Eskom	specification	Kusile Power Station

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Content

Page

1. Introduction 3
2. Supporting Clauses 3
   2.1 Scope 3
      2.1.1 Purpose 3
      2.1.2 Applicability 3
      2.1.3 Effective date 3
   2.2 Normative/Informative References 3
      2.2.1 Normative 3
      2.2.2 Informative 4
   2.3 Definitions 5
   2.4 Abbreviations 7
   2.5 Roles and Responsibilities 8
   2.6 Process For Monitoring 10
      2.6.1 Procedures 10
   2.7 Related/Supporting Documents 10
3. Scope Of Work 10
   3.1 Breakdown Maintenance 13
   3.2 Repair 13
   3.3 Transport 13
4. Acceptance 14
5. Revisions 14
6. Development Team 14
7. Acknowledgements 14

1. Introduction

This document will assist the supplier and maintenance team what is most important when comes to motor repair.

Kusile Power Station Management has decided to establish a partnership with a suitably qualified, experienced and well-established service provider to overhaul and repairs on low voltage (below 1000V) motors. 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 contract.

2. Supporting Clauses

2.1 Scope

The contractor will overhaul and repair all LV motors (≤1000 V) as acknowledge at Kusile. These applications range from fans, pumps, agitators, compressors to conveyors. The application thereof is linked to the driven machines function on the Power Plant.

2.1.1 Purpose

The purpose of this document is to define the LV Motors scope of work for Kusile Power Station. This document serves to formally establish an optimal maintenance, based on the electric motors used in the various areas of the Power Station, in order to improve the availability of the power plant.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

2.1.3 Effective date

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] ISO 9001 Quality Management Systems

[2] Insert normative document references here.

[3] Act No 73 of 1989: The Environment Conservation Act No 107 of 1998: National Environmental Management Act, 1998

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

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

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

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

[8] GGR 0992: Plant Safety Regulations

[9] Act No 14 of 2009: The National Environmental Laws Amendment Act, 2009

[10] Act No 73 of 1989: The Environment Conservation Act, 1989

[11] 32-846 Rev 0 Operating Regulations for High Voltage Systems

[12] 240-134613227 List of Hazardous plant areas

[13] NMP47-7 Rev 0: Application of KKS Plant Coding

[14] Contractor OHS Management Strategy

[15] Contractor Safety Improvement Plan

[16] GGSS 1181: Specification for chemical product and material used in a power

2.2.2 Informative

[17] 414 - 32 Rev 0: Kusile Maintenance User Requirement Specification

[18] 32 - 726 Rev 0: Mandatory S.H.E. Requirements for the Eskom Procurement and

[19] Supply Chain Management Process

[20] 237 - 0016 Rev 0: Integrated Business Improvement – prevention and improvement standard

[21] GGR 0992: Plant Safety Regulations

[22] NMP47-7 Rev 0: Application of KKS Plant Coding

[23] 36 -702 Rev 1: Remnant Life Monitoring

[24] GGSS 1181: Specification for chemical product and material used in a power plant

[25] GVLIR 0007: Safety, Health and Environment Specifications for Contractors

[26] ESKASAAA3: Eskom approval of personnel performing quality related special processes.

[27] 32-726 Annexure C: S.H.E. Requirements for Tender Enquiries

[28] 32-726 Annexure D: S.H.E. Tender Evaluation and Scoring Card

[29] 32-726 Annexure E: Supplier Suspension

[30] 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 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.

Definition	Description
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
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
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
QMP:	Quality Management Programme
RP:	Responsible Person
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
SHE:	Safety, Health, Environment
SOW:	Scope of Work
UCLF	Unplanned Capability Loss Factor
URS:	User Requirement Specification

Abbreviation	Explanation
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

1 All Contractor employees shall comply with Eskom's policies and site regulations, adherence to Eskom's cardinal rules, smoking policy, zero tolerance on alcohol usage, etc. These requirements will be detailed during the induction training process.

2 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.

3 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.

a. Competent Maintenance Person according to OHS Act
b. Occupational Health and Safety Act 85 of 1993
c. NEC contract management
d. Quality Management Control and Assurance procedures
e. Plant Safety Regulation authorisation
f. Spares optimisation
g. Plant optimisation and commissioning
h. Procedure writing
i. BOM compilation

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

5 All personnel, certificates, will be kept valid and submitted to Eskom upon request

7 Safety file must be approved before contract commences, the requirements may be requested from the safety department

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

f) 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.

g) The successful Contractor shall utilise/provide skilled and suitably qualified staff (in line with Eskom Job specifications) with current experience in the overhauling and repairs of LV Motors.

a) All staff brought onto site in connection with this work scope should be able to fluently speak, understand and write in English.
b) 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 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.
c) Ensures proper behaviour of personnel under his/her supervision as per the Kusile culture.
d) Ensures training of all personnel under his/her supervision. The training required will include but not limited to Eskom safety training requirements.
e) Ensures that throughout the duration of the contract that they conform and adhere to the safety, health and environment regulations as stipulated in the Kusile Maintenance URS.
f) The Contractor shall be responsible or held liable for any defects arising from poor workmanship performed by their staff, within a 48hours period from the time that the equipment is put into operation including collection and delivery to site.
g) The Contractor is to ensure adequate manpower and equipment resources are available to meet outage program timelines.
h) The contractor must provide all the required PPE to his staff during any site visit
i) The contractor must ensure that all the necessary induction has been done before any work will start.
j) 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.
k) The contractor must assist the Security Department by providing a name list and copies of identity documents for all the workers at least one day before coming on site.

2.6 Process For Monitoring

2.6.1 Procedures

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

b. Strip and assess to be approved by Electrical department before commencement of repair work.

c. Safe work procedures or temporary work procedures shall be available and used for each job.

d. 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.

e. 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 including hazardous environments.

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

g. The contractor must identify all potentially hazardous tasks in the Works Information and prepare safe working procedures to issue to his staff before any work starts.

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

2.7 Related/Supporting Documents

Not Applicable

3. Scope Of Work

The scope of work for overhauling and repairs of LV Motors will ensure that all the motors are in a healthy operating condition. The following to be considered when overhauling the LV Motors but not limited to:

1. Collect the motor from Kusile Power Station.
2. Disassemble, clean, and assess complete motor (assessment form to be developed as per assessment sheet developed by the supplier with the employer) and provide and report.
3. Electrical maintenance department and other departments affected to witness and sign strip and assessment before repair work

4. Electrical maintenance department and other departments affected to verify and sign SOW for equipment before repair work commences
5. Replace damaged components,
6. Assemble the motor
7. Test a motor for the following (and provide a report):
    a. Insulation Resistance test
    b. PI Test
    c. Vibrations measurements
    d. Winding insulation resistance test
    e. Winding resistance test
    f. Surge and hi-pot test
    g. Locked rotor test
    h. Rotor bars test (Bar to bar)
    i. No load test
    j. Core test
8. Paint complete motor: Emerald Grey (G29) on external metal
9. Deliver motor to Kusile Power Station
10. Replace terminal box including box studs, box gaskets and seals
11. Replace terminal block and connect windings
12. Replace thermistor terminals
13. Replace fan
14. All seals to be replaced whenever motor is opened
15. Nameplate should be engraved not written; the old original one should be kept on the motor and not painted.
16. Replace cooling fan key
17. Replace circlip on bearing

18. Unclog/Replace grease nipple.
19. For motors that come with a dip stick, please replace the dip stick.
20. Replace rotor
    a. Replace rotor shaft
21. Micro weld rotor shaft
22. Eccentricity test
23. Balancing as per Grade (e.g. G6.3, G2.5, G1)
24. If there was rewinding of the LV Motor stator, apply Dip and Bake Varnishing Technique (DBVT) to strengthen insulation.
25. Replace stator laminations/core after receiving approval from the employer.
26. Unstack and restack stator core.
27. Treat and paint stator with vanish
28. Replace thermistor
29. Replace fixing bolts
30. Fit DE and NDE with grease nipples
31. Replace DE bearings (with their seals matching the IP rating of that particular motor)
32. Replace NDE bearings (with their seals matching the IP rating of that particular motor)
33. Refurbishment of the motor terminal box
34. Run the motors coupled and uncouple and take vibrations measurements, should the vibrations magnitude be found above spec, please disassemble the motor and start over.
35. Electrical maintenance department , QC department , and performing and testing and any other department affected to witness test running of the motor
36. Approved Material handling , storage and transportation procedure to be sent to Eskom for approval prior to contract commencement
37. Contractor to be present during investigations of premature failures for LV motors
38. The contractor may be requested to come on site to resolve minor defects during initial commissioning.

39. Motor spec/parts must not be modified during repairs without the client's knowledge

40. Fan, bolts and nuts, terminal blocks, links may be requested by client for supplying

NB: a) Repair motor as per hazardous location requirements (Hazardous Motor Plant Areas Listed)

b) **Should the motor fail any test, rework must be done and prioritized, Eskom representative to be notified.**

3.1 Breakdown Maintenance

1. A field support technician will be on standby 24 hours on holidays and weekends and after normal working hours at Kusile – during weekdays.
2. Response time is six hours after notice of emergency.
3. A contact number will be supplied by the Contractor, and contact person's name, if required.
4. Any fault will be documented using the Eskom field failure report and Eskom's computerized maintenance management system (SAP). Copies must be sent to contract supervisor and system engineer.
5. Breakdown plant will be brought back to service (in a healthy state) as soon as possible.

3.2 Repair

1. Any spares requiring repairs shall be approved by Eskom.
2. Eskom may require emergency
3. Documentation will be kept by Contractor for record purposes stating the value of spares purchased. Aauthorization will be done by Contract Supervisor.
4. No extra cost will be charged for the use of equipment and traveling, which is included in the proposal. This does not include traveling to purchase spare parts.

3.3 Transport

The supplier is responsible and accountable for the transporting of LV motors 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:

Name	Designation
Abel Vuma	Maintenance Group Manager
Bongekile Makini	Electrical Maintenance Manager
Vely Sondezi	Electrical System Engineer
Ntombifuthi Ngwenya	Electrical Senior Technician

5. Revisions

Date	Rev.	Compiler	Remarks
May 2026	Rev. 7	Sanele Mazibuko	Seventh Issue
June 2024	Rev. 6	Oupesh Khumalo	Sixth Issue
June 2021	Rev. 5	Oupesh Khumalo	Fifth Issue
June 2019	Rev. 4	Oupesh Khumalo	Fourth Issue
August 2017	Rev. 3	NP Mngomezulu	Third Issue
July 2015	Rev. 2	NP Mngomezulu	Second Issue
June 2014	Rev. 1	NP Mngomezulu	First Issue

6. Development Team

1. George Mbangula
2. Sanele Mazibuko
3. Ntombifuthi Ngwenya

7. Acknowledgements

Generation Maintenance teams.