

	<b>Specification</b>	<b>Kusile Power Station</b>
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Title: **Kusile Power Station Milling Grinding Roller and Table Welding 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.....	3
2.2.2 Informative.....	3
2.3 Definitions .....	4
2.3.1 Contractor .....	4
2.3.2 Employer .....	4
2.4 Abbreviations .....	4
2.5 Roles and Responsibilities .....	5
2.6 Process for Monitoring.....	9
2.7 Related/Supporting Documents.....	9
3. Works information.....	9
3.1 Milling Plant.....	9
3.2 Exclusions .....	10
4. Acceptance.....	<b>Error! Bookmark not defined.</b>
5. Revisions.....	<b>Error! Bookmark not defined.</b>
6. Development Team .....	<b>Error! Bookmark not defined.</b>
7. Acknowledgements .....	<b>Error! Bookmark not defined.</b>

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## **1. Introduction**

Kusile Power Station Management has decided to outsource the total Milling Grinding Roller and Table Welding 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.

## **2. Supporting Clauses**

### **2.1 Scope**

#### **2.1.1 Purpose**

The purpose of this document is to define the specified Milling Grinding Roller and Table Welding Scope of Work activity requirements for Kusile Power Station. The station is expected to perform at 92% UCF, 6% PCLF and 2% UCLF, and the specified Milling Grinding Roller and Table Welding Scope of Work 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 throughout Eskom Kusile Power Station

#### **2.1.3 Effective date**

Document is effective from authorisation date.

### **2.2 Normative/Informative References**

#### **2.2.1 Normative**

Not Applicable

#### **2.2.2 Informative**

Not Applicable

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## **2.3 Definitions**

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

**2.3.2 Employer:** Eskom, or Eskom Kusile Power Station

## **2.4 Abbreviations**

<b>Abbreviation</b>	<b>Explanation</b>
<b>BS:</b>	British Standard
<b>ISO:</b>	International Standards Organisation
<b>KKS:</b>	Kraftwerk Kennzeichen System
<b>NEC:</b>	New Engineering Contract
<b>ORHVS</b>	Operating Regulations for High Voltage Systems
<b>PCLF:</b>	Planned Capability Loss Factor
<b>PM:</b>	Plant Maintenance
<b>PSR</b>	Plant Safety Regulations
<b>PTW:</b>	Permit to Work
<b>QA:</b>	Quality Assurance
<b>QC:</b>	Quality Control
<b>QCP:</b>	Quality Control Plan
<b>QMP:</b>	Quality Management Programme
<b>SANS:</b>	South African National Standards
<b>SAP PM:</b>	SAP Plant Maintenance
<b>SAP:</b>	Systems, Applications, Products (Plant Maintenance, Procurement, Finance and Materials Management) integrated maintenance management system.
<b>SHE:</b>	Safety, Health, Environment
<b>SOW:</b>	Scope of Work
<b>STEP:</b>	Station Thermal Efficiency Program
<b>UCF:</b>	Unit Capability Factor

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Abbreviation	Explanation
<b>UCLF:</b>	Unplanned Capability Loss Factor

## **2.5 Roles and Responsibilities**

**Note:** Further roles and responsibilities can 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).
- 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, ORHVS, FFFR and any other training as deemed necessary by the Employer.
- d. Employer to provide special tools where applicable.
- e. The Employer and Contractor in this SOW is committed towards the following;
  - i. Retention of critical skills
  - ii. Continuous cost reduction
  - iii. Health & Environment Safety
  - iv. Transfer of maintenance 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 Milling Grinding Roller and Table welding as per Employer's instructions, processes and systems.
- c. The Contractor shall be responsible to provide a competent personnel for execution of all the activities associated with this SOW.
- d. The Contractor shall be responsible for all equipment alignment requirements within this scope of work.
- e. The following complementary services to improve Plant and labour performance can be defined as follows;
  - i. Procedure and documentation writing
  - ii. Compile and improve task lists
  - iii. Implement approved design and modification
  - iv. Technical advice

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- f. 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.
- g. 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.
- h. All works will be subject to anytime inspection from the Employer.
- i. Please note that equipment will only form part of the works once the respective area has been commissioned and handed over to Generation.
- j. This is a as and when required contract .
- k. The Contractor must ensure that they have Responsible Persons (in terms of PSR and ORHVS) for any work performed on plant.
- l. All maintenance technically qualified (above semi-skilled) Contractors shall be trained and authorised (in terms of PSR and ORHVS) within 6 months of the contract start date.
- m. The Contractor must ensure that all personnel successfully complete a written examination for the relevant regulation based on the Eskom Fossil Fuel Firing Regulations.
- n. The Contractor to provide relevant tools as required.
- o. The Contractor shall participate in improvement programs as stipulated by the employer.

#### **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 any defects arising from maintenance/operational faults twenty four 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 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.

##### **2.5.3.1 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.

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- 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 where applicable, 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. Hazardous substances
  - v. Risk Assessment

#### **2.5.3.2 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.

#### **2.5.4 Quality and Documentation Control**

- a. The Contractor shall compile QCP's and Method Statements and submit to the Employer for review and approval.

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- b. The Contractor shall ensure that any witness, hold and inspection points are strictly adhered to.
- c. The Contractor to ensure that all measuring and test equipment is calibrated at all times & proof thereof must be readily available.
- d. All Quality References and Standards as stipulated in this document will be adhered to.
- e. Work will only be conducted with an Employer approved Quality Management Programme.
- f. 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;
  - i. Manpower plan
  - ii. Organogram
  - iii. SHE plan
  - iv. Site establishment

### **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, but not limited to, the following disciplines;
  - i. Occupational Health and Safety Act 85 of 1993
  - ii. NEC contract management
  - iii. Quality Management Control and Assurance procedures
  - iv. Procedure writing
  - v. BOM compilation
  - vi. Task list development/review
- c. Staff must meet minimum requirements of Eskom job descriptions, with additional requirements specified where applicable.
- d. All staff brought onto site in connection with this work scope should be able to fluently speak, understand, read and write in English.
- e. Proof of Contractor and staff qualifications is to be supplied on request by the Employer.
- f. The Contractor ensures that all staff being brought onto Kusile site have a valid fitness certificate based on the specified plant man-job specification.
- g. Provide daily supervision of all related works through trained and competent personnel to ensure that inspections & work activities are conducted.

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**2.6 Process for Monitoring**

Not Applicable

**2.7 Related/Supporting Documents**

Not Applicable

**3. Works information**

**3.1 Milling Plant**

**3.1.1 Applicable Plant Area**

Plant Area	Boundaries of Plant Area
<b>Milling Plant</b>	<p>The Milling Plant is defined as the plant and equipment interfacing with coal, that exists between the following points;</p> <p><b>Mill (Vertical Spindle)</b></p> <p>The plant and equipment interfacing with coal, that exists between the following points;</p> <ul style="list-style-type: none"> <li>- raw coal inlet chute to the mill, and</li> <li>- outlet of the classifier</li> </ul> <p>This implies the following plant and equipment;</p> <ul style="list-style-type: none"> <li>- grinding elements (i.e. track &amp; rollers)</li> <li>- mill body</li> <li>- Rotating throat and Dam Ring</li> </ul>

**3.1.1.1 Applicable S.O.W**

All Welding shall be executed according to the following Specifications:

- a) IN-SITU weld build up of MHPS designed MPS 265 mill grinding table segments to a tolerance of +3 -0mm. (table outer diameter is 3340mm)
- b) IN-SITU weld build up of 3 X MHPS designed MPS265 mill grinding tyres to a tolerance of +0 -6mm (original wheel diameter 2070mm)  
 \*All original castings have a microstructure of tempered martensite with chromium carbides and secondary carbides, manufactured according to DIN EN12513 and DIN EN 1559-1, Material EN-GJN-HV600(XCr23), Material Number EN-JN3049 with chemical composition range of Carbon 2.4%-3.2%, Mn:0.5%-1.5%, Cr:23%-28%, Mo:3%Max, Si:1%Max, Cu: 1.2%Max, S:0.08%Max (balance is Fe). The hardness is 600 HV minimum.
- c) IN-SITU weld build up of MHPS designed MPS265 mill dam rings.

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- d) Manufacturing and or Hardfacing of mill wear components (mostly smaller wear plates) as and when required.

#### QUALITY ASSURANCE

1. Repairs to be done by (FCAW) flux cored arc welding in-situe where possible.
2. Welding must be done according to the latest revision of EN 14700: Standard for Filler Materials for Hard-Surfacing.
3. Welding consumable code to be used is TFe15 (bulk of filling) and TFe16 (last 8-10 mm) in line with EN 14700. Changes to the welding consumables are allowed, but should be pre-approved.
4. As welded through hardness of 57-62 HRC for TFe15 and 62-64 HRC for TFe16 both in an austenitic matrix. The following is important to note regarding the build-up:
  - a. There shall be no cracks between welds.
  - b. Relief cracks in the region of 90 degrees to the weld direction are normal and will be permitted
  - c. There shall be no blow holes, porosity or flux entrapment within the first layer of the weld overlay on the original material.
  - d. Superior bonding must be achieved between the weld overlay and the original material and a complete fused chain of overlay shall exist from the dilution zone to the surface of the completed overlay.
5. Dye penetrant test to be done on the parent material (castings) before welding and after welding is completed. No cracks are allowed.
6. Continuous parameter control is required to ensure consistent and quality product with criteria to stop welding in case of errors. The parameters must be available on request.
7. Suitable welding fume extraction must be provided with fume management plan.
8. Linear welding speed must always be consistent and corrected as build-up increases (as tyres diameter increases). Tyre and table turning method to be proposed and means available.
9. A minimum surface temperature of 20 degrees Celsius is required before welding starts. If temperature is too low then suitable electrical pre-heating shall be provided.
10. WPS and QCP to be pre-approved by Eskom before work can start.

### 3.2 Exclusions

- a. Scaffolding & Insulation
- b. Lubrication activities
- c. Unauthorised Modifications
- d. Civil Maintenance
- e. Mechanical Maintenance
- f. Control & Instrumentation Maintenance

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