Eskom	**Scope of Work**	**Kusile Power Station**

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Content

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Introduction

Kusile Power Station wants to contract out the maintenance of the Ash bulk materials Handling Plants to an external Contractor. This contract will comprise of overall plant Mechanical Maintenance and inspection on the Submerged Scrapper Conveyor.

This document will describe the scope of work required for this contract.

1 Supporting Clauses

1.1 Scope

This document will cover the requirements for the maintenance contract on the Kusile Submerged Scrapper Conveyor.

1.1.1 Purpose

The purpose of this document is to define the scope of work for Mechanical Maintenance on the Kusile power station Submerged Scrapper Conveyor.

1.1.2 Applicability

This document is applicable to Generation Kusile Power Station only.

1.2 Normative/Informative References

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

1.2.1 Normative

[1] Kusile Bottom Ash Removal Maintenance Strategy

[2] Kusile Bottom Ash Removal Spares Strategy

1.2.2 Informative

[3]	BS 4504	Circular flanges for pipes, valves and fittings
[4]	BS 5316	Acceptance tests for centrifugal, mixed flow and axial pumps
[5]	DIN EN ISO 5199	Technical Specification for Centrifugal Pumps
[6]	ESKASAAA3	Eskom approval of personnel performing quality related special processes on all Eskom Plant.
[7]	ESKPVAEY6	Eskom Operating Regulations for High Voltage Systems
[8]	ISO 5048 power and tensile	Continuous mechanical handling equipment – belt conveyor with carrying idlers calculation of operating
[9]	SANS 1123	Pipe Flanges
[10]	SANS 1313-12	Conveyor belt idlers
[11]	SANS 1366	Steel cord reinforced conveyor belting
[12]	SANS 1669-105	Pulley types, construction and dimensions
[13]	SANS 1700	Fasteners
[14]	SANS 1977	Conveyor chains, attachments and sprockets
[15]	SANS 657-3	Steel tubes for rolls for conveyor belt idlers
[16]	SANS 962-1	Mechanical Fasteners for conveyor belts
[17]	237 - 0012	Medupi Maintenance User Requirements Specification
[18]	Act 107 of 1998	National Environmental Management Act, 1998
[19]	Act 14 0f 2009	The National Environmental Laws Amendment Act, 2009

[20] Act 73 of 1989 The Environment Conservation Act 1989
[21] Act No 102 of 1980 National Key Points
[22] Act No 85 of 1993 Occupational Health and Safety & Regulations
[23] ESKPVAEY6: Eskom Operating Regulations for High Voltage Systems
[24] GGR 0992 Plant Safety Regulations
[25] NMP47-7 Application of KKS plant coding

1.3 Definitions

Definition	Explanation
Contractor	Service provider contracted to supply specific service to Eskom, Kusile Power Station
Employer	Eskom Kusile Power Station
Responsible Person	Person Authorised to take permits in line with the Eskom Plant Safety Regulations (PSR)

1.3.1 Classification

1.3.1.1.1.1 **Public domain:** published in any public forum without constraints (either enforced by law, or discretionary).

1.3.1.1.1.2 **Controlled disclosure:** controlled disclosure to external parties (either enforced by law, or discretionary).

1.3.1.1.1.3 **Confidential:** the classification given to information that may be used by malicious/opposing/hostile elements to **harm** the objectives and functions of Eskom Holdings Limited.

1.3.1.1.1.4 **Secret:** the classification given to information that may be used by malicious/opposing/hostile elements to **disrupt** the objectives and functions of Eskom Holdings Limited.

1.3.1.1.1.5 **Top Secret:** the classification given to information that may be used by malicious/opposing/hostile elements to **neutralize** the objectives and functions of Eskom Holdings Limited.

1.4 Abbreviations

1. Abbreviation	2. Description
AP	Appointed Person
BOM	Bills of Material
BS	British Standard
BU	Business Unit
C&I	Control and Instrumentation
DCS	Distributed Control System
Gx	Eskom Generation
GPS	Global Positioning Satelite
HMI	Human Machine Interface
HV	High Voltage (> 1000V)
HVAC	Heating, Ventilation & Air Conditioning
ISO	International Standards Organisation

1. Abbreviation	2. Description
KKS	Kraftwerk Kennzeichen System
KPI	Key Performance Indicator
LV	Low Voltage (< 1000V)
NEC	New Engineering Contract
OEM	Original Equipment Manufacturer
O&M	Operating and Maintenance
KPI	Key Performance Indictor
PCLF	Planned Capability Loss Factor
PJFFP	Pulse Jet Filter Fabric Plant
PM	Plant Maintenance
PLC	Programmable Logic Controller
PSR	Plants Safety Regulations
QC	Quality Control
QCP	Quality Control Plan
QMP	Quality Management Programme
RP	Responsible Person
SANS	South African National Standards
SAP	Systems, Applications, Products (Plant Maintenance, Procurement, Finance and Materials Management) integrated maintenance management system
SHEQ	Safety, Health, Environment and Quality
SOW	Scope of Work
SSC	Submerged Scraper Conveyor
UCF	Unit Capability Factor

1. Abbreviation	2. Description
UCLF	Unplanned Capability Loss Factor
V	Volts
VT	Voltage Transformer

1.5 Roles and Responsibilities

- The document compiler is responsible to ensure that any changes to this document are communicated with the procurement department and other relevant internal departments.
- Maintenance Boiler is responsible for ensuring that the Service is provided as per the SOW. The contractor will be reporting to Maintenance Boiler. Maintenance Boiler will also be responsible for quality control and co-ordination of spares.
- Maintenance Contracts Management will be managing the contract.
- Engineering will be involved in documentation review, technical support, change management, and will be part of the quality control.
- Commercial will be part of the contract placement process and communication with the contractor until contract award.
- Production will be responsible for coordinating production activities and scheduling of permits for maintenance.

1.6 Process for monitoring

N/A

1.7 Related/Supporting Documents

N/A

2 Requirements and scope of work

Below is the scope of work which comprise of management strategy, manpower, operational management, overall planned and corrective maintenance requirements as well as plant monitoring and inspections. Included in the scope of work are requirements for condition monitoring, continuous improvement, quality, and documentation control. Condition Monitoring excludes vibration monitoring and oil and lubricant analysis

2.1 Plant areas included is the SOW

The Plant areas for this scope include.

- Submerged scraper conveyor including the agitator system and the discharge chute.
- The flue gas duct system from the GAH drain line valves including the piping and the pumps.
- All the piping for makeup water and nozzle cleaning piping for the chains

2.2 Contract Period

The Contract period is 5 years (60 months).

2.3 Management strategy requirements

The management strategy of the contractor is expected to comply with the Safety, Health, Environment and Quality policies of Eskom Generation. The Contractor is also expected to support the business competitiveness, retention of critical skills and high-performance culture. The overall management strategy and performance thereof will be measured against set key performance indicators (KPI's) which support the Kusile Power Station long term production plan of 92:6:2 (92% Unit Energy Availability Factor (EAF), 6% Planned capability loss factor (UCLF), 2% Unplanned capability Loss Factor (UCLF)). This technical KPI will be the core contracting factor in which performance compensation will be based-on, supported by related plant availability.

Complementary services to improve plant and labour performance shall include project management, value engineering, and compilation of procedures, QCP's and documentation control, spares management, technical advice, operation process review and asset management.

It is further expected of the management strategy to support the governmental socio-economic requirements such as local black economic empowerment as well as transfer of skills and operational experience.

2.4 Manpower requirements

2.4.1 Skills Requirements

It is expected that the Contractor will provide skilled and suitably qualified staff with relevant experience and medical fitness to fulfil services required in each discipline. All positions shall be aligned to Eskom job list and shall meet minimum requirements and skills of Eskom job descriptions. Such skills requirement shall include but not be limited to English proficiency, knowledge of SAP system, knowledge of Occupational Health and Safety Act 85 of 1993, NEC contract management, quality management, control and assurance, procedure writing and bills of material compilation. Skills requirements will also be part of the Technical Evaluation and once a contract is in place these requirements need to be adhered to for the appointment of staff.

Table 1: Envisaged skills and maximum Manpower number for the SSC.

#	**Skill Required**	
	Daytime Manpower Resources	
1	Site Manager	1

#	**Skill Required**	
2	Clerk	1
3	Planner	1
4	Safety Officer	1
5	Mechanical Supervisor	1
6	QC Technician	1
7	Mechanical Fitter	4
8	Mechanical Assistants	7
9	Rigger	1
10	Boilermaker	1
11	Welder	1
12	Lifting equipment operator	2
16	Store person	1
	Total Number	**23**

2.4.2 Plant Safety Regulations

It is *compulsory for all Mechanical Fitters* to be trained and authorised as *Responsible Persons (RP)* in terms of Plant Safety Regulations. This training will be provided by the E*mployer* within 3 months of contract award date. Authorization of the persons as RPs will be through the *Employer* authorization committee within 3 months of theoretical training and thereafter RPs will be expected to undergo re-authorization every two years.

Please note the following:

- Eskom Kusile Gx will allow each incumbent RP to attend the training free of charge
- If the incumbent RP fails the training on the first try it does not exempt him/her of the compulsory requirement to be authorized.
- Eskom Kusile Gx will *not pay* the contractor for the hours spend on the RP training of an incumbent that has to *repeat* the *training.*
- The expectation is that the contractor will have at least 1/3 of their Mechanical fitters trained and authorized 6 months after the contract start date, 2/3 after 12 months and 100% after 18 months
- The contractor can identify incumbent RP's from the other skills and send them on the training, subject to the same conditions mentioned above.
- The Contractor needs to quote on a rate for fitters and technicians with Authorization. If the RP's authorization lapse, the rates for those RP's will immediately be reduced with 15%, until such a time that the RP is re-authorised.

2.4.3 Other training

Additional training required will include but not limited to Eskom safety training requirements, specific related plant training.

Employees that are employed for specific skills, e.g. The Safety Officers and QC Personnel are required to be trained in all necessary trainings before being employed by the contractor for this Scope of Work.

2.4.4 Condition Monitoring and continuous improvement requirements

The scope includes implementation of corrective actions which are identified by the Kusile Power Station Condition monitoring programme. The scope also includes participation in improvement programs and implementation of continuous improvement program to optimise plant performance as well as to reduce system and equipment failures.

2.5 Operational management requirements

Part of the operational management of this scope is reporting. The types of reports include defect reporting, plant availability and any other reportable incidents. The level of detail and frequency of reporting will be mutually agreed by the *Employer* and the *Contractor* during the contract negotiation phase of this agreement. These may change from time to time on request by the *Employer*.

The scope includes attendance of monthly Contract meetings, plant focus meeting, tool box talks meeting and all production related meetings which may be daily, weekly or monthly, all *Employer* safety meetings and any ad-hoc meetings that may arise in order to address any production or safety related matters.

All work conducted at operational level shall be managed such that any service rendered does not interfere with the ***Employer's*** scheduled work and should be aligned with the ***Employer's*** internal work control process. Should the *Employer* become aware of any changes to the activity schedule (programme of notifications), the *Employer* may issue the *Contractor* with a revised programme. All works will be subject to anytime inspection from the *Employer*.

Any witness, hold and inspection points shall be strictly adhered to. All measuring and test equipment is expected to be calibrated at all times & proof thereof must be readily available. All Quality References and Standards as stipulated in this document will be adhered to. Work will only be conducted with an *Employer* approved QMP and with Eskom's quality documentation management system and processes.

Housekeeping is expected to be done with every activity and failure to comply to this requirement will result in the *employer* issuing a non-conformance report (NCR) to the *contractor*.

Please note the following:

- Any work that required additional manpower or other resources not part of the original Task Order may only be performed upon receipt of a Task Order.
- *Task Order* dates, if *before* the contract end date, need to be *strictly adhered to* and if required to be extended needs to be discussed and agreed upon between the Contracts Manager and the Contractor before the Task Order end date is reached.
- If the Task Order date is not extended by the Contracts Manager as agreed as mentioned above, Eskom reserves the right to not pay the contractor for the costs incurred after the Task Order date.

2.6 Recommissioning requirements

All Plant equipment maintained shall be re-qualified as per site specific procedures, after any maintenance intervention. The *Contractor* shall be responsible or held liable for any defects/rework arising from maintenance/operational faults relating to contractual costs for a period of twenty-four hours after an intervention, provided that the equipment has been placed into service. Eskom will not pay the Contractor for the re-work, if required.

Any work on conveyor or machine drive motors, couplings or gearboxes will require realignment of the drive train and vibration monitoring to be done. The contractor will be present for the start-up of the conveyor or the machine after permit clearance and will have to arrange with the employers 3rd party contractor to do the vibration monitoring.

2.7 Record keeping and reporting requirements

All records and archives are to be kept or recorded using the Eskom systems. Expected records to be captured, reported and archived are:

- Routine preventative maintenance task order information, defects and history capturing with Notification numbers for defects identified.
- Daily logs of plant inspections and defects and notification number(Where required)
- Plant simulations in the FLIP system
- Monthly records of personnel
- Equipment availability reports
- Tool inspections
- Calibration certificates
- QC Documentation, and
- Any other reports that might be deemed necessary by the Contractor or any other Kusile delegated Manager.

All these records should be submitted electronically to the relevant Manager/Supervisor/QC Technician and archived by the *Contractor* for the duration of the contract

2.8 Tools and Equipment

1. The contractor will supply all his own tools required to execute the scope of work as stated.
2. This includes tools to move the SSC into maintenance position and back to its operational position.
3. The contractor shall supply Laser alignment machine for any work on the conveyors or machine drive motors, couplings or gearboxes that will require realignment of the drive train.
4. All tools that need calibration must always have valid certificates of calibration before being utilized in the plant. This list must be produced at the monthly contractual meeting and will be part of the minutes of that meeting.
5. The contractor shall supply all his own lifting equipment, i.e., web slings, chain slings, shackles, chain blocks, tirfor hoists, lever hoists, etc.
6. All lifting equipment must have valid certificates of use before being utilized in the plant
7. The contractor will be required to have a Vehicle on site for the safe transportation of heavy spares from stores to site and vice versa.

8.The contract will be required to avail a folk lift or mobile crane for the installation of heavy parts on the ssc as when is required and will be obtained through a task order.

2.9 Mobile Office, Ablution, tools and storage FACILITIES (Park homes)

1. The contractor will be required to establish mobile workspace units to serve as Office, Ablution and storage Containers/Units for the contractor’s staff, on site.

2. The contractor will be responsible for connection of power from the nearest Eskom supply point to the various mobile workspace units.
3. The contractor will also be responsible for the connection of potable water from the supply by the Employer to the various units that require potable water.
4. The contractor will be required to install Sewage removal pipes from the ablution mobile units to the nearest connection sewage pipeline of the employer or use ablution mobile units equipped with septic tanks.
5. The contractor will be required to supply a rental price as well as a price to purchase the Units in which case the units will become the property of the employer.
6. The contractor will be required to maintain the Mobile units for the duration of the contract. The Contractor will rectify any defects immediately or as soon as practically possible, at the contractors cost. The Employer may conduct inspections at any time and instruct the contract to rectify any defects, at the contractors cost.

3 Functions And Services Scope Of Work

The overall functions and services required to service Kusile Power Station materials handling include maintenance, inspection and monitoring of plant.

Maintenance of all systems will be conducted as per *Employer's* instructions, processes & systems and according to all hazardous location specifications. The *Contractor* shall perform leak checks on all responsible plant areas and inform the *Employers* representative accordingly. The *Contractor* shall be responsible for statutory inspections/tests as defined by the *Employer* and supply the *Employer* with proof of such tests. The *Contractor* shall ensure the integrity of Plant labelling and that deficiency with regards to KKS labelling is reported immediately.

The scope includes attendance to breakdowns, defects, fault finding and repairs thereof. Below are detailed functions required under each discipline:

4.2 SCOPE OF WORK

The following sections highlight the maintenance scope of work for the mechanical plant.

3.1 Bottom Ash Removal Plant (SSC)

Conduct all mechanical maintenance associated with the Bottom Ash Removal Plant. This includes scheduled inspections and tasks as per the 'Kusile Bottom Ash removal Maintenance Strategy as well as Corrective maintenance task not scheduled as per the maintenance strategy. Correct maintenance tasks typically include but are not limited to:

4.3.1 Scraper Chain Conveyor and Structure

1. Removal of SSC to its maintenance position and replacement back into its operational position
2. Disconnecting and reconnection make-up water, chain washing and other pipes in preparation for moving of the SSC
3. Removal and replacement of SSC side plates and gasket for ad-hoc SSC and Boiler repairs
4. Replacement of scraper chain, drive sprockets and scrapers
5. Replacement of chain idler wheels
6. Replacement of chain washing piping and components
7. Repair and replacement of SSC make-up water piping, valves and actuators
8. Replacement of wear liner strips in SSC
9. Replacement of drive shaft cover.
10. Repair and replacement of structural components
11. Replacement of shafts, bearings and seals on drive shafts and tensioning shafts
12. Repair and replacement of chain tensioning system and hydraulic cylinders.

4.3.2 Chain Conveyor Hydraulic drive

1. Replacement of chain hydraulic drive electric motor, hydraulic motor, planetary gearbox and pumps.

4.3.3 Two –way chute with Grizzly louvers

1. Replacement of grizzly louvers
2. Repair of worn chutes
3. Replace or repair chute deflector plate and liners

4.3.4 Agitation system

1. Repair and replacement of agitation pump and motor
2. Descaling and repair of piping and nozzles, replacement of valves and components
3. Replacement of V-belts and pulleys.

3.1.4 Flue Gas Duct System.

1. Repair and replacement of slurry pumps and motor
2. Descaling and repair of piping and nozzles, replacement of valves and components
3. Replacement of V-belts and pulleys.

4.3.5 Outage activities on the SSC

Major outage replacement activities on the SSC will be conducted by *other contractors* but minor activities and quality control will still be part of the Contractor's scope during outages.

The Contractor will however be responsible for all activities during shorter opportunity outages as well as during tube leaks, i.e., removal of the SSC and replacing it back to its operational position.

4 Applicable plant areas

Below is the list of applicable plant areas to which the works shall be applied.

Table 2: Plant Boundaries

Plant Area	**Boundaries of Plant Area**
Bottom Ash Removal	The Bottom Ash Removal system is defined as the plant and equipment interfacing with boiler bottoms ash, that exists between the following points, • The inlet into the dipper boxes at the bottom of the boiler to the Submerged scraper conveyor, • make-up water system control valves and discharge inlet to SSC, • inlet of the mill reject discharge pipe to the Submersible Scraper Conveyor, • outlet of the overflow pipe into to the degritting sump, • outlet of SSC discharge chute to coarse ash conveyors at each Unit This implies the following plant and equipment; **Submerged Scraper Conveyor** • Dipper boxes • Chain conveyor with flights and chain guide idler wheels • Hydraulic drive System

	• Two-way discharge chute with Grizzly louver system • Agitation system • Chain washing system • Chain tensioning system • Make-up valves and actuators •Flue gas duct system

5 Authorisation

This document has been seen and accepted by:

	Designation
	Auxiliary Engineering Manager
	Maintenance Manager
	Middle Manager Engineering
	Project Coordinator Outages

6 Revisions

Date	**Rev.**	**Compiler**	**Remarks**
November 2022	0		Scope of work to enable suppliers to quote or tender

7 Development team

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

8 Acknowledgements

N/A