Eskom	Specification	Kusile Power Station

Title: **Kusile Power Station Scope of Work – Electric Heater Elements Refurbishment**

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1. Introduction

Kusile Power Station Management is in support of the vision to establish a partnership to perform the Electric Heater Elements Refurbishment function with a suitably qualified, experienced and well established Contractor. This document describes the detail of the scope of work, standards, quality, requirements, specifications, terms & conditions as well as the criteria to qualify for the tender.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

This document serves to formally establish an optimal maintenance, based on the Electric Heater Elements used in the various areas of the Power Station, in order to improve the availability of the power plant as a whole. The station is expected to perform at 92% UCF, 6% PCLF and 2% UCLF, and the Electrical Heaters scope of work strategy efforts must support this requirement. It is therefore imperative that the successful and suitably qualified partner aligns fully his/her organisation to the Electrical heater scope of work activities and processes specified in this document.

2.1.2 Applicability

This document is applicable to all permanent Electric Heater Elements at Kusile Power Station.

2.1.3 Effective date

This document is effective from authorisation date.

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] Act No 14 of 2009: The National Environmental Act, 1989

[2] Act No 102 of 1980: National Key Points Act, 1980

[3] Act No 36 of 1998: National Water Act, 1998

[4] Act No 85 of 1993: Occupational Health and Safety Act & Regulations, 1993.

[5] GGR 0992: Plant Safety Regulations
[6] Act No 14 of 2009: The National Environmental Laws Amendment Act, 2009
[7] Act No 73 of 1989: The Environment Conservation Act, 1989
[8] 32-846 Rev 0 Operating Regulations for High Voltage Systems
[9] NMP47-7 Rev 0: Application of KKS Plant Coding
[10] Contractor OHS Management Strategy
[11] Contractor Safety Improvement Plan
[13] GGSS 1181: Specification for chemical product and material used in a power plant

2.2.2 Informative

[1] 414 - 32 Rev 0: Kusile Maintenance User Requirement Specification
[2] 32 - 726 Rev 0: Mandatory S.H.E. Requirements for the Eskom Procurement and
[3] Supply Chain Management Process
[4] 237 - 0016 Rev 0: Integrated Business Improvement – prevention and improvement standard
[5] GGR 0992: Plant Safety Regulations
[6] NMP47-7 Rev 0: Application of KKS Plant Coding
[7] 36 -702 Rev 1: Remnant Life Monitoring
[8] GGSS 1181: Specification for chemical product and material used in a power plant
[9] GVLIR 0007: Safety, Health and Environment Specifications for Contractors
[10] ESKASAAA3: Eskom approval of personnel performing quality related special processes.
[11] 32-726 Annexure C: S.H.E. Requirements for Tender Enquiries
[12] 32-726 Annexure D: S.H.E. Tender Evaluation and Scoring Card
[13] 32-726 Annexure E: Supplier Suspension
[14] 36 – 942: Arc Flash Protection Specification

2.3 Definitions

Definition	Description
Availability	Period when a system is operating satisfactory when used under specified conditions
Certificate of Compliance	a) A certificate with unique number obtainable from the chief inspector, or a person appointed by the chief inspector, in the form Annexure1 of Electrical Installation Regulation, and issued by registered person in respect to an electrical installation or part of an electrical installation. **b) A certificate of compliance issued under Electrical Installation**

Definition	Description
	Regulations, 1992.
Competent Person According to SANS 10108	The definition of "Competent Person" as per SANS 10108 [5] reads as follows: Person who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
Compliance Manager (GMR 2.1)	The GMR2 of each Eskom site is accountable for the compliance to the Electrical Machinery Regulations, Section 9 with regards to documentation, inspection, testing and maintenance of electrical equipment in hazardous locations on existing sites.
Contractors	All contractors shall work within the parameter of the job description and scope of work. To keep all instructions/ procedures on hand and supply Eskom power station with reference to As cu As custodian of the Maintenance Basis, they must ensure all actions required in terms of the reliability base and any other reliability matters are implemented on their systems. Custodian of the Maintenance Basis, they must ensure all actions required in terms of the reliability base and any other reliability matters are implemented on their systems. Contractors must also ensure that the work is performed to the highest standard and safety standards and regulations
Employer	Eskom, or Eskom Kusile Power Station or representative
Initial Inspection	Inspection conducted on initial installation and after modifications.
Inspection	Activities, which by means of examination, observation or measurement, determine the conformance of material, parts, components etc., to predetermined specifications and quality requirements.
Maintenance	A combination of all technical, administrative and managerial actions during the lifecycle of an item intended to retain it in, or restore it to, a condition in which it can perform its required function
Maintenance Philosophy	The principle approach decided upon for performing maintenance, such as pro-active or re-active maintenance
Maintenance Plan	A plan that details the maintenance that needs to be done on a specific asset / plant item or component and the frequency and quality requirements for that maintenance

Definition	Description
Maintenance Schedule	The timing of the Maintenance Plan information stipulating when in the calendar year, work needs to be done
Maintenance Strategy	The type of maintenance selected for specific asset / plant and equipment, such as time or condition based maintenance, corrective or preventative maintenance.
Post Maintenance Testing	Any appropriate combination of inspections, checks, and testing performed following maintenance to verify that a particular piece of equipment or system performs its intended function based on its design criteria and verification that the original deficiency has been corrected
Quality Controller	Must inspect the system after the maintainer has maintained, following the approved quality control plan.
System Engineer	As custodian of the Maintenance Basis, they must ensure all actions required in terms of the reliability base and any other reliability matters are implemented on their systems.
Testing	All activities required determining the actual performance or condition of an item.
Visual Inspection	An inspection that identifies defects without the use of access equipment or tools.

2.4 Abbreviations

Abbreviation	Explanation
AP:	Appointed Person
BOM:	Bills of Material
BU:	Business Unit
COC:	Certificate of Compliance
DIIR	Disabling Injury Incidence Rate
EMS:	Environmental Management System
ISO:	International Standards Organisation

Abbreviation	Explanation
KKS:	Kraftwerk Kennzeichen System
KPA:	Key Performance Area
KPI:	Key Performance Indicator
LTIR:	Lost Time Injury Rate
LV:	Low Voltage (< 1000V)
NEC:	New Engineering Contract
OEM:	Original Equipment Manufacturer
OHSAS	Occupational Health and Safety Assessment
OHS Act	Occupational Health and Safety Act
O&M:	Operating and Maintenance Manual
PI test:	Polarisation Index test
PM:	Plant Maintenance
PPE:	Personal Protective Equipment
PS:	Power Station
PSR	Plant Safety Regulations
PTW:	Permit to Work
QA:	Quality Assurance
QC:	Quality Control
QCP:	Quality Control Plan
QMP:	Quality Management Programme
RP:	Responsible Person
SABS:	South African Bureau of Standards
SANS:	South African National Standards
SAP PM:	SAP Plant Maintenance

Abbreviation	Explanation
SAP:	Systems, Applications, Products (Plant Maintenance, Procurement, Finance and Materials Management) integrated maintenance management system.
SHE:	Safety, Health, Environment
SOW:	Scope of Work
UCLF	Unplanned Capability Loss Factor
URS:	User Requirement Specification
VSD:	Variable Speed Drive
KW:	Kilowatts
AC:	Alternating Current
DC:	**Direct Current**
SAP:	Systems, Applications, Products (Plant Maintenance, Procurement, Finance and Materials Management) integrated computer system.
T:	Temperature
RTF:	Run to Failure

2.5 Roles and Responsibilities

2.5.1 Contractor

a) All Contractor employees shall comply with Eskom's policies and site regulations, adherence to Eskom's Life Saving Rules, adherence to Generation Occurrence Management Procedure, Smoking Policy, zero tolerance on alcohol usage, etc. These requirements will be detailed during the induction training process. This document will be used in conjunction with the Kusile Maintenance URS.

b) The number of maintenance staff required to execute the works is to be recommended by Kusile, but the Contractor is responsible for allocating adequate resources in order to provide the required services, after his/her assessment of the scope of work and submitted to the Employer for approval.

c) The successful Contractor shall utilise/provide skilled and suitably qualified staff (in line with Eskom Job specifications) with current experience in the following but not limited disciplines;

i. Competent Maintenance Person according to OHS Act
ii. Occupational Health and Safety Act 85 of 1993
iii. NEC contract management
iv. Quality Management Control and Assurance procedures
v. Plant Safety Regulation authorisation
vi. Spares optimisation
vii. Plant optimisation and commissioning
viii. Procedure writing
ix. BOM compilation

d) Staff must meet minimum requirements of Eskom job descriptions, with additional requirements specified.

e) All staff brought onto site in connection with this SOW should be able to fluently speak ,understand and write in English.

f) Proof of qualification is to be supplied on request by the Employer.

g) The Contractor ensures that all staff being brought to Kusile PS site has a valid fitness for duty certificate based on the specified plant man-job specification.

h) The Contractor shall employ in and about the execution of the works only such persons that are careful, competent and efficient in their several trades and callings and the Employer shall be at liberty to object to and require the Contractor to remove from the works forthwith any person employed by the Contractor in or about the execution of the works who, in the opinion of the Employer, misconduct's himself/herself or is incompetent or negligent in the proper performance of his/her duties and such person shall not be again employed for the works without the written permission of the Employer.

i) Provide daily supervision of all related plant through trained and competent personnel to ensure that inspections & work activities are conducted daily.

j) Ensures proper behaviour of personnel under his/her supervision as per the Kusile culture.

k) not limited to Eskom safety training requirements, related plant training and Kusile culture.

l) Ensures high morale of staff and competency.

m) A comprehensive risk assessment shall be done prior to any work being carried out

n) If a Permit to Work is required for working on plant and/or equipment, on completion of the work the relevant piece of plant/equipment shall be properly re-commissioned prior to the clearance of the Permit to Work.

o) The Employer reserves the right to have any of the Contractors personnel removed off site without any compensation to the Contractor in the event of Contractor's personnel being in contravention with the OHS Act or any of the Employer's rules, regulations, and procedures.

p) Repair work to commence on exact time agreed between Contractor and Employer and the Contractor on this plan of action.

q) The Contractor must issue a Certificate of Compliance for the work done where applicable.

r) The Contractor is to complement their services to improve plant performance by:

i. Project Management

ii. Value Engineering

iii. Procedure and Documentation Writing
iv. Design Services
v. Spares Management
vi. Technical Advice
vii. Operational and Production Process Review

s) The contractor will be responsible for reviewing equipment requirement

t) The employer may request the contractor to ensure that an accurate description of spare parts is maintained in the contractor stores and the contractor will inform the employer of any changes.

u) Only Contractor binded by this contract will be authorised to carry out work on equipment at Kusile Power Station

v) The course of action for not achieving the Safety Target is that, after 2 warning letters from the Employer, the contractor or his personnel may be removed from site.

w) The Contractor to be represented at any ad-hoc meetings that may arise to address any production or safety related matters

x) Liaison meetings shall be held with the Employer's Representative or his/her delegate on a 6 monthly basis or when necessary to discuss any technical details, or concerns. And it is compulsory for contractor's management to attend all meetings or send a re-presentative on his/her behalf.

y) The contractor shall respond to any communication sent to him by the employer within 24 hours after the communication is sent

z) All works will be subject to an inspection by the employer.

aa) The contractor shall ensure that any witness, hold points are strictly adhered to

bb) Before work starts on site, an inaugural meeting is held with the contractor and the employer, to explain in detail all the requirements of the site regulations. The contractor is issued with a file of current site regulations on arrival. The file remains the property of the employer.

2.5.2 Defects and Liability Period

a) The Contractor shall be responsible or held liable for any defects arising from poor workmanship

Performed by their staff, within a 48-hour period from the time that the equipment is on to operation.

b) Any defects arising from the heaters which have never been utilised are solely the responsibility of the contractor and not the Eskom and will be repaired by contractor at no cost to Eskom

2.5.3 Categories of Labour Required

a) The Contractor must decide the number of staff required executing this work after his assessment of the scope of work and this should be submitted to the Employer for approval.

b) Each individual in the team is to be formally qualified in his/her trade.

c) Employer may for certain reasons request the removal of any key person from site.

2.6 Process for Monitoring

2.6.1 Procedure

a) Risk assessment shall be done and documented/filed for each task and collection

b) Safe work procedures or temporary work procedures shall be available and used for each job

c) All documentation required to complete work shall be referenced and filed for future reference. (Test results, reports, drawings etc.) All documentation to be completed and filed – test sheets, test results, technical reports, drawings etc.

d) Perform toolbox talks, discuss and fill risk assessment, ensure you're in possession of the correct drawings, correct check sheet, correct work procedure, correct QCP's and you're at the correct plant.

e) The contractor must supply with the tender an approved and signed copy of the "contractor's safety management policy".

f) The contractor must identify all potential hazardous tasks in the Works Information and prepare safe working procedures to issue to his staff before any work will start.

g) The contractor must familiarize himself with the works and must make available his specific "housekeeping" action plans to ensure that the working areas and surroundings are kept safe and tidy during the duration of the works.

h) The contractor must ensure that all the necessary induction has been done before accessing site

i) The contractor must ensure before any work is carried out, the correct equipment and hand tools is available to his staff and that it is in a good and safe working condition and complying to all OHSA requirements.

j) This specification will be reviewed after every Five years period from date of initial authorisation or when necessary.

2.6.2 Conditions

a) All stand - alone reports on the work done, tests performed or modifications carried out shall be submitted to the contract supervisor not later than 7 days after completion of the work.

b) The contractor may be requested to support the employer's personnel by providing cross sectional drawings and part numbers for stock identification and subject to the employer's access control procedures, assists in checking the stock holding.

2.6.3 Continuous improvement

a) The Contractor shall implement a program of continuous improvement to optimise Plant performance and equipment failures.

b) The Contractor shall participate in improvement programs and root cause investigations as stipulated by the employer.

c) The Contractor shall provide technical support for related service rendered.

2.6.4 Management 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 any ad - hoc meetings that may arise in order to address any production or safety related matters.

c) Liaison meetings shall be held with the Employer's Representative or his/her delegate on a monthly basis or when necessary to discuss any technical details, or concerns.

d) The contractor will be responsible for implementing a performance management system consistent with the employer's management requirements.

2.6.5 Quality and Documentation Control

a) The contractor will submit Failure reports, repairs reports, Heaters tests certificates, and QCPs that will be overseen by Eskom and will ensure that the relevant documentation is available on site to manage the scope and related programs.

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 applicable to this SOW will be adhered to.

d) The contractor shall ensure that any witness, hold points are strictly adhered to

e) The Contractor must utilise the Employer's quality documentation management system and Processes.

f) Contractor shall provide drawings of all heaters being manufactured and submit to Eskom for approval before manufacturing can proceed

2.6.6 Project Implementation

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

a) Manpower plan

b) Organogram

c) Skills required and associated cost per skill (e.g. artisan, site manager, etc.)

2.6.7 General

a) The contractor shall carry out all works as per the system engineer document provided.

b) The contractor is to ensure that the work area is kept clean on completion of any work done.

c) Before any work starts an inaugural meeting is held with the contractor and the employer, to explain in details all the requirements of the site regulations.

d) The contractor is issued with a file of current site regulations on arrival. The file remains the property of the employer.

e) The Employer and Contractor in this SOW shall commit towards the following;

i. Retention of critical skills

ii. Continuous cost reduction

iii. Health & Environment Safety

f) The Employer against those areas, which contribute to the Employer's business, measures performance.

g) Areas of measurement include the Employer's key business indicators and will be redefined from time to time.

h) 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 process.

i) 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.

j) 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.

k) All works will be subject to time inspection from the Employer.

l) The Contractor maintains all year round an agreed base crew at their workshop, which is supervised by the Contractor with any changes to the crew being negotiated and agreed upon with the Employer.

m) The Contractor shall ensure the integrity of Plant labelling and that deficiency with regards to KKS labelling is reported immediately.

k) Contractor to ensure that the colour schemes are maintained

l) Contractor to ensure part numbers are visible in all heaters or parts being repaired or manufactured

m) Contractor will make sure that measurements are correct for each heater type being repaired or manufactured

2.6.8 Project Implementation

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 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.

2.6.9 Contractors Organisation's

a) The contractor submits a project organogram to the employer for acceptance, indicating the contractor's and the sub - contractor's employees

2.6.10 Tender

a) A proposal is to be submitted by the tenderers for the above-mentioned scope of work.

b) Here after a contract shall be negotiated with the successful Contractor.

c) The appointment of a Contractor is at Eskom's (The Employer) sole discretion taking into account the factors, which Eskom considers relevant.

d) The Employer shall perform evaluation based on the criteria of commercial, financial and technical evaluation as per specific applicable enquiry document.

e) The tender prices shall be completed as per the pricing structure.

2.7 Related/Supporting Documents

Not applicable

3. Document Content

The contractor will overhaul and repair all Electrical Heater Elements found at Kusile Power Station.

The SOW will include but not be limited to the following:

3.1 Works information

a) All Low Voltage heaters single and three phase shall be evaluated on its criticality and environment to determine whether it will be considered as RTF (Run To Failure). This will ensure that all electrical heaters under the following plant areas are in a healthy operating condition:

b) Boiler plant

c) Turbine Plant

d) Ash Plant

e) Water treatment plant

f) FGD Plant

g) BOP outside plant

h) Limestone plant

3.2 Scope of Work

The scope of work for overhauling and repairs of Electric Heater Elements Refurbishment will ensure that all the heaters are in a healthy operating condition. The following to be conceded when overhauling the Electric Heater Elements Refurbishment but not limited to:

a) Collect the faulty heater element form Kusile Power Station
b) Electrically tests and Measurements of the heater elements before and after cleaning
c) Test for insulation resistance before and after cleaning with an insulation resistance tester
d) Determine all mechanical and electrical faults on the heater
e) Submit the failure report and quotation to the Employer for approval
f) Submit QCPs to the Employer for approval
g) Check the condition of the elements and replace if necessary
h) Check terminal connection for rust and clean
i) Check for loose connection and tighten
j) All trust washers, oil seals, seals should be put back in their original positions if not damaged.
k) All parts to be put back to their original positions, damaged parts must be noted and replaced before returning to site with new ones.
l) Re-assembly the heater
m) Pressure test and check heater for leaks and functionality
n) Perform all tests on the heater elements
o) Employer reserves the right to see all parts which have been purchased by contractor before replacing on the heater.
p) All the old parts being removed will be assessed by Employer before being discarded by Contractor and Employer reserves the right to request for parts as and when required.
q) Paint the heater outing according to the Eskom standard
r) Record and send results including QCPs
s) The heater shall be returned on site only if it accompanied with a data pack comprising as a minimum of:

    i. Failure analysis report
    ii. Result of the tests and certifications specified on scope work

3.3 Breakdown Maintenance

a) Contractor shall collect heater elements within 6 hours during emergency breakdowns.
b) Contractor shall collect the heater element within 24 hours during normal breakdowns.
c) Contractor shall be available on standby 24 hours and contact person details for standby shall be updated and shared to the Employer on weekly basis.
d) The Contractor, and contact person's name, if required shall supply a contact number.

3.4 Repairs

a) Contractor shall submit the failure report and the repair scope of work to the Employer for approval before any work can commence.

b) Contractor will keep documentation for record purposes stating monetary value of spares purchased.

c) All Heaters being striped and assessed will be witnessed by the Employer's rep before repairs commence

d) No extra cost shall be charged by the Contractor for the use of equipment and travelling, which is included in the proposal. This does not include travelling to purchase spare parts.

e) Spare parts replaced on the heater elements repairs used shall be included in the invoice.

f) Contractor to ensure that the correct material is being utilised when manufacturing heater types , eg. Air, oil, water types

g) All heaters will be pressure tested by the contractor and certification issued to Employer before being delivered to site

h) All QCP's , Certifications required by the Employer will be sent by contractor as per request by Employer

3.5 Transport

a) The supplier is responsible and accountable for the transporting the heater element from Kusile Power Station to their sites and from their site to Kusile Power Station.

4. Acceptance

This document has been seen and accepted by:

5. Revisions

Date	Rev.	Compiler	Remarks
March 2025	1		First Issue

6. Development Team

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

- Electrical Maintenance department – Kusile Power Station

7. Acknowledgements