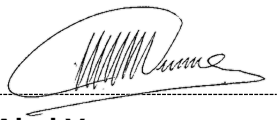
Eskom	Specification	Kusile Power Station

Title: **Kusile Power Station Soot-Blowers Maintenance Scope of Work**

Document Identifier:	**240-100951859**
Alternative Reference Number:	**414-50-MM-SP**
Area of Applicability:	**Kusile Power Station**
Functional Area:	**Mechanical Maintenance**
Revision:	**05**
Total Pages:	**14**
Next Review Date:	**August 2029**
Disclosure Classification:	**Controlled Disclosure**

Compiled by	Supported by	Functional Responsibility	Authorized by
			
Sifiso Madonsela	**Selby Mahumani**	**Given Rikhotso**	**Abel Vuma**
Mechanical Snr Technician	**System Engineer**	**Maintenance Boiler Manager**	**Middle Maintenance Manager**
Date: 03/09/2024	Date: 05-09-2024	Date: 2024/09/10	Date: 2024-09-10

Content

Page

1. Introduction

Kusile Power Station Management has decided to outsource the total Soot-Blowers Mechanical Maintenance Scope service function to a suitably qualified, experienced and well established Contractor. This document describes the detail of the applicable plant areas, scope of work, standards, quality, requirements, specifications, terms & conditions as well as the criteria to be met to qualify for the tender.

There are three types of soot blowers systems at Kusile:

a. The furnace soot blowing consists of 48 motorised retractable blowers;
   i. 8 Helical soot blowers and,
   ii. 40 Long retractable soot blowers.
b. The Air heater soot blowing system is equipped with one soot blower each for the hot and the cold flue gas path.
c. Water soot blowers (water cannons) are permanently installed in the boiler to clean fouled furnace walls. To cover the entire combustion chamber,8 water cannons in 2 levels are installed.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

The purpose of this document is to define the specified Soot-Blowers Mechanical Maintenance, scope of work activity requirements for Kusile Power Station. The station is expected to perform at 92% EAF, 6% PCLF and 2% UCLF, and the specified Soot-blowers Mechanical Maintenance activities and management strategy efforts must support this requirement. It is therefore imperative that the successful and suitably qualified Contractor aligns his/her organisation fully to these specified scope activities and processes laid down in this document.

2.1.2 Applicability

This document shall apply to all employees at Kusile Power Station.

2.1.3 Effective date

This document is effective from the authorisation date.

2.2 Normative/Informative References

2.2.1 Normative

Kusile Power Station Soot blower Maintenance Execution Strategy 240-92511552

2.2.2 Informative

Not Applicable

2.3 Definitions

2.3.1 Contractor: Service provider contracted for supplying specific servie to Eskom, Kusile Power Station.

2.3.2 Employer: Eskom, or Eskom Kusile Power Station.

2.4 Abbreviations

Abbreviation	Explanation
BOM:	Bills of Material
BS:	British Standard
DIN:	German Institute of Standards
ISO:	International Standards Organisation
KKS:	Kraftwerk Kennzeichen System
NEC:	New Engineering Contract
ORHVS	Operating Regulations for High Voltage Systems
PCLF:	Planned Capability Loss Factor
PM:	Plant Maintenance
PSR	Plant Safety Regulations
PTW:	Permit to Work
QA:	Quality Assurance
QC:	Quality Control
QCP:	Quality Control Plan
QMP:	Quality Management Programme
SABS:	South African Bureau of Standards
SANS:	South African National Standards
SAP PM:	SAP Plant Maintenance
SAP:	Systems, Applications, Products (Plant Maintenance, Procurement, Finance and Materials Management) integrated maintenance management system.

Abbreviation	Explanation
SHE:	Safety, Health, Environment
SOW:	Scope of Work
STEP:	Station Thermal Efficiency Program
UCF:	Unit Capability Factor
UCLF:	Unplanned Capability Loss Factor
EAF	Energy Availability Factor

2.5 Roles and Responsibilities

Note: Further roles and responsibilities shall be obtained from the NEC3 TSC book.

2.5.1 The Employer

a. Performance is measured by the employer against those areas which contribute to the employer's business and the contractor shall be compensated accordingly, (e.g. Reliability, Availability and safety). Areas of measurement include the Employer's key business indicators and will be redefined from time to time.

b. The Employers shall provide training for the PSR, FFFR and any other training as deemed necessary by the Employer.

c. The Employer to provide special tools where applicable.

d. The Employer and Contractor in this SOW are committed towards the following;

   i. Retention of critical skills

   ii. Continuous cost reduction

   iii. Health & Environment Safety

   iv. Transfer of operational experience and skills

2.5.2 The Contractor

a. The Contractor shall compile improvement programmes to enhance plant performance and achieve cost reductions and the Employer will approve such programmes.

b. The Contractor shall be responsible for all mechanical maintenance as per Employer's instructions, processes and systems.

c. The Contractor shall be responsible for the inspections, maintenance, repair, testing and replacement of all mechanical and electrical equipment associated with this SOW.

d. The Contractor shall be responsible for all equipment alignment requirements within this scope of work.

e. The Contractor must ensure that all spares preservations requirements are adhered to. Kusile engineering to compile Preservation Procedure for the spares that need to be preserved and Maintenance Contractor to execute the PM's on items to be preserved.

f. The Contractor shall be responsible for the inspection, repair and replacement of all structural and support steel work in this scope of work including but not limited to;

   i. Walkways

   ii. Grating

   iii. Handrails

   iv. Cat ladders

   v. Hangers

   vi. Supports etc.

g. The contractor shall provide the following complementary services to improve plant and labour performance;

   i. Compile and improve task list.

   ii. Procedure and documentation writing

   iii. Design services

   iv. Spares management

   v. Technical advice

   vi. Operational and production process review

   vii. Asset management in accordance with ISO 55000

   viii. Component failure analysis reporting

h. The Employer may request the Contractor to ensure that an accurate description of spare parts is maintained in the Employer's stores and the Contractor informs the Employer as to any recommended changes.

i. The Contractor is to ensure that any service rendered does not interfere with the Employer's scheduled work and should align himself with the Employer's work control management process.

j. 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.

k. The contract entered into with the Contractor is non-exclusive and work against this contract can only be performed upon receipt of a task order.

l. All statutory tests or inspections done by the Contractor shall be reviewed and accepted by the Employer.

m. The Contractor shall be responsible for statutory inspections/tests as defined by the Employer and supply the Employer with proof of such tests.

n. All works will be subject to anytime inspection from the Employer.

o. Please note that equipment will only form part of the works once the respective area has been commissioned and handed over to Generation. The Contractor shall take cognisance of the fact that the contract start date can deviate.

p. The Contractor maintains all year round, agreed base crew at Kusile Power Station which is supervised by the Contractor with any changes to the crew being negotiated and agreed upon with the Employer.

q. The Contractor will utilise the rotable process in SAP for all refurbishable spares item. Employer to provide appropriate training.

r. This contract is for preventative, predictive, corrective maintenance (breakdowns) and outage SOW.

s. Spillage is viewed to be very important for plant housekeeping and any spillage caused as a result of the Contractor shall be cleaned by the Contractor.

t. The Contractor shall perform leak checks on all responsible plant areas and inform the Employer's representative accordingly. Defects must be raised on the Flip system to address any plant deviations.

u. The Contractor shall ensure the integrity of plant labelling and that deficiency with regards to KKS labelling is reported immediately.

v. The Contractor must ensure that they have responsible persons (in terms of PSR and ORHVS) for any work performed on plant.

w. This requires individuals to successfully complete a written and oral examination for the relevant regulation based on the Plant Safety Regulations and Operating Regulations for High Voltage Systems and they are found competent.

x. All maintenance technically qualified (above semi-skilled) Contractors will be trained and authorised (in terms of PSR and ORHVS) within 6 months of the contract award date. Training will be supplied by the Employer.

y. The Contractor must ensure that all personnel successfully complete a written examination for the relevant regulation based on the Fossil Fuel Firing Regulations. Training will be provided by the Employer.

z. Before any work starts on site the Contractor is responsible to submit their Safety File to the Employer for review and acceptance.

aa. The contractor to provide relevant tools as required.

bb. The Contractor is also responsible for their employee's annual medical checks which must be up to date and also be kept in the Safety File. Site Induction must be done before any work is done by any Contractor on site.

cc. The Contractor shall ensure that all safety valves are sealed and that nameplates are fitted to all pressure equipment.

dd. **Note:** The Contractor shall be responsible for potable water downstream from the last isolating valve on the inlet to the strainers of the booster pumps and upstream to the outlet from water lance blower (water cannons).

ee. **Note:** The Contractor shall be responsible for auxiliary steam downstream from the last isolating valve on the inlet to the steam soot-blowers (super-heaters, re-heaters, economiser and air preheaters) and upstream to the outlet from the nozzle of the steam soot-blower.

ff . **Note:** The Contractor shall be responsible for the emergency removal of lances that are stuck in the boiler in order to prevent boiler tube leaks and /or damage to the lance.

2.5.2.1 Re-commissioning

a. All Plant equipment maintained shall be re-qualified as per site specific procedure after any maintenance intervention.
b. The contractor shall be responsible or held liable for the defects arising from maintenance/operational faults 24hrs after an intervention, provided that the equipment has been placed into service.

2.5.3 Management and Reporting

a. The type of reports, 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.
b. The Contractor to be represented at all production and outage related meeting which may be daily, weekly or monthly.
c. The Contractor to be represented at all Employer safety meetings.
d. The Contractor to be represented at any ad-hoc meetings that may arise in order to address any production or safety related matters.
e. Liaison meetings shall be held with the Employer's Representative or his/her delegate on a monthly basis to discuss any technical details, or concerns.

2.5.4 Contractors Management, Meetings and key people

a. Before work starts on site, an inaugural meeting is held with the Contractor and the Employer, to explain in detail all requirements of the Site Regulations.
b. The Contractor is issued with a file of current Site Regulations on arrival. The file remains the property of the Employer and the Contractor is responsible for its maintenance and updating to include new or revised regulations as issued by the Employer.
c. The Contractor must ensure that all personnel operating mobile equipment and vehicles are authorised, this includes but not limited to;
    i. Forklifts
    ii. Mobile Cranes
    iii. Cherry Pickers
    iv. Sky Jacks
d. The Contractor shall be responsible for the regular inspections and daily equipment checks of the mobile equipment and vehicles including record keeping.
e. The Contractor must ensure that all personnel performing work on the plant are authorised, this includes but not limited to;
    i. Confined space locations
    ii. Working at heights
    iii. Heat stress areas
    iv. Scaffolding

v. Hazardous substances.

2.5.5 Communication and Correspondence

a. All correspondence includes;
   i. Kusile Power Station
   ii. Employer's Contract number
   iii. Contract description
   iv. Correspondence subject matter
   v. Employer's name and contact details
   vi. Contractor contact details
   vii. Date
b. Where appropriate the correspondence includes the Employer's reference and is delivered as a single package.
c. All communications from the Contractor are numbered sequentially with a prefix as advised by the Employer. The Employer responds in like manner. The prefix and numbering system is decided upon at the Inaugural meeting.

2.5.6 Quality and Documentation Control

a. The Contractor shall ensure that any witness, hold and inspection points are strictly adhered to.
b. The Contractor to ensure that all measuring and test equipment is calibrated at all times & proof thereof must be readily available.
c. All Quality References and Standards as stipulated in this document will be adhered to.
d. Work will only be conducted with an Employer approved Quality Management Programme.
e. The Contractor shall utilise the Employer's quality documentation management system and processes.

2.5.7 Project Implementation

The Contractor shall supply a project implementation plan including at least the following;

i. Site establishment
ii. Manpower plan
iii. Organogram

2.5.8 Manpower Requirements

a. The number of maintenance staff required to execute the works is to be decided by the Contractor after his/her assessment of the scope of work and submitted to the Employer for approval.

b. The successful Contractor shall utilise/provide skilled and suitably qualified staff with current experience in the following but not limited disciplines;
   i. Working knowledge of SAP system
   ii. Occupational Health and Safety Act 85 of 1993
   iii. NEC contract management
   iv. Quality Management Control and Assurance procedures
   v. Spares optimisation
   vi. Procedure writing
   vii. BOM compilation
c. Staff must meet minimum requirements of Eskom job descriptions, with additional requirements specified.
d. All staff brought onto site in connection with this work scope should be able to fluently speak, understand and write in English.
e. Proof of qualification is to be supplied on request by the Employer.
f. The Contractor ensures that all staff being brought onto Kusile site has a valid fitness certificate based on the specified plant man-job specification.
g. Provide daily supervision of all related plant through trained and competent personnel to ensure that inspections & work activities are conducted daily.

2.6 Process for Monitoring

Not applicable

2.7 Related/Supporting Documents

Not applicable

3. Document Content

3.1 Works Information

3.1.1 Boiler Soot-Blowers

3.1.1.1 Applicable Plant Area

Plant Area	Boundaries of Plant Area

Boiler Soot-Blowers	The Boiler Soot-blowers is defined as the plant and equipment interfacing with potable water, re-heat steam or auxiliary steam, that exists between the following points: 1. water inlet to the strainer and booster pumps 2. water outlet from the water lance blower 3. steam inlet from re-heat header to soot blowers 4. steam outlet from soot-blower nozzles This implies the following plant and equipment: **Soot-blowers** 1. water cannons 2. steam soot-blowers

3.1.1.2 Applicable S.O.W

Inspection, testing, maintenance and replacement of the following;

i. Water cannon blowers for the furnace
ii. Half retractable soot-blowers for economiser
iii. Long retractable soot-blowers for super heaters and re-heaters
iv. Filters/strainers
v. Booster pumps
vi. Horizontal and vertical drive units for water cannons
vii. Gearboxes
viii. Chain drive (chain and sprockets)
ix. Carriage Assembly
x. Expanda cable assembly
xi. Front and rear suspension
xii. Feed tube
xiii. Rack
xiv. Sealing and scavenging air fan

xv. Piping
xvi. Flexible hoses
xvii. Valves
xviii. Nozzle
Xxiii Lance tube
xix. Lance joint and packing assembly
xx. Steam valve and mechanical operating mechanism
xxi. Poppet valve
xxii. Guides
xxiii. Related compressed air distribution system (if applicable)
xxiv. Supporting structure
xxv. Wall box
xxvi. Soot blower sleeve

3.1.2 Air Heater Soot-blower

3.1.2.1 Applicable Plant Area

Plant Area	Boundaries of Plant Area
Air Heater **Soot-Blower**	The Air Heater Soot-blowers is defined as the plant and equipment interfacing with re-heat steam or auxiliary steam, that exists between the following points: 1. steam inlet from re-heat header to soot blowers 2. steam outlet from soot-blower to nozzles This implies the following plant and equipment: **Soot-blowers** 1. - steam soot-blowers

3.1.2.2 Applicable S.O.W

Inspection, testing, maintenance and replacement of the following:

i. Helical type steam soot-blowers for air heater
ii. Filters/strainers
iii. Feed tube
iv. Rack

v. Sealing and scavenging air fan
vi. Piping
vii. Flexible hoses
viii. Valves
ix. Sealing and cooling air fans
x. Nozzles
xi. Lance tube
xii. Guides
xiii. Related compressed air distribution system (if applicable
xiv. Crossties
xv. Multi-nozzle heads
xvi. Lance joints and packing assemblies
xvii. Steam valve and mechanical operating mechanism
xviii. Poppet valves
xix. Drive units
xx. Chain drives
xxi. Carriage assembly
xxii. Expanda cable assembly
xxiii. Front and rear suspension
xxiv. Supporting structure

3.2 Exclusions

a. Scaffolding & insulation
b. Lubrication activities
c. Non-destructive testing
d. Condition monitoring
e. Unauthorised modifications
f. Civil maintenance
g. Control and instrumentation maintenance

4. Acceptance

This document has been seen and accepted by:

Name	Designation
Luvuyo Feni	Technical Plant Manager

Name	Designation
Abel Vuma	Maintenance Group Manager

5. Revisions

Date	Rev.	Compiler	Remarks
November 2024	05	S Madonsela	Fourth review
September 2019	04	S Mathaile	Third review
November 2016	03	M Kutumela	Second review
September 2015	02	S Byroo	First review
July 2013	01	MS Letebele	First Issue

6. Development Team

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

- Sammy Selebogo – Electrical Maintenance Manager
- Simon Letebele - Mechanical Maintenance Manager
- Stanley Mathye - Control and Instrumentation Manager
- Patience Dlamini – Routine Works Management Manager

7. Acknowledgements

Not Applicable.