2.1.3 Effective date

Effective from the date of approval

2.2 Normative/Informative References

This document shall apply to all employees at Majuba Power Station and preferred Eskom subsidiaries/ contractors.

2.2.1 Normative Reference

- 0.66/95088:** Ash and Coal Plant Layout and Schedules Diagram
- Act 107 of 1998:** National Environmental Management Act, 1998
- Act 14 Of 2009:** The National Environmental Laws Amendment Act, 2009

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Act 73 of 1989: The Environment Conservation Act 1989
Act No 102 of 1980: National Key Points
Act No 85 of 1993: Occupational Health and Safety & Regulations
SANS 1700: Fasteners

2.2.2 Informative Reference

32 – 726: S.H.E. Requirements for the Eskom Procurement and Supply Chain Management Process.
GGR 0992: Plant Safety Regulations
GGG 0462: Quality Requirements for Engineering and construction works in Generation

2.3 Definitions

Contractor: Service provider contracted for supplying specific service to Eskom, Majuba Power Station.
Employer: Eskom, or Eskom Majuba Power Station

2.4 Abbreviations

Abbreviation	Description
BU	Business Unit
CSY	Coal Stock Yard
ISO	International Standards Organisation
KKS	Kraftwerk Kennzeichen System
KPA	Key Performance Area
KPI	Key Performance Indicator
MJP	Majuba Power Station
NEC	New Engineering Contract
OEM	Original Equipment Manufacturer
OH&SA	Occupational Health and Safety Act
PCLF	Planned Capability Loss Factor
PM	Plant Maintenance
PPE	Personal Protective Equipment
PS	Power Station
PSR	Plant Safety Regulations
PTW	Permit to Work
QA	Quality Assurance

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Abbreviation	Description
QC	Quality Control
QCP	Quality Control Plan
QMP	Quality Management Programme
SABS	South African Bureau of Standards
SANS	South African National Standards
SAP	Systems, Applications, Products (Plant Maintenance, Procurement, Finance and Materials Management) integrated maintenance management system.
SAP PM	SAP Plant Maintenance
SHE	Safety, Health, Environment
SOW	Scope of Work
SY	Stock Yard
UCF	Unit Capability Factor
UCLF	Unplanned Capability Loss Factor
VSD	Variable Speed Drive

2.5 Roles and Responsibilities

Engineering Department:

To generate the project scope of work and ensure it is technically acceptable with regards to Sound Engineering Practice.

Projects Department:

To become a liaison between the Contractor and Engineering and ensure that the scope and all project related issues are addressed.

Contractor:

To execute the scope of work provided by engineering. Where there are possible improvements, this shall be communicated to the Project Manager to be discussed with the Project Engineer.

2.6 Process for Monitoring

Reports as requested by the Employer at any agreed frequencies. This is over and above the expected weekly progress report entailing completed works, works in progress and projected works for the following week.

3. Document Content

3.1 Works Information

3.1.1 Project Description

- a. This project involves the disassembly of SY3 at Komati Power Station, its transportation to Majuba Power Station's facility, and the subsequent installation and commissioning of the conveyor system at Majuba Power Station. The conveyor has the following specifications:

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- a. 900mm belt width
- b. Max 1000tons per hour
- c. Max 60m conveyor length
- d. Unconfirmed inclination angle

3.1.2 Project Location:

- b. **Origin:** [Komati Power Station]
- c. **Destination:** [Majuba Power Station]

3.1.3 Scope of Work (High Level):

A. Disassembly SY3 Conveyor Belt at Komati Power Station:

- a. Carefully dismantle SY3 while preserving all components, including mechanical, electrical, and control systems.
- b. Inspect and document the condition of each component during disassembly.
- c. Make provision for reconditioning of 30% the structure (sandblasting, coating and galvanization).
- d. Make provision for replacement of 100% of idlers.
- e. Make provision for replacement of drive train.

B. Transportation:

- a. Arrange all transport logistics.
- b. Securely pack and transport all disassembled components to Majuba Power Station's facility.
- c. Ensure safe handling and protection of all conveyor parts during transit.
- d. Securely unpack components at Majuba Power Station's facility for installation preparation

C. Installation at Majuba Power Station:

Civil Works

- a. Prepare the foundation or support structure for the conveyor system as needed. Use similar designs as the Komati PS plinths at Majuba PS.
- b. Ensure the structural integrity of the installation area. (to be verified by the Engineer)
- c. Prepare the designated installation area at Majuba Power Station's facility.
- d. Reassemble SY3 Conveyor belt using the disassembled components.
- e. Align and position the conveyor system to meet operational requirements.

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Mechanical Works:

- a. Ensure all mechanical components are reassembled and aligned correctly.
- b. Verify proper tensioning of belts, chains, or other conveyor elements.
- c. All structures must be in good condition upon installation. (to be verified by the Engineer)
- d. Conduct necessary adjustments to optimize conveyor performance.
- e. Buy and install new gearbox and couplings.

Electrical Works:

- a. Reconnect all electrical components, including motors, sensors, and wiring.
- b. Ensure that electrical connections meet safety and regulatory standards.
- c. Refurbish the electric drive motor.
- d. Conduct electrical testing and troubleshooting as needed.
- e. Buy and install new electric motor.

Control Systems Works:

- a. Reconnect and configure the control systems and protections for SY3.
- b. Verify that control logic, sensors, and PLC (Programmable Logic Controller) settings are functional.
- c. Allocate 30% for C&I field instruments.
- d. Perform control system testing to ensure proper operation.

D. Commissioning:

- a. Conduct a thorough commissioning process to ensure that SY3 operates reliably and efficiently.
- b. Test all conveyor functions, including start-up, shutdown, emergency stops, and safety features.
- c. Address any issues or discrepancies identified during commissioning.
- d. Perform a 72hr run performance test.

E. Documentation:

- a. Maintain detailed records of all disassembly, transportation, installation, and commissioning activities and any alterations (if applicable) that may have been made.
- b. Provide documentation on component conditions, electrical connections, control system configurations and civil designs.

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- c. Produce as built drawings for (Mechanical, Electrical, Civil And C&I)

F. Safety and Compliance:

- a. Ensure that all work adheres to safety standards and regulations, including OHSA Permit to work systems for Eskom Power Plants.
- b. Comply with all relevant electrical and mechanical codes and regulations.

G. Reporting and Communication:

- a. Regularly communicate progress to project stakeholders.
- b. Provide status updates and reports as required.

H. Evaluation Criteria:

The success of the project will be evaluated based on the successful transportation, installation, and commissioning of SY3 at Majuba Power Station, meeting operational requirements and safety standards.

i. Documentation

- a. This covers all spares and maintenance strategies for the conveyor belt.
- b. Training documentation is to be supplied as well.
- c. Supply of design information (1 X Electronic copy and 1 X Hard Copy)

ii. IP Ratings

All equipment that is to be installed is to comply to IP65 and above. This is electrical and C&I equipment. Consultation with the Employer is necessary where there is equipment from the Komati Conveyor that is available but does not comply. Supply of that equipment is on the Contractor's account. Hence it is necessary to do site visits before tendering.

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I. Additional information

The *Contractor* is responsible for the review and verification of the provided designs where applicable and SEP must be employed. Verification of size of the conveyor belt and distance to be done by the *Contractor*. The works listed in the document are not necessarily in a sequence or preference, which the *Contractor* must adhere to hence, the *Contractor* considers all requirements in preparing and submitting his own plan for review and acceptance by the *Project Manager*. It is also possible, that planning may change during the works should the *Employer* deem it necessary, and the *Contractor* re-aligns the programme accordingly.

i. Walkways, platforms and Gantries

These are provided. Where they do not meet minimum standard, The Contractor shall ensure minimum compliance to Safety and Engineering practice.

ii. Loading and Transfer Points

- a. Ensure that the chute system provided is modelled properly to facilitate flow without issues.
- b. Chutes (loading and discharge) shall be provided with replaceable liners. All surfaces to be lined shall be covered over the full surface area that may be subject to wear.
- c. Sideliners shall be made of not less than 4.5 mm thick VRN 500 plate.
- d. Impact liners shall be made of no less than 4.5 mm thick VRN 500 plate.
- e. The liners shall be sized to facilitate ease of replacement and inter-changeability.

iii. Rotating equipment

- a. The direction of rotation of all rotating non-reversing equipment will be clearly and indelibly marked on the casing or nameplate.

iv. Equipment erection

- a. All equipment shall be erected in accordance with the requirements of the Mechanical Erection, Specification, and in accordance with Equipment Manufacturer's Installation Instructions.

v. Equipment name plates (KKS Codes)

- a. All equipment shall have permanent nameplates of material suitable for corrosive conditions on which the equipment number and description shall be clearly marked. This will facilitate equipment identification during construction and commissioning. KKS system shall be used in this regard.

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vi. Safety

General

- a. All mechanical designs shall ensure that the relevant regulatory and statutory requirements are met.

Guards

- b. All rotating parts that are accessible shall be guarded.
- c. Shield guards or guard railing shall be provided at all belts, pulleys, gears, or moving parts.
- d. Handrails, toe boards, and nonslip surfaces shall be provided on all elevated platforms, walkways, stairways and ramps.
- e. All nip points shall be adequately guarded to prevent injuries

vii. Signs

- a. Signs shall be provided to alert all personnel of the need for protective clothing such as steel capped boots, hard hats, and safety glasses.
- b. Signs shall be provided where a specific exists, such as live conductors, high noise levels, low head clearance, trip hazards, hot surface prevails.
- c. Strobe lights and siren are to be installed.

viii. Manufacture (Where applicable)

- a. Tenderers shall submit with their tender a detailed Project Quality Plan, stating how they control the flow of paperwork from commencement of the Project through final handover to the Client, a sample of their Quality Control Plan, (QCP) and Project Quality Plan, (PQP) both during the Project, manufacture and finally, installation.
- b. The successful Tenderer shall submit a QCP covering all aspects of the manufacturing process, indicating held points to allow the Engineer opportunities to evaluate the equipment for compliance to this specification.
- c. All items of equipment shall be subject to inspections by the Engineer during design and manufacture per these QCP's.
- d. In general, it is anticipated that this Project shall be in accordance with the relevant ISO 9000 requirements.

ix. Installation

- a. The successful Tenderer shall submit a QCP covering all aspects of the installation of each item of equipment to be installed under this Project, including a method statement.

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- b. The Engineer shall be afforded every opportunity to certain stages of completion of the installation to ascertain compliance with the Specifications and to witness the Contractor's site activities at the Engineer's discretion.

x. Offices and ablution facilities

- a. The offices and ablution facilities shall be established on the allocated area.
- b. Electrical and plumbing facilities are to be catered for.
- c. Filling station piping is to be rerouted.

xi. Electrical Works

The conveyor system electrical supply and requirements are identified as follows:

- a. Low Voltage Ash Substation No. 2.
- b. Spare Circuit available: 04 BFG06DA001
- c. Power: 55kW
- d. FLA: 101A
- e. Isolator: 100A (HL121)
- f. Fuse: TCP100M200
- g. O/L Range: 0.8 – 1.2 (B17S)
- h. CT: 125/1
- i. Contactor: LS 177 (Max A 130) or equivalent replacement
- j. CCT Type: H3A, SC 8, 14, 18
- k. Flood lights along the conveyor

Site visit is essential for the Contractor with all stakeholders involved.

xii. Control and Instrumentation Works

General

Each Conveyor LLP is centred on a Head End Control Unit (HECU) which is an intelligent programmable unit with built in fault diagnostics facility and control, monitors and supervises all conveyors safety and protection features.

Inputs to the HECU are as follows:

- a. Emergency Stop Pushbuttons
- b. Pull Keys
- c. Belt Tear Detectors
- d. Block Chute Detectors
- e. Speed Units
- f. Take-up Devices
- g. Drive Unit Temperatures and Pressures
- h. Belt Misalignment Detectors
- i. Primary Devices

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The HECU outputs are monitored by the ABB Distributed Control Systems (DCS) and displaying the information on the Human Machine Interface (HMI) in the Outside Plant Control Room (OPCR) and trips are hard wired to the Switchgear ETR/MTR.

The new ash link conveyor will only be stop/start and monitored from the OPCR with safety protection circuits alive at the conveyor plant.

ABB Control System Structure and Configuration

The ABB Control System consists of a network of functionally and where necessary geographically Distributed Processing Systems (DPS) which are linked to Centralised Distributed Processing Systems (CDPS) located in the Equipment Rooms adjacent to the Centralised Control Rooms by means of an interconnected communication bus system suitable for conditions prevailing at Majuba Power Station i.e. high lightning activity.

A facility is provided on the HMI for selecting the various HECU modes described above and they are displayed on the VDU.

4. Acceptance

This document has been seen and accepted by:

Name	Designation
Manqoba Kubeka	System Engineer
Sipho Masango	Senior Engineer
Sinothi Buthelezi	Auxiliary Engineering Manager

5. Revisions

Date	Rev.	Compiler	Remarks
August 2024	0	M Kubeka	1 st Draft

6. Development Team

The following people were involved in the development of this document:

- Manqoba Kubeka
- Sinothi Buthelezi
- Sipho Masango

7. Acknowledgement

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