

	Specification	Kusile Power Station
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Title: **Kusile Power Station Buffalo
Feeder Maintenance Scope of Work**

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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 Reference.....	3
2.2.2 Informative Reference	4
2.3 Definitions	5
2.4 Abbreviations	5
2.5 Roles and Responsibilities	6
2.5.1 The Employer	6
2.5.2 The Contractor	6
2.5.3 Management and Reporting	7
2.5.4 Quality and Documentation Control	9
2.5.5 Project Implementation	9
2.5.6 Manpower Requirements.....	9
2.6 Process for Monitoring.....	10
3. Document Content.....	10
3.1 Works Information	10
3.1.1 Auxiliary System.....	10
3.2 Exclusions	10
4. Acceptance.....	12
5. Revisions.....	12
6. Development Team	12
7. Acknowledgement	13
Appendix A	Error! Bookmark not defined.

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1. Introduction

Kusile Power Station Management has decided to outsource Buffalo Feeder maintenance services scope of work 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 qualify for the tender.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

The purpose of this document is to define the Mechanical, Electrical and C&I activities with regard to the Buffalo Feeder maintenance services requirements for Kusile Power Station. The station is expected to perform at 92% UCF, 6% PCLF and 2% UCLF, and the Coal Handling management strategy efforts must support this requirement. It is therefore imperative that the successful and suitably qualified Contractor aligns his/her organisation fully to the Buffalo Feeder maintenance scope activities and processes laid down in this document.

2.1.2 Applicability

This Document is applicable to Eskom Kusile Power Station

2.1.3 Effective date

Effective from the date of approval

2.2 Normative/Informative References

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

2.2.1 Normative Reference

Act 107 of 1998: National Environmental Management Act, 1998

Act 14 Of 2009: The National Environmental Laws Amendment Act, 2009

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

BS 4504: Circular flanges for pipes, valves and fittings

IEC 60034: Rotating Electrical Machines

IEC 60037: Surge Arrestors

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IEC 60038:	IEC Standard Voltages
IEC 60044:	Instrument Transformers
IEC 60060:	High voltage techniques
IEC 60060-2:	High-voltage Test Technique – Part 2: Measuring Systems
IEC 60071:	Insulation coordination
IEC 61024:	Protection of Structures against Lightning
SANS 10108:	The Classification of Hazardous Locations and the Selection of Apparatus for Use in Such Locations
SANS 1056-1:	Ball valves Part 1: Fire safe valves
SANS 1056-2:	Ball valves Part 1: Heavy duty valves (not fire safe)
SANS 1056-3:	Ball valves Part 1: Light duty valves (not fire safe)
SANS 1123:	Pipe Flanges
SANS 1700:	Fasteners
SANS 1973-1:	Low-voltage Switchgear and Control gear Assemblies (Part 1)

2.2.2 Informative Reference

414-32-C&IM-SP:	Kusile Maintenance User Requirements Specification
240-92783805:	Kusile Coal Handling Plant Maintenance Strategy Rev 1
237 - 0016:	Integrated Business improvement Standard
237 – 0081:	Post Mechanical Maintenance Re-qualification
237 – 0040:	Management of Kusile Power Station Control and Instrumentation
32 – 726:	S.H.E. Requirements for the Eskom Procurement and Supply Chain Management Process.
36 – 942:	Arc Flash Protection Specification
ESKPVAEY6:	Eskom Operating Regulations for High Voltage Systems
GGR 0992:	Plant Safety Regulations
NMP47-7:	Application of KKS plant coding
ESKASAAA3:	Eskom approval of personnel performing quality related special processes on all Eskom Plant.
GGPP 0592:	Power station plant classification policy
GGs 0462:	Quality Requirements for Engineering and construction works in Generation
GGs 0682:	High voltage testing of rotating electrical machines in Eskom Power Stations
GGs 1080:	Transport of Power Station Electric Motors

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GGSS 0423: Specification for Low Pressure Valves

GGSS 0456: Specification for Switchgear and Associated for Voltages up to and including AC 1090V and DC 1200V

240-87384533 Kusile MV Motor Maintenance strategy

2.3 Definitions

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

Employer: Eskom, or Eskom Kusile Power Station

2.4 Abbreviations

Abbreviation	Description
BU	Business Unit
ISO	International Standards Organisation
KKS	Kraftwerk Kennzeichen System
KPA	Key Performance Area
KPI	Key Performance Indicator
LCP	Local Control Panel
LV	Low Voltage
MV	Medium Voltage
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
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.

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Abbreviation	Description
SHE	Safety, Health, Environment
SOW	Scope of Work
UCF	Unit Capability Factor
UCLF	Unplanned Capability Loss Factor
VSD	Variable Speed Drive

2.5 Roles and Responsibilities

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 evaluated on a monthly basis against specific Key Performance Indicators. (e.g. Reliability, Availability and Safety).
- b. Areas of measurement include the Employer's key business indicators and will be redefined from time to time.
- c. Employer shall provide training for PSR and any other training as deemed necessary by the Employer. All other functionality training shall be the responsibility of the Contractor.
- d. The Employer and Contractor in this SOW is committed towards the following;
 1. Retention of critical skills
 2. Continuous cost reduction
 3. Health & Environment Safety
 4. 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 ensure that all maintenance is executed as per Employer's instructions, processes and systems.
- c. The Contractor shall be responsible for all Mechanical, Electrical and C&I maintenance activities within this Scope of Work.
- d. Contractor shall provide Engineering Support services that will be discussed and approved by the Employer
- e. The Contractor must manage and ensure the availability of all required spares necessary for ensuring smooth plant/equipment operation. Employer and contractor will discuss and agree on on-site/off-site spares strategy necessary to meet the operation strategy
- f. The Contractor shall provide the following complementary services to improve Plant and labour performance
 - i. Procedure and documentation writing
 - ii. Compile and improve task list's and QCP's

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- iii. Implement approved design and modification
- iv. Spares management
- v. Technical advice
- vi. Component failure analysis reporting
- g. 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.
- h. 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.
- i. Work against this contract can only be performed upon receipt of a task order.
- j. All works will be subject to anytime inspection from the Employer.
- k. The Contractor will utilise the rotatable process for all refurbishable spares item. Employer to provide appropriate training. The Employer and contractor to agree on what repairs should be done onsite and off-site
- l. This contract is for preventative, predictive, corrective maintenance (breakdowns) and opportunity maintenance when the unit shuts down.
- m. 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.
- n. The contractor shall apply QCP process on all the tasks to be executed and all the old spares to be retained.
- o. The Contractor shall ensure the integrity of plant labelling and that deficiency with regards to KKS labelling is reported immediately.
- p. The Contractor to provide all required equipment and tools.
- q. The Contractor shall assist in the implementation, recommendations and corrective actions which are identified by the Kusile Power Station Condition monitoring programme.
- r. The Contractor shall implement a program of continuous improvement to optimise Plant performance and reduce system and equipment failures.

2.5.2.1 Re-commissioning

- a. All Plant equipment maintained shall be re-commissioned as per site specific procedure after any maintenance intervention to certify full work completion.
- b. The Contractor shall be responsible or held liable for any defects arising from maintenance/operational faults forty eight hours 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 Employer safety meetings.

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- c. The Contractor to be represented at any ad-hoc meetings that may arise in order to address any production or safety related matters.
- d. 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.

2.5.3.1 Contractor's 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;
 - 1. Forklifts
 - 2. Mobile Cranes
 - 3. Cherry Pickers
 - 4. Sky Jacks
- d. The Contractor shall be responsible for the equipment inspections before use.
- e. The Contractor's team/s must always be led by an experienced splicing supervisor.
- f. The Contractor must ensure that all personnel performing work on the plant are authorised, this includes but not limited to;
 - 1. Confined space locations
 - 2. Working at heights
 - 3. Heat stress areas
 - 4. Scaffolding
 - 5. Hazardous substances

2.5.3.2 Communication and Correspondence

- a. All correspondence includes;
 - 1. Kusile Power Station
 - 2. Employer's Contract number
 - 3. Contract description
 - 4. Correspondence subject matter
 - 5. Employer's name and contact details
 - 6. Contractor contact details
 - 7. Date

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- 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.
- d. Call-outs to site by the relevant plant section shall be done telephonically and the Contractor is expected to report to site within three hours for emergency work, otherwise at the time given by the client for all pre-planned work.

2.5.4 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. The Contractor to compile the QCPs and method statement and submit to employer for influence and approval
- e. The Contractor shall utilise the Employer's quality documentation management system and processes.

2.5.5 Project Implementation

- a. The Contractor shall supply a project implementation plan including at least the following;
 - 1. Site establishment
 - 2. Manpower plan
 - 3. Organogram
 - 4. Skills required and associated cost per skill (e.g. artisan, site manager, etc.)

2.5.6 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;
 - 1. Occupational Health and Safety Act 85 of 1993
 - 2. NEC contract management
 - 3. Quality Management Control and Assurance procedures
 - 4. Spares optimisation
 - 5. Procedure writing

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- 6. 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

3. Document Content

3.1 Works Information

3.1.1 Auxiliary System

3.1.1.1 Applicable Plant Area

- Buffalo Feeder

3.1.1.2 Applicable S.O.W

Mechanical maintenance/ service or breakdown repairs on one FLSmidth Buffalo Reclaim Feeders at Kusile Power Station. Electrical and C&I repairs/service work will be conducted as identified or as and when requested by the Employer.

All Preventative Maintenance activities will be carried out as per the OEM manual, including chain tensioning and shortening when required.

Minor corrective action/s that will not require extra labour will be conducted accordingly.

Major/Larger repairs will be carried out with the support of the coal maintenance contractor and FLSmidth may supply an extra team/s, dependant on the enormity of the task.

CONVEYOR SYSTEM

1. Check conveyor flight chain tension & tension accordingly, if required.
2. Check conveyor drive chain sprockets, shear pins, shear pin bushes & tensioners. If

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- applicable.
3. Check conveyor torque limit couplings.
 4. Check headshaft sprockets for wear & bearings for lubrication.
 5. Check tailshaft collars/sprockets for wear & lubrication at bearings.
 6. Check kink roller assembly adjustment and lubrication.
 7. Check for wear & loose bolts on keeper plates.
 8. Check if flight bars are parallel to flight chain & if any are missing.
 9. Check for missing/damaged flight bars, flight ends & missing cotter pins.
 10. Check oil level on double acting cylinders & hand pumps & top up with VG 32 oil if necessary, shims must be somewhat equal on either side. (Oil to be supplied by Employer)
 11. Check oil levels on conveyor drive gearboxes & top up with EPW80-90 if necessary. (Oil to be supplied by Employer)
 12. Check for abnormal play on spider rubber at fluid drive coupling.
 13. Check fluid drive coupling oil levels. Correct if necessary.
 14. Check fusible plug, thermal element and mechanical trip switch.
 15. Check for any oil leaks & clean breathers on gearboxes.
 16. Check for any loose mounting bolts & torque accordingly.
 17. Check all glands/rubbers for sealing.
 18. Check wedge guard coupling and ensure wedge pins are in position.

BREAKER SYSTEM (If applicable)

1. Check mounting bolts on electric motor & glands/rubbers for sealing.
2. Check brake coupling & adjust brake linings if necessary.
3. Check tyre/spider rubber coupling for wear and replace if necessary.
4. Check gearbox mounting bolts.
5. Clean breathers & sight glass.
6. Check gearbox oil level & top up with EPW80-90 if necessary.
7. Check for abnormal play on spider rubber at fluid drive coupling.
8. Check fluid drive coupling oil levels. Correct if necessary.
9. Check fusible plug, thermal element and mechanical trip switch.
10. Check bearings for lubrication/purging of grease.
11. Check for any loose mounting bolts & torque accordingly.
12. Check for any missing or loose picks & replace if necessary.

AUTO LUBE SYSTEM (If applicable)

1. Check grease level & top up with multi-purpose grease if necessary. (Grease to be supplied by Employer)
2. Check for any loose/leaking grease pipes & fittings.
3. Clean auto lube panel.
4. Check if Auto lube system is functional and in order.

VSD DRIVE (If applicable)

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1. Blow out all coal dust in the VSD panel.
2. Clean and blow out dust extraction filters. (If applicable)
3. Checked seal arrangement on panel door.
- 4.

STRUCTURE

1. Check for any loose, missing or bent guards, chutes & covers.
2. Check overall condition of body and main frame.

RUN MACHINE

1. Check & observe any abnormal sounds/noise.
2. Check all E-stops & pull switches are functional.

3.2 Exclusions

- a. Scaffolding & Insulation
- b. Unauthorised Modifications
- c. Civil Maintenance

4. Acceptance

This document has been seen and accepted by:

Name	Designation

5. Revisions

Date	Rev.	Compiler	Remarks

6. Development Team

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

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