

	<b>Instruction</b>	<b>Hendrina Power Station</b>
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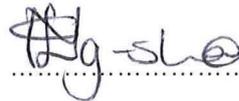
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### **CONTROLLED DISCLOSURE**

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## **1 INTRODUCTION**

This document defines the contract works to be executed by the successful bidder, of which is evaluated and selected using the open tender process. The Scope of Work (SOW) for this contract entails the ongoing maintenance work for Hendrina Milling Plant operational units 1-10.

## **2 SUPPORTING CLAUSES**

### **2.1 SCOPE**

The scope comprises of, but is not limited to, the repair, maintenance and refurbishment of all required components of the milling plant and associated auxiliaries.

#### **2.1.1 Purpose**

The purpose of this scope of work is to outline all the contract work to be performed by the contractor, and the responsibilities of all parties involved. The contract scope of work serves to support the tender technical evaluation process.

#### **2.1.2 Applicability**

This document is applicable to Hendrina Power Station.

### **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] 240-168966153: Generation Tender Technical Evaluation Procedure
- [2] 240-105691858: Materials Management Safe Work Procedures Transportation Requirements for Material Handling
- [3] 32-1034: Eskom Procurement and Supply Chain Management Procedure
- [4] 32-1033: Eskom's Procurement and Supply Chain Management Policy
- [5] 240-56239137: Standard for Babcock & Wilcox E type Hollow Grinding Balls
- [6] 474-12656 Mills and Coal Burners Group Technology Strategic Report 2022 (Rev 1)
- [7] Eskom Babcock and Wilcox maintenance manuals

#### **2.2.2 Informative**

- [8] ISO 9001 Quality Management Systems
- [9] 32-1-34 Eskom Procurement Policy

### **2.3 DEFINITIONS**

<b>Term</b>	<b>Definition</b>
Contractor	Service provider contracted for supplying a specific service to Eskom Hendrina Power Station. Used interchangeably with the term <i>Supplier</i> .

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<b>Term</b>	<b>Definition</b>
Employer	The organization (Eskom) to which the supplier will be contracted for this tender and contracts that may result therefrom
Employer's Premises	Hendrina Power Station
Industrial Storage Facility	Physical space suitable for the storage of the items specified in the scope of work
Returnable	Document submitted by tenderer for evaluation in support of tender bid
Spares	Parts that can be used for replacement.

### 2.3.1 Classification

**Controlled Disclosure:** Controlled Disclosure to external parties (either enforced by law, or discretionary).

## 2.4 ABBREVIATIONS

<b>Abbreviation</b>	<b>Description</b>
kPa	Kilopascal
m	Metre
mm	Millimetre
MPa	Megapascal
OD	Outer Diameter
OEM	Original Equipment Manufacturer
QCP/QIP	Quality Control Plan / Quality Inspection Plan
PS	Power Station
PTW	Permit to Work
SOW	Scope of Work

## 2.5 ROLES AND RESPONSIBILITIES

### 2.5.1 The Employer

The responsibilities of the employer include the following:

- a) Inform the contractor when mill defects need to be attended to.
- b) Provide information of operations prior to refurbishment, repair, or overhaul.
- c) Make all necessary arrangements, including permit to work (PTW), for the contractor to gain site access and perform work required.
- d) Send a representative to the contractor's premises/workshop/work area if there are any inspection, witness, or hold points.
- e) The employer to conduct plant orientation with the contractor during site establishment

### 2.5.2 Contractor

The responsibilities of the contractor include the following:

- a) Comply with the employer's environmental, health, and safety standards, policies, and procedures.
- b) Make all repair/refurbishment information available to the employer on request.

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- c) Inform the employer's representative at least 48 hours prior to any hold points that may require the employer.
- d) Do plant walks on a daily basis, check all the leaks (pf leaks and oil leaks) that are in the plant and rectify accordingly.
- e) Contractor to apply for a PTW and to gain access before starting the work

## **2.6 PROCESS FOR MONITORING**

N/A

## **2.7 RELATED/SUPPORTING DOCUMENTS**

N/A

## **3 SCOPE OF WORK**

The contractor's scope of work consists of core services (daily routine maintenance) and overhauling of milling plant group components as per the available maintenance work instructions and procedures and outage works. Any of the work is doable as per all defects within the below mentioned boundaries.

### **3.1 BOUNDARIES OF THE RELEVANT PLANT**

#### **3.1.1 The Mill**

- The mill internally & externally, the gearbox and its auxiliaries i.e. the lube oil system, cooling water system (from the horizontal common supply and discharge pipes), tensioning system from the gas cylinder & the mill motor. The contractor collects, removes, installs and aligns all the motors.

#### **3.1.2 Raw coal system**

#### **3.1.3 The bunker coal gate to the mill inner raw coal pipe including all the components within the raw coal distribution system, the coal feeder and its auxiliaries.**

#### **3.1.4 PF distribution system**

- The two PF outlet pipes on top of each mill classifier to the last flange of the PF pipe below the burner box including all the components on the PF distribution system.

#### **3.1.5 Hot and cold air system:**

##### **Hot air:**

- The hot air common duct to the primary air (PA) fan suction damper excluding the damper and its pneumatic opening and closing controls at unit 1 - 5.
- The hot air common duct to the PA fan louvre vane control damper excluding the damper and its electrical opening and closing controls at unit 6 – 10.
- The primary air fan outlet casing flange to the mill PA inlet flanges including expansion joints and welds on the mill inlet pressure tapping points to the next fitting.

### **CONTROLLED DISCLOSURE**

- From the hot air common duct to the PA fan suction damper including the hot air damper seals and its controls.
- The hot air common duct, the expansion bellows, the damper seals, the damper, the control arms and the mechanical part of the actuator, the venture, the hot PA suction duct and the quick closing damper with its accessories at unit 6 – 10.

### **Cold/Tempering air system:**

From the cold air common duct to the PA inlet flange, the mechanical part of the damper controls, the tadpole seals and the cold air ducting excluding the electrical actuator at unit 1 – 5.

The cold air common duct, the expansion bellows, the damper seals, the damper, the control arms, the mechanical part of the actuator the motor at unit 6 – 10 and the colds air discharge duct to the hot PA duct at unit 6 – 10.

### **3.1.6 Excluded:**

All C&I and electrical work

## **3.2 SCOPE OF WORK**

### **3.2.1 Pre Job Plan**

- Compile risk assessment and request/ apply the permit to work from the relevant Senior Shift Supervisor Operating
- QC must be notified prior to any inspection or work to be carried out
- Inform workers about all the risk hazards, precaution in case of emergency or an accident, required PPE and scope of work
- Confirm at the planners meeting date and time day before inspection or test is required
- Ensure an isolation permit has been obtained and gas test certificate issued , safe entry certificate and environmental certificates are issued
- Ensure hot work approval documents/permit has been obtained and a fire watcher is available before execution of work.

### **3.2.2 Safe Work Procedure**

- Ensure that all work is done in compliance with Occupational Health and Safety Act of 1993
- Ensure that all dangers/hazards have been identified and explained
- Wear necessary protective clothing such as hard hat, overalls, safety shoes, leather gloves, eye protection and ear protection
- Do not work under crane load or suspended load
- Always use legal tools or equipment or approved hand-made tools
- Beware of fellow workers safety
- Beware of ultraviolet rays and hot surfaces when welding work in progress

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- Beware of sharp edges and falling or rolling objects
- Safety barriers and notices must be erected
- All workers will stand clear when equipment and parts being lifted or lowered
- Work area must be kept clean at all times
- Work area to be adequate lit and only 32 v lighting to be used inside plant
- **Note:** Always watch out for the nipping points

### **3.2.3 Risk/Precautions:**

- The mill is a confined space, gas test certificate must be issued
- There must be sufficient light and ventilation
- Only 32v light to be used inside the mill
- A person cleaning around mill must wear the dust mask to prevent the dust intake which will affect a person's health and dispose the pulverized fuel at the correct area
- The area is noisy and dusty, ear muffs and dust must be used
- Beware of hot plant and working at height
- Beware of ultra violet when welding work in progress
- Ensure that the door is properly hooked onto the bracket
- Do not use compressed air for external cleaning.
- Ensure the FFR regulations are adhered to at all times
- Seal all PF leaks around the work area

**Note:** Refer to the Milling Plant base line risk assessment for comprehensive milling plant related risks, hazards and dangers.

### **3.2.4 SHEQR requirements**

- The Quality Inspection Plan as per the procedures and instructions( Appendix D) are developed and are to be followed to ensure quality work
- Before work commence, the supervisor or responsible person must assess the working area and inform the co-workers about the **Potential Risks or Hazards**.

**Note:** The basic hazards and precautions are indicated in the Risk Assessment above.

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### 3.3 NORMAL MILLING PLANT MAINTENANCE ACTIVITIES AS PER THE ENGINEERING STRATEGY (HSSTPMM005)

#### 3.3.1 BALL CHANGE/ADD AND SERVICE UNTI 1- 7 (INSTRUCTION HSIPMM 558)

*Frequency: During Outage as per the Engineering philosophy and as and when required.*

##### 3.3.1.1 Clean mill internally:

- Position portable step ladder.
- Open the top and the main inspection door and obtain gas test certification.
- Use a brush or broom to sweep the PF on top of the ring.
- Use scraper to remove PF from reject brushes doors and reject box.
- **Never use compressed air** to clean the mill and feeder on the outside.
- Remove the coal, debris, PF, clinkers and possible tramp irons from reject chamber.
- Clean around the mill by using a broom **never compressed air**

##### 3.3.1.2 Lift the grinding ring:

- Remove the mill motor fan cover and install special bracket.
- Depressurise the hydraulic/ pneumatic loading system.
- Remove the top tension rams pins and use the clamp with chain to support the cylinders.
- Loosen the silent block bushes support brackets.
- Loosen the stay brackets.
- Visually check the lugs.
- Using the lever hoist of 6 ton and of shackle 12 ton, pull the loading unit external arms until knuckles disengage from the stirrups.
- Lift the spider and the top ring with 4 off the 6 ton lever hoists and special chain sling (**Use the ring protection pieces**)
- **At unit 1-5 use safety chain when lifting the ring at unit 1-5 mills**
- Remove the balls from the mill with special pins and the sling with the mobile crane or special boom fitted to forks of the forklift.
- Clean the PF and the raw coal from bottom ring.
- Replace the missing tiles and silicone sealant.
- **Hold points:**

Measure the grinding balls and point the size but if less than 590mm in diameter – dispose at the correct area in the scrap yard.

Measure the rings profile and record in the notification. Submit all the readings to milling plant supervisor and engineering (grinding balls reading and ring profile reading)

Check and repair the throat segment (Rotating type and stationary type) wear and record throat gap (Average: 19mm on stationary throat) – Call out PPD to inspect and confirm and sign QIP.

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QC to be called for any repairs that have taken place inside or outside the mill.

**Note:** When welding and repairing of gladiator fingers beware of UV rays and hot surfaces.

### **3.3.1.3 Replacing the grinding balls**

- Install the correct size balls into the mill (verify the size with the Supervisor or Technician).
- Lower the top rings onto the grinding balls.
- Remove the lifting equipment and rotate the spider ring until knuckles (swivels) are at the main door.
- On a grinding ball addition and service, replace long stirrup and short swivels with short stirrup and long swivels (Knuckles).
- Align the stirrups with the internal arms by rotating the mill motor.
- Inspect and repair the inner raw coal pipe.
- Engage the loading levers short swivels (knuckles) with the stirrups by pulling with the crane (loading lever number 3 with 6 ton pull lift).
- Recharge the cylinders with gas at required pressure and also check for gas leaks.
- Open motor/gearbox coupling guard and inspect the condition of the coupling element and replace it if cracked.
- Close the mill doors and ensure that they are air tight sealed.
- Inspect and repair the inner and the outer reject doors and seals.
- Ensure that workers tools and debris are removed from the mill as per PSR.

### **3.3.1.4 Clean work area**

- Clean the feeder and repair as per feeder inspection and repair as per instruction HSIPMM064 and HSIPIIM 086
- Inspect and repair the raw coal pipe below feeder.
- Clean and change the lube oil filters and repair any oil leaks or defects in the mill gearbox lube oil system as per the system service instruction HSIPIIMM 087

### **3.3.1.5 Clear the permit**

- **Note:** Ensure that all the relevant documentation is submitted as per the PSR GGR 0992 (use the latest revision applicable as it supersedes the older version).

## **3.3.2 GRINDING BALL SIZE CHECK AND INTERNAL INSPECTION (UNIT 1 to 7) INSTRUCTION HSIPM084 AND HSIPMM546**

**Frequency:** *During the Outage, as per the Engineering philosophy and as and when required.*

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### **3.3.2.1 Ball size check**

- Position portable step ladder close to the mill door.
- Open the door and lower with the appropriate lifting equipment.
- Measure the grinding ball sizes outside diameter with the special callipers and record; they are easily accessible through the inspection door.
- Check the top and the bottom rings for any possible damages or defects.
- Inspect and repair the other mill components as per the Thermal Performance Based Inspection of Vertical spindle Mills standard 240-115052916.
- Hold point
- Close the door and secure. Ensure that a proper sealing is achieved.
- Inspect the entire mill group system and create defect notifications if found, remove the scaffold.
- Submit ball sizes to milling supervisor or technician and engineering.

### **3.3.2.2 Clear the permit**

**Note:** Ensure all the relevant documentation is submitted as per the PSR GGR 0992 (use the latest revision applicable as it supersedes the older version).

### **3.3.3 MILL REBUILD OR OVERHAUL (UNIT 1 – 7) INSTRUCTION HSIPMM074**

**Frequency:** *During the Outage, as per the Engineering philosophy and as and when required.*

#### **3.3.3.1 Cleaning the mill internally**

- Open the inspection door.
- Make sure the damper is open to boiler and that there is a draft flowing to the boiler.
- Stand outside the mill and use an air hose with a steel pipe at the front and blow the coal and P.F. in the throat to the reject chamber

**Note:** Wear gloves, safety goggles and dust mask before commencing with any PF or dust cleaning

Do not use compressed air to clean mill and feeder on the outside

Remove the coal and PF from reject chamber

Clean around the mill by using a broom (no compressed air)

#### **3.3.3.2 Mill motor removal**

- All electrical supply to be disconnected by electrical department
- Remove and inspect the coupling guards and the coupling element.
- Remove and inspect the base bolts and the jacking bolts.
- EMD to assist when motor is removed.

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### **3.3.3.3 Raw coal pipes**

Remove and inspect the raw coal pipes between feeder and the mill top (tiled with ceramic wear protection linings)

### **3.3.3.4 Production outlet pipes**

Support outlet pipes by using a 6 ton chain block, loosening flanges, and bolts and remove production outlet pipes/bends

### **3.3.3.5 Removal of the mill top/classifier:**

- Remove classifier flange bolts using the impact wrench.
- Loosen the lower classifier cone and remove classifier stays brackets.
- Lift the lower cone into position.
- Using the mobile crane, remove the mill top/classifier and safely support it on A-frames.
- If crane not available at 6&7 use crawl beams on top of the mill

### **3.3.3.6 Stripping of the mill**

- Depressurise the hydraulic loading system.
- Remove the top pins and lower the tension ram cylinders onto special brackets.
- Remove flexible gas pipes.
- Remove the top tension rams pins and use the clamp with chain to support the gas cylinders and lower them with the forklift lift.
- Use the lever hoist to pull the lever of the loading unit to disengage the knuckles from the stirrups.
- The spider or top ring shall be removed with a crane and special slings.
- Remove the grinding balls from the mill (Refer to the Ball change procedure HSIPMM 558).
- Loosen three (3) throat segments (rotating type) and remove (cut if solid/stationary type).
- Remove the bottom ring.
- Remove the centre plate and loosen the yoke bolts.
- Remove the remainder of the throat segments.
- Take labyrinth seal sizes before the mill table is removed and submit reading to milling supervisor or technician.
- Use the crane to remove the mill table.  
**Note:** Be careful not to damage labyrinth seal.
- Remove the gearbox jacking and base bolts.
- Drain the oil from the gearbox and remove the oil pipes.
- Withdraw or remove the gearbox and transport it to cleaning bay.

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### **3.3.3.7 Cleaning**

- Clean the mill, the classifier and all loose parts thoroughly
- Record all profiles and ball sizes

### **3.3.3.8 Inspections**

- Inspect the raw coal pipes for wear not less than 3 mm thick.
- The Production outlets for erosion.
- The Mill gearbox base for wear and on the base contact surfaces and the gearbox feet out of level (Maximum 0.2 mm. If worn, it must be machined and corrected. Thickness packers to be made up to ensure alignment of bottom ring and mill throat. Base height to the dome bottom = 1245 mm)
- Inspect horseshoe for wear.
- Check hold down bolts and hold threads.
- The Inner reject door must be repaired if damaged.
- The Outer reject door to be replaced.
- Check and repair reject chamber liners.
- Inspect seal air cone and seal rings.
- Classifier blade to be repaired and reset to 290 mm at 35 ° on mills 1 – 5.
- Inspect vortex finder, repair or replace. The measured length from top plate must be 450 mm ± 3mm.
- Inspect the classifier cone, coal inlet pipe.
- Remove the turret top to renew the liner.
- Check & turret outlets 90 °. Re-tile with 6 mm tiles with outlet pipes as centres.
- Renew classifier return skirts.
- Inspect hanger brackets. Hanger studs and classifier studs.
- Crack test the loading units and spider ring pins, report to be sent to engineering and mills technician and supervisor.
- Inspect table keys.
- Inspect yoke surface if damaged, renew or re-sleeve such that it is within > 0.2 mm concentricity
- **Hold point for quality inspection**

### **3.3.3.9 Assembling the mill**

- Ensure that all surfaces are clean and smooth.
- Coat the contact surfaces of mill gearbox feet and base with anti-seize compound.
- Position the gearbox firmly against the horse shoe and align gearbox axis to metal axis and secure.

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- Coat output coupling on the gearbox with anti-seize compound.
- Lower the table yoke on the output coupling and ensure key fits properly and secure the yoke bolts.
- Check the yoke alignment to steel ring clearance at 4 points (0.7 mm – 0.2 mm)
- **Hold point QC to check**
- Fit labyrinth seal and check alignment at four points 0.5 mm ± -0.1.
- **Hold point QC to check**
- Fit the bottom ring onto the table, ensure the keys fit neatly and ring rests flat on the table.
- Check the level between throat and ring.
- Call plant performance to verify the throat gap.
- Rebuild the throat and set to 19 mm and seal weld.
- **Hold point QC and witness**
- Fit the ball holding down units to mill casing.
- Place 9 x 730 mm balls on bottom ring (Refer to Ball change instruction HSIPMM 558)
- Lower the top and spider ring into position.
- Tighten the new stirrups bolts and weld metal plates to lock into position.
- Fit correct length knuckles to spider ring (Hook up stirrups with lever hoist pull in hold down unit levels to enlarge stirrups and knuckles)
- Lift the classifier / till top and position correctly, align with production outlets, Ensure that flanges are well coated with sealing compound
- Secure mill / classifier flanges
- Fit the production outlets and raw coal pipes and raw coal pipe fit gaskets and sealing compound on all flanges
- Install and align mill motor
- **Hold point QC and witness**
- Fit new reject brushes
- Fit mill motor coupling element and replace safety guard
- Ensure all knuckles and stirrups engage correctly
- Install hydraulic cylinders and fit gas pipes
- Secure silent block bush brackets nuts
- Fit gearbox oil pipes and fill gearbox with oil to correct level
- **Hold point for quality inspection and quality control**

### **3.3.3.10 Clear the permit**

Note: Ensure all the relevant documentation is submitted as per the PSR GGR 0992 rev.2

#### **CONTROLLED DISCLOSURE**

When downloaded from the EDMS, this document is uncontrolled and the responsibility rests with the user to ensure it is in line with the authorised version on the system.

### **3.3.3.11 Prepare mill for service**

Box up/close all mill inspection doors and check for leaks

### **3.3.3.12 Re-commission the mill**

**Note:** Ensure the relevant recommissioning check list is followed and signed.

## **3.3.4 ALIGNMENT AND TENSIONING OF THE PRESSURE RING AND PHI MILL SERVICE AND REPAIR UNIT 8 -10 (INSTRUCTION HSIPMM545 AND HSIPIM085)**

**Frequency:** Outage, as per the engineering philosophy and as and when required.

### **3.3.4.1 Pre job arrangements:**

- Compile risk assessment
- Do a pre-job brief
- QC must be notified two (2) days prior to any inspection to be carried out as per RWM
- Inform the workers about all the risk hazards, precaution in case of emergency or an accident, required PPE and scope of work
- Risk assessment shall be revised when the scope of work or plant condition changes
- Minimise the use of flogging spanners by using pneumatic, safe finger or hydraulic tools or slogging hammers.

### **3.3.4.2 Permit to work:**

Obtain permit to work as per Plant Safety Regulations.

Sign workman's declaration if work is not done by the responsible person

### **3.3.4.3 Mill internal cleaning:**

- Open inspection door
- Stand outside mill and use air hose with a steel pipe at the front and blow the coal and PF in the throat to the reject chamber (Please note: wear gloves, safety goggles and respirator)
- Do not use compressed air to clean mill and feeder on the outside
- Remove the coal and PF from reject chambers
- Clean around mill or externally by using brooms (no compressed air)

### **3.3.4.4 Riffle box and PF distribution/splitter box inspection and repair:**

- Obtain Permit to Work (Refer to Eskom Plant Safety Regulation – GGR 0992 rev.2)
- Make sure riffle box is open to the boiler and that there is a draft flowing to the boiler. Refer to procedure number HSPMM048

## **CONTROLLED DISCLOSURE**

- Remove thermal insulation from riffle box covers
- Remove covers i.e. bottom and top covers
- Clean internally (Ceramic tiles, raw coal and PF, rough coal in the riffle box damper means inefficient grinding or raw coal leaking into the PF system)
- Ensure that the dampers operate freely (Left hand threaded spindle) in both directions (open/shut) and confirm if contact is made by the limit switches
- Inspect and repair the first (Bottom flapper stage) and second stage (Top riffle plates/vanes)
- Clean and lubricate the spindle and hand wheel nut.
- Hold point for Quality controller, Milling plant supervisor and Plant performance
- Repair as required and as per the work instruction or replace
- **Hold point for quality controller**
- Replace covers with an airtight seal and notify contractors to replace thermal insulation

#### **3.3.4.5 Raw coal feeder inspection and repair**

- Close feeder or bunker coal gate
- Open inspection covers
- Clean raw coal build ups from the feeder casing into the mill - Use compressed air internally only
- Check raw coal pipe liner thickness, coal build up and liner securing bolts and nuts
- Check and repair for raw coal leaks from feeder casing, measure casing liner thickness and cut off bent edges or replace the feeder casing
- Check spiral length, diameter and spiral thickness and replace if wear is more than 20% especially below the raw coal supply pipe.
- Check and clean coal build ups and repair raw coal leaks on the feeder outlet chute
- Check gearbox, clean and repair oil leaks. Check oil level and top up.
- Check around the feeder system for cleanliness and empty excessive oil from the drip tray.
- Check feeder speeds pick up proper alignment to the motor fan and tightness
- Check speeds pick up blades on the fan (2 off at 180 degrees) and report EMD if broken/missing.
- Report to C & I if loose wiring is evident.
- Check and clean raw coal around the coal feeder casing.
- Clean gearbox breather and clean by blowing with compressed air or replace if damaged
- Inspection doors – Replace the seals and close properly.
- **Hold point quality controller**
- Inform Plant performance department to check critical performance areas and do PF sample when the mill is on load if required.
- Check all the inspection door/cover to be closed before PTW clearance
- Check the plant for cleanliness, tools and debris removed

**CONTROLLED DISCLOSURE**

- Check if the service is carried out as per the work instruction
- Check mill gearbox oil level and top up to out of service gearbox oil level with Meropa 220 oil

Refer to instruction HSIPMM551.

Refer to instruction HSIPMM543

#### **3.3.4.6 Mill inspection and repair:**

- Close the riffle box damper and lock
- Open mill inspection doors
- Remove coal and PF out from mill and clean
- Measure the profiles of each roller with a special gauge and record.
- Check for damage, abnormal scratches and cracks and report
- Inspect the pressure rings, the mill casing, the thrust pads and rebound wearing plates.
- Erect scaffolding or use proper platform and a slogging hammer and renew if necessary (Housing/ pressure ring to have 3mm gap as maximum)
- Check thrust pads studs length after final alignment, machine to correct length (Stud to protrude with less than 5 and more than three threads behind the nut) and lubricate with anti-seize compound
- Check and adjust mill tension to 48 Mpa with 3 jacks simultaneously and 515mm distance between the pressure and spring ring
- Inspect the nozzle ring for wear and cracks
- Inspect the mill throat for wear especially behind roller number 2, check for damage and repair
- Inspect the wiper bar / reject scrapper for wear and replace
- Inspect the yoke protection plates (bottom and sides) and general condition of the mill internally repair and replace ceramic tiles
- Inspect the tension cables for wear, damage and replace
- Inspect seal air pipes for wear, damage, blockages and replace
- Repack the labyrinth seal with new gland packing.
- **Hold point quality controller**
- Clean around the mill gearbox

#### **3.3.4.7 Mill classifier inspection and repair:**

- Remove the explosion disc to gain access into the classifier cone for proper inspections and avoid using fingers to worn out areas.
- Check and clean classifier cone internally
- Check classifier blades, the cone, production outlet and raw coal pipe for erosion, replace or repair

**CONTROLLED DISCLOSURE**

- Cut out holed/worn out areas on the cone, production outlet and raw coal pipe until the thickness is more than 3mm and window patch with original thickness plate. Replace the tiles on the repaired areas.
- Seal the gap between the production outlet pipe and the classifier inner pipe with rope and silicon sealant.
- Check and reset blades to 390mm - 410mm average.
- Check vortex for wear and measure the height to be 380mm
- Inspect classifier reject trap flaps for free movement and neat seating on hanging position.

Refer to HSIPMM 549 procedure

- **Hold plant for the quality controller or the supervisor to inspect the mill components and confirm repairs done**

#### **3.3.4.8 Mill motor alignment check**

Pre-service check by Condition Monitoring – Check latest vibrations report

- Remove coupling guards
- Remove Fenna flex coupling rubber or tyre and inspect for cracks
- Align mill motor axis to the gearbox input shaft to the correct tolerances maximum misalignment less than 0.2mm
- **Hold point** – Call QC to confirm alignment
- Run motor for vibration check (**Maximum 2mm/sec**) and direction test
- Fit tyre or coupling rubber onto the coupling halves and tighten properly
- Replace safety guards and check if rubbing against the shafts and rectify

Refer to HSIPMM562 procedure

#### **3.3.4.9 Mill lubrication oil system inspection and repair**

- Remove filters and clean with solvent and blow lightly with compressed air.  
**Note:** Compressed air to be used outside station
- Check O ring close up filters
- Check for any oil leaks – Request the system to be on load
- Remove change over valve , change oil seals
- Clean all spilled oil and discard in drums to the oil disposal area at the scrap yard.

Refer to HSIPIM087 procedure

#### **3.3.4.10 Tensioning of the pressure rings**

- Clean PF or raw coal from the tension sling block to provide level and solid support

**CONTROLLED DISCLOSURE**

- Clean dust from both coupler (fittings) before connecting
- Do not lift the hydraulic cylinders by using the hoses
- Test the hydraulic power pack for correct operation before installation
- Correctly install the hydraulic cylinder on the tension sling block.
- Install the spacer/s below the plunger and ensure proper alignment
- Operate to ensure stability of the cylinder and the spacer
- Stand clear from the cylinders, spacers and hydraulic oil pipes

**Note:** Ensure that the operator of the hydraulic power pack is familiar with the operation of machine

- Operate the power pack until the tension spacers are loose
- Measure the distance between pressure ring (top) and spring ring (bottom)
- Calculate the sizes of spacers to be installed to get the distance of 515mm between the rings.
- Check the cylinders and oil pipes for oil leaks and stability, and the spacers for stability
- Check if the pressure is not slowly going down - distance not closing
- If the three cylinders are available, use them to pressurise the 3 units simultaneously to 48Mpa and measure the size of spacers to install – This method should be the first preference.
- Pressurise more than 48Mpa and install the calculated (measured) size spaces.
- Stand clear from cylinders oil pipes and spacers and release the pressure
- Allow the PF dust to settle inside the mill
- Check (confirm) the distance between pressure ring and spring ring to be 515mm or use the three cylinders simultaneously to check the tension pressure to be 48Mpa
- Visually check the pressure ring level to determine the effectiveness of the springs
- Check any welding done during the repairs to ensure it is applied at the correct places  
Refer to instruction HSIPMM545
- **Hold plant for the supervisor/QC to inspect the mill components and sign box up certificate**

### **3.3.5 SPIRAL COAL FEEDER INSPECTION AND REPAIR (INSTRUCTION HSIPMM 551)**

Frequency: Outage, as per the philosophy and as and when required.

- Close bunker coal gate.
- Run the raw coal pipe empty
- Inspect raw coal pipe liner.
- Clean feeder inside and outside
- Inspect feeder coal gate
- Check the casing liner for wear visually.

#### **CONTROLLED DISCLOSURE**

- Check feeder outlet chute for wear visually
- Check gear box for leaks
- Remove equipment from site
- Check the spiral for damages especially directly below the raw coal supply pipe
- The maximum wear 20%of the original dimension the spiral must be replaced
- Check all the bolts and welding
- Check oil condition and oil level on the feeder gearbox
- Check and clean /replace gearbox breather

**Note:** If the feeder and raw pipe are not drained of coal don't weld the feeder and raw coal pipe

- **Hold point for quality inspection and quality control**
- Clean and replace inspection cover seals

**NOTE:** Boiler 6, 7, 8 and 10 spiral lengths must be 150mm shorter than the original new spiral length

### **3.4 OUTAGE SCOPE OF WORK (IN- INSPECTION REPAIRS)**

#### **3.4.1 Mills**

- Obtain Mill group Permit to work
- Apply for gas test and hot work approval permit
- Open inspection doors
- Clean the mills internally
- Clean the mills externally and the work area
- Repair mills as per inspection report
- Repair the raw coal leaks on mill top and around the mills
- Inspect and repair tension system
- Inspect, clean and replace hot and cold air damper tadpole seals
- Take ball sizes & do due ball changes
- Fit new gaskets and seals
- Do all outstanding defects (As per SAP Notification system)
- Clean gearboxes filters and breathers
- Inspect all mill gearboxes defects and repair
- Final inspections and box up certification
- The employer & the contractor
- Close all inspection doors
- Attend outage meetings and provide progress feedback

**CONTROLLED DISCLOSURE**

### **3.4.2 Rejects and Brush box**

- Clean out rejects from the brush plough box/chamber
- Replace worn out or damaged rejects brushes/ploughs
- Fit new packing on rejects box outer door (if necessary)
- Close the reject box/chamber doors
- Final inspections and box up certification
- Clean the work area

### **3.4.3 Coal Feeders**

- Clean the feeders internally and externally
- Inspect feeders internally and externally
- Repair feeders as per inspection report
- Check and re-set all relevant settings
- Clean feeder gearboxes, check and top up oil level
- Clean the raw coal below the feeder table
- Re-set seal air height from the waffle plates to 3mm
- Re-set feeder ploughs' height to 3mm
- Replace feeder shaft seals and close inspection doors
- Check and replace feeder and the build-up scrapper
- Do all outstanding defects (As per SAP Notification system)
- Inspect and repair feeder coal gates
- Window patch worn out feeder outlet chutes (For tiles repair)
- Repair holed (patched) intermediate bunkers
- Final inspections and box up certification
- Clean the work area

### **3.4.4 Mill gearboxes and lube oil system**

- Inspect gearboxes as per monthly oil sampling report
- Clean or replace lube oil filters and gearbox breathers
- Change oil (according to monthly oil report)
- Check and clean cooling water system
- Check lube oil pumps for leaking oil seals & remove for repair
- Inspect coupling and replace if damaged
- Run system to check for oil leaks (repair if any leaks)

## **CONTROLLED DISCLOSURE**

- Clean excessive raw coal and PF around the gearbox and work area
- Final inspections and box up certification

### **3.4.5 PF and raw coal pipes**

- Online inspection on all PF pipes (Pf leaks) and steel hanger brackets
- Off load inspection of PF pipes (patches) hanger brackets (steel hangers)
- Repair or replace PF pipes found with leaks during inspection
- Arrange and replace raw coal pipes liners previously removed or damaged
- Repair or replace patched raw coal pipes, including mill inner raw coal pipe
- Repair and repack leaking Johnson couplings (spool pieces)
- Repair patched intermediate bunkers
- Final inspections and box up certification
- Clean the area
- Complete notifications of all the work done and submit to be closed
- Complete box up certificate and Clear PTW

## **3.5 OUTAGE SCOPE OF WORK (IR- INTERIM REPAIRS)**

### **3.5.1 Mills**

- Obtain Mill group Permit to work
- Apply for gas test and hot approval permit
- Open inspection doors
- Clean the mills internally
- Clean the mills externally and the work area
- Repair mills as per inspection report
- Repair the raw coal leaks on mill top and around the mills
- Inspect and repair tension system
- Take ball sizes & do due ball changes
- Fit new gaskets and seals
- Do all outstanding defects (As per SAP Notification system)
- Inspect, clean and replace hot and cold air damper tadpole seals
- Clean gearboxes filters and breathers
- Inspect all mill gearboxes defects and repair
- Close all inspection doors
- Attend outage meetings and provide progress feedback

### **CONTROLLED DISCLOSURE**

- Final inspections and box up certification

### **3.5.2 Rejects box, the chamber and Brushes**

- Clean out rejects from the brush plough box/chamber
- Replace worn out or damaged rejects brushes/ploughs
- Fit new packing on rejects box outer door (if necessary)
- Final inspections and box up certification
- Close the reject box/chamber doors
- Clean the work area

### **3.5.3 Coal Feeders**

- Clean the feeders internally and externally
- Inspect feeders internally and externally
- Repair feeders as per inspection report
- Check and re-set all relevant settings
- Clean feeder gearboxes, check and top up oil level
- Clean the raw coal below the feeder table
- Re-set seal air height from the waffle plates to 3mm
- Re-set feeder ploughs' height to 3mm
- Replace feeder shaft seals and close inspection doors
- Check and replace feeder and the build-up scrapper
- Do all outstanding defects (As per SAP Notification system)
- Inspect and repair feeder coal gates
- Window patch worn out feeder outlet chutes (For tiles repair)
- Repair holed (patched) intermediate bunkers
- Final inspections and box up certification
- Clean the work area

### **3.5.4 Mill gearboxes and lube oil system**

- Inspect gearboxes as per monthly oil sampling report
- Clean or replace lube oil filters and gearbox breathers
- Change oil (according to monthly oil report)
- Remove one mill gearbox for proper cleaning (Highest particle count)
- Check and clean cooling water system

## **CONTROLLED DISCLOSURE**

- Check lube oil pumps for leaking oil seals & remove for repair
- Inspect coupling and replace if damaged
- Run system to check for oil leaks (repair if any leaks)
- Clean excessive raw coal and PF around the gearbox and work area
- Inspect gearboxes as per monthly oil sampling report
- Final inspections and box up certification

### **3.5.5 PF Distribution System**

- Online inspection on all PF pipes (Pf leaks) and steel hanger brackets
- Off load inspection of PF pipes (patches) hanger brackets (steel hangers)
- Replace patched PF pipes and those found with leaks during inspection
- Arrange and replace raw coal pipes liners previously removed or damaged
- Replace patched raw coal pipes, including mill inner raw coal pipe
- Repair and repack leaking Johnson couplings (spool pieces)
- Replace patched Y-pieces
- Repair patched intermediate bunkers
- Final inspections and box up certification
- Clean the work area
- Complete notifications of all the work done and submit to be closed
- Clear PTW as per PRS

## **3.6 OUTAGE SCOPE OF WORK (MO- MINI GENERAL OVERHAUL)**

### **3.6.1 Mills**

- Obtain Mill group Permit to work
- Apply for gas test and hot work approval
- Open inspection doors
- Clean the mills internally
- Clean the mills externally and the work area
- Repair mills as per inspection report
- Clean and repair rotating throat and gladiator fingers
- Repair the raw coal leaks above the mills and coal feeders
- Inspect, clean and repair tension system
- Take ball sizes & do due ball changes/add, services and repairs
- Plan and carry out due mill rebuilds (minimum two)

**CONTROLLED DISCLOSURE**

- Check, repair and set the classifier blades angles
- Fit new gaskets and seals on inspection doors
- Do all outstanding defects (As per SAP Notification system)
- Clean gearboxes filters and breathers
- Remove oil coolers for workshop to clean and pressure test
- Inspect all mill gearboxes defects and repair
- Remove one mill gearbox for internal repairs (highest particle count)
- Clean out rejects from the brush plough box/chamber
- Replace worn out or damaged rejects brushes/ploughs
- Close and check inner doors for proper sealing and repair
- Fit new packing's/seals on rejects box outer doors (if necessary)
- Close the reject box/chamber doors
- Inspect and replace all hot and cold air damper tadpole seals
- Inspect and repair oil leaks around hot air and suction dampers
- Inspect, replace and tighten mill motor couplings
- Inspect, clean and replace leaking expansion joints
- Clean excessive PF and raw coal on mill tops
- Final inspections and box up certification
- Clean the work area and close all inspection doors
- Attend outage meetings and provide progress feedback

### **3.6.2 Coal Feeders**

- Clean the feeders internally and externally
- Inspect feeders internally and externally
- Repair feeders as per inspection report
- Check and re-set all relevant settings like inner raw coal pipe height
- Clean feeder gearboxes, check and top up oil level
- Clean the raw coal below the feeder table
- Re-set seal air height from the waffle plates to 3mm
- Clean seal air supply pipe
- Re-set feeder ploughs' height to 3mm
- Replace feeder shaft seals and close inspection doors
- Check and replace feeder and the build-up scrapper
- Do all outstanding defects (As per SAP Notification system)

**CONTROLLED DISCLOSURE**

- Inspect motor couplings, re-do alignment and tighten couplings properly
- Inspect and repair feeder coal gates
- Window patch worn out feeder outlet chutes and arrange tiling
- Repair holed (patched) intermediate bunkers and arrange tiling
- Final inspections and box up certification
- Clean the work area

### **3.6.3 PF and raw coal pipes**

- Online inspection on all PF pipes (Pf leaks) and steel hanger brackets
- Off load inspection of PF pipes (patches) hanger brackets (steel hangers)
- Replace all patched PF pipes and those found with leaks during inspections
- Measure the PF pipes for thickness and replace those with thickness of 3mm or less.
- Repair/ replace steel hangers on PF pipes
- Inspect raw coal pipes liners and replace previously removed and damaged
- Repair or replace patched raw coal pipes
- Repair intermediate bunker inspection covers
- Support PF pipes and remove a piece of PF enable burners removal
- Remove PF pipes to enable other contractor to work on oil burners and re-install
- Repair and repack Johnson couplings (spool pieces)
- Repair patched intermediate bunkers and arrange tiling
- Remove and repair bunker coal gates and re-install
- Final inspections and box up certification
- Clean the area.

### **3.6.4 Mill gearboxes and lube oil system**

- Inspect gearboxes as per monthly oil sampling report
- Clean or replace lube oil filters and gearbox breathers
- Change oil (according to monthly oil report)
- Remove one mill gearbox for proper cleaning (Highest particle count)
- Check and clean cooling water system
- Check lube oil pumps for leaking oil seals & remove for repair
- Inspect coupling and replace if damaged
- Run system to check for oil leaks (repair if any leaks)
- Clean excessive raw coal and PF around the gearbox and work area

### **CONTROLLED DISCLOSURE**

- Inspect gearboxes as per monthly oil sampling report
- Final inspections and box up certification

### **3.7 OUTAGE SCOPE OF WORK (GO- MAJOR GENERAL OVERHAUL)**

#### **3.7.1 Mills**

- Obtain Mill group Permit to work
- Apply for gas test and hot work approval
- Open inspection doors
- Clean the mills internally
- Clean the mills externally and the work area
- Repair mills as per inspection report
- Clean and repair rotating throat and gladiator fingers
- Repair the raw coal leaks above the mills and coal feeders
- Inspect, clean and repair tension system
- Take ball sizes & do due ball changes/add, services and repairs
- Plan and carry out due mill rebuilds (minimum two)
- Check, repair and set the classifier blades angles
- Fit new gaskets and seals on inspection doors
- Do all outstanding defects (As per SAP Notification system)
- Clean gearboxes filters and breathers
- Remove oil coolers for workshop to clean and pressure test
- Inspect all mill gearboxes defects and repair
- Remove motor & mill gearboxes for internal repairs
- Clean out rejects from the brush plough box/chamber
- Replace worn out or damaged rejects brushes/ploughs
- Close and check inner doors for proper sealing and repair
- Fit new packing's/seals on rejects box outer doors (if necessary)
- Close the reject box/chamber doors
- Inspect and replace all hot and cold air damper tadpole seals
- Inspect and repair oil leaks around hot air and suction dampers
- Inspect, replace and tighten mill motor couplings
- Inspect, clean and replace leaking expansion joints
- Clean excessive PF and raw coal on mill tops
- Clean the work area and close all inspection doors

**CONTROLLED DISCLOSURE**

- Attend outage meetings and provide progress feedback
- Final inspections and box up certification

### **3.7.2 Coal Feeders**

- Clean the feeders internally and externally
- Inspect feeders internally and externally
- Repair feeders as per inspection report
- Check and re-set all relevant settings like inner raw coal pipe height
- Clean feeder gearboxes, check and top up oil level
- Clean the raw coal below the feeder table
- Re-set seal air height from the waffle plates to 3mm
- Clean seal air supply pipe
- Re-set feeder ploughs' height to 3mm
- Replace feeder shaft seals and close inspection doors
- Check and replace feeder and the build-up scrapper
- Do all outstanding defects (As per SAP Notification system)
- Inspect motor couplings, re-do alignment and tighten couplings properly
- Inspect and repair feeder coal gates
- Window patch worn out feeder outlet chutes and arrange tiling
- Repair holed (patched) intermediate bunkers and arrange tiling
- Final inspections and box up certification
- Clean the work area

### **3.7.3 PF and raw coal pipes**

- Online inspection on all PF pipes (Pf leaks) and steel hanger brackets
- Off load inspection of PF pipes (patches) hanger brackets (steel hangers)
- Replace all patched PF pipes and those found with leaks during inspections
- Measure the PF pipes for thickness and replace those with thickness of 3mm or less.
- Repair/ replace steel hangers on PF pipes
- Inspect raw coal pipes liners and replace previously removed and damaged
- Install and remove raw coal chutes used for coal drainage for all bunkers
- Replace patched raw coal pipes
- Repair intermediate bunker inspection covers
- Support PF pipes and remove a piece of PF enable burners removal

#### **CONTROLLED DISCLOSURE**

- Remove PF pipes to enable other contractor to work on oil burners and re-install
- Repair and repack Johnson couplings (spool pieces)
- Repair patched intermediate bunkers and arrange tiling
- Remove and repair bunker coal gates and re-install
- Final inspections and box up certification
- Clean the work area.

#### **3.7.4 Mill gearboxes and lube oil system**

- Inspect gearboxes as per monthly oil sampling report
- Clean or replace lube oil filters and gearbox breathers
- Change oil according to monthly oil report)
- Remove one mill gearbox for proper cleaning (Highest particle count)
- Check and clean cooling water system
- Check lube oil pumps for leaking oil seals & remove for repair
- Inspect coupling and replace if damaged
- Run system to check for oil leaks (repair if any leaks)
- Clean excessive raw coal and PF around the gearbox and work area
- Replace gearboxes as per monthly oil sampling report
- Final inspections and box up certification

### **3.8 SERVICE INFORMATION**

#### **3.8.1 Core Services**

Core services consist of preventative, corrective maintenance, preservation of mills on the running units, units that are on cold reserve or extended inoperability or any classifications and shall be relevant to maintaining plant availability and reliability in a cost effective way.

#### **3.8.2 Annual Revisions**

The employer revises the number of skills in the team and the specific skills requirement annually and adjusts accordingly.

#### **3.8.3 Work orders**

Notifications/defects to be identified prioritised as per Work Prioritisation Procedure 240-44948953. Planned, executed and closed as per routine works management policy and week work management procedure 240-130843041. No ageing/outdated outstanding work orders allowed, PM's and Scheduled work compliance to be improved and maintained above 95%. Emergent work is 20% and less. No statutory PM order violation.

### **CONTROLLED DISCLOSURE**

#### 3.8.4 Labour force

Contractor provides the employer with a labour force and toolboxes including but not limited to at the employers discretion:

- Site Manager
- Supervisor (Mechanical)
- Riggers
- Quality Controller
- Safety officer
- Boiler Makers
- Mechanical Fitters
- Welders (Class B)
- Semi-skilled (Mechanical)
- Assistant Supervisor (Mechanical)
- Fire Watcher
- Cleaner
- Storeman
- Administration clerk

#### 3.8.5 Qualifications

The contractor provides proof of qualifications and experience for all the above listed skills. The listed skilled personnel are authorised and accredited with relevant authorities and proof is submitted to the Service Manager at the start of contract.

#### 3.8.6 Authorisation of personnel

The contractor ensures that his/her personnel are authorised to take out permits to work (PTW) in accordance with Generation Plant Safety Regulations 36-381 within three months of being awarded the contract by sending the employees to the relevant training. All the fitters, boilermakers, riggers and welders must be authorised. All relevant personnel on site, including management must be trained and certified in terms of the Fossil Fuel Firing Regulations, to the level as determined by the site matrix, within 6 months of being awarded the contract.

#### 3.8.7 Training of artisans

The contractor trains all the artisans to be authorised to safely operate the forklifts, mobile and overhead cranes within the station. The crane and forklift driver's scope of work is driving anywhere within Hendrina Power Station premises including assisting other sections as authorised/approved by the employer.

#### 3.8.8 Training of unskilled or semi-skilled workers

The contractor trains and appoints the semi-skilled employees to be hot work observers or fire watchers when hot work is in progress as per procedure HSPMM 005 to prevent violation of the PSR.

#### 3.8.9 Assets of the employer

The contractor maintains, inspect, service, repair, safeguard, uses and the milling plant assets if provided by the employer and will replace missing or damaged assets if negligence is proven.

### **CONTROLLED DISCLOSURE**

### 3.8.10 Operating hours

The contractor provides 24 hour service for any plant failures, with a response time of 0 -1 hour by providing standby team of one fitter authorised as per PSR, one boiler maker/welder or authorised as per PSR and one semi-skilled with the response time of 0 - 1 hour after hours including weekends and public holidays.

### 3.8.11 Mill UCLF

### 3.8.12 Contractor Performance

The contractor reduces milling plant related UCLF and maintains it below 0.5% or as determined in the annual milling plant target, executes an internal safety audit twice per year, reduces LTIR and keeps it at zero as per the employer's KPI's.

### 3.8.13 Material, tools and equipment

The contractor supplies material, tools and equipment to ensures adherence and compliance to the control of plant construction, repair and maintenance welding activities procedure 36-775.

### 3.8.14 Plant Policy

The contractor supports and assists in promoting the Plant Fundamental Management Policy.

### 3.8.15 Contractor procedures

The contractor makes available the written safe working procedures for the maintenance, service and overhauling of milling plant as per the scope of work.

### 3.8.16 Mill activities durations

Mill services and rebuilds are to be executed as per the milling plant maintenance strategy. A normal mill rebuild scope of work is to be completed within 15 (Fifteen) calendar days, Grinding ball changes /additions & services is to be completed in 2 (Two) calendar days to reduce the risk of another mill failure resulting in an extended UCLF duration.

### 3.8.17 Contractor QIP's

The contractor makes available the written quality inspection plans (QIP's) for the maintenance, overhauling of milling plant as per the scope of work and maintenance instructions and procedure and enforces usage as per Hendrina Power station quality Manual QMM 001 to avoid rework on mechanical work. The quality control programme must meet the requirements of the code of practice for quality systems, ISO 9001:2015.

### 3.8.18 Pricing and Payments

The contractor adheres to the tendered prices as listed, ensures invoices are prepared and submitted in time for a cash flow control purpose, and planned overtime is kept below 10%.

### **3.9 QUALITY ASSURANCE TESTS, INSPECTIONS AND DOCUMENTATION**

The following documentation, inspections and tests are required.

#### **3.9.1 Provision of certificates and technical data**

- a. The *Contractor* shall submit a QIP to Eskom for the required activities which need to be carried out.
- b. The *Contractor* should also provide a time base repair schedule to Eskom prior to starting the work.
- c. The following data must be provided by means of an official report:
  1. Thickness reports/surveys
  2. Internal inspection, mill rebuild and ball change reports
  3. Serial Numbers where applicable.
  4. Material Certificates for all consumables used.

#### **3.10 EFFECTIVE DATE**

This document will be effective from the date that the contract is authorised.

#### **3.11 WORKS**

Maintenance of the milling plant as outlined in the SOW above.

#### **3.12 MATERIAL CERTIFICATES AND GUARANTEES**

The following documentation must be supplied to the *Employer's* representative before any item is accepted on site:

- All documentation, but not limited to, as detailed in the scope of work above and section 3.9 above.

#### **3.13 GENERAL REQUIREMENTS**

Other milling plant related work required on an as and when needed basis subject to approval by both the *employer* and the *contractor*.

## **4 AUTHORISATION**

This document has been seen and accepted by:

<b>Name</b>	<b>Designation</b>
Bongi Ngoloti	Mills Maintenance Manager
Goitseman Kgwathe	Boiler Engineering Manager
Linky Nkadimeng	Technician Mills Maintenance
Lomile Ngqenesha	Group Engineering Manager
Jabu Galela	Manager Procurement

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## **5 REVISIONS**

<b>Date</b>	<b>Rev.</b>	<b>Compiler</b>	<b>Remarks</b>
July 2025	0	E Ebrahim	First Issue

## **6 DEVELOPMENT TEAM**

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

Eesa Ebrahim

Brian Somwahla

Tshimangadzo Sigidane

## **7 ACKNOWLEDGEMENTS**

N/A

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**8 APPENDIX A - MILLING PLANT MAINTENANCE INSTRUCTIONS AND PROCEDURES**

<b>NUMBER</b>	<b>DESCRIPTION</b>	<b>PROC./INSTR.</b>
HSPPIM030	BOILER 1 - 10 MILL BUNKER AND COAL PIPE INSPECTION/REPAIR	PROCEDURE
HSPPIM031	MILL LUBRICATION SYSTEM INSPECTION AND REPAIR	PROCEDURE
HSIPMM303	MILL OIL LUBRICATION SYSTEM INSPECTION AND CLEAN	INSTRUCTION
HSIPMM071	FEEDER COAL GATE AND OVERHAUL: BOILERS 6-10	INSTRUCTION
HSIPMM061	FEEDER COAL GATE CHANGE AND OVERHAUL - BOILER 1 - 5 MILLS	INSTRUCTION
HSIPIM227	A TO F COAL BUNKERS INSPECTION AND REPAIRS - BOILERS 1 - 10	INSTRUCTION
HSIPIM089	BOILERS 8 - 10 PEKRUN PHI MILL GEARBOX INTERNAL INSPECTION	INSTRUCTION
HSIPIM094	MILL CLASSIFIER INSPECTION AND REPAIR: BOILERS 1 - 7	INSTRUCTION
HSIPIM084	MILL INSPECTION AND REPAIRS BOILER 1 - 7	INSTRUCTION
HSIPIM091	MILL GEARBOX INSPECTION BOILERS 1 - 7 MILLS	INSTRUCTION
HSIPIM080	THRUST WEAR CHECK MILL GEARBOXES BOILERS 1 - 10	INSTRUCTION
HSIPIM027	RIFFLE AND DISTRIBUTION BOX INSPECTION	INSTRUCTION
HSPPMM048	RIFFLE BOX CHANGE AND REPAIR	PROCEDURE
HSPPMM041	FEEDER AND GEARBOX REPAIR	PROCEDURE
HSIPIM382	MILLS MOBILE EQUIPMENT FORK LIFTS - 3 MONTHLY INSPECTION	INSTRUCTION
HSIPMM046	MOTOR UNCOUPLE AND RE- COUPLE MILL SECTION - BOILERS 1-10	INSTRUCTION
HSPPMM001	FEEDER GEARBOXES (OIL LEVEL CHECK)	PROCEDURE
HSIPIM086	BOILERS 1 - 10 MILL BUNKER & COAL PIPES INSPECTION & REPAIR	INSTRUCTION
HSIPMM543	MILL GEARBOX PEKRUN CHANGE	INSTRUCTION
HSIPMM544	PHI MILL TABLE CHANGE	INSTRUCTION
HSIPMM545	ALIGNMENT AND TENSIONING OF THE PRESSURE RING MILLS 8 - 10	INSTRUCTION
HSIPMM546	BALL SIZE CHECK BOILERS 1 - 7 MILLS	INSTRUCTION
HSIPMM547	MILL GEARBOX OIL CHANGE	INSTRUCTION

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HSIPMM548	GEARBOX CHANGE BOILERS 1 - 7	INSTRUCTION
HSIPMM549	MILLS 1 - 10 CLASSIFIERS INSPECTION AND REPAIR	INSTRUCTION
HSIPMM550	FEEDER GEARBOX OIL CHANGE UNITS 1 - 10	INSTRUCTION
HSIPMM551	BOILER 9 - MILL SPIRAL FEEDER	INSTRUCTION
HSIPMM553	MILL GEARBOX BREATHER INSPECTION	INSTRUCTION
HSIPMM555	PEKRUN GEARBOX OVERHAUL	INSTRUCTION
HSIPMM556	HITACHI GEARBOX OVERHAUL	INSTRUCTION
HSIPMM557	DAVID BROWN MILL GEARBOX MILLS 1 - 7	INSTRUCTION
HSIPIM394	DUCTINGS AND DAMPERS	INSTRUCTION
HSIPMM558	BALL CHANGE OR ADDITION BOILERS 1 - 7	INSTRUCTION
HSIPMM560	MILL BASE REPAIR	INSTRUCTION

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**9 APPENDIX B - STANDARD ARTISAN & SEMI SKILLED MINIMUM TOOLS LIST**

<b>NO.</b>	<b>TOOL DESCRIPTION</b>	<b>QUANTITY</b>
1	Tool box and pad lock	1
2	Socket set 8- 32mm	1
3	Combination spanners 10 - 36	2
4	17mm combination spanner - Forms part of the combination set	2
5	19mm combination spanner - Forms part of the combination set	2
6	24mm combination spanner - Forms part of the combination set	2
7	4 pounds hammer	1
8	2 pounds hammer	1
9	450mm pipe wrench	1
10	Hack saw and blade	1
11	Stanley knife	1
12	Tin snip	1
12	137mm vice grap	1
13	300mm chisel	1
14	450mm hand file - smooth	1
15	Tommy bar	1
16	Scraper	1
17	Punch (big)	1
18	Punch (small)	1
19	Packing extractor	1
20	Torch	1
21	Measuring tape (0 - 5 metre)	1
22	Ratchet spanner 17mm and 19mm	
23	Vernier caliper	1
24	inside caliper	1
25	Engineering square	1

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## 10 APPENDIX C - MAINTENANCE TACKLE SHOP ADDITIONAL LIFTING EQUIPMENT

ITEM	DESCRIPTION
1	SHACKLE-BOW 3.25 TON
2	AIRWINCH -3TON C/W WIRE ROPE 100 M
3	SHACKLE-BOW 25 TON
4	LIFT CHAIN BLOCK - 6 METRE,2 TON
5	CHAIN BLOCK 3 TON 15 METRE LIFT
6	CHAIN SLING 2 METRE LONG 8.2 TON
7	LIFT RATCHET LEVER HOIST/PULL LIFT 1.5 TON 1.5/3 METRE
8	WIRE ROPE SLING 13MM THICK x 2 MET
9	SHACKLE-BOW 12 TON
10	LIFT RATCHET LEVER HOIST/PULL LIFT 3 TON 1.5/3 METRE
11	WIRE ROPE SLING 20MM THICK x 3 MET
12	BEAM CLAMP 2 TON
13	WIRE ROPE SLING 13MM THICK x 1 MET
14	SAFETY HARNESS - DOUBLE LANYARD
15	CHAIN BLOCK 2 TON 8 METRE LIFT
16	SNATCH BLOCK 3 TON
17	WIRE ROPE TIRFOR C/W 30 METRE 3 T
18	BEAM CLAMP 10 TON
19	LIFT RATCHET LEVER HOIST/PULL LIFT 6 TON 1.5/3METRE
20	CHAIN BLOCK 5 TON 10 METRE LIFT

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**11 APPENDIX D - MILLING PLANT RECOMMENDED ADDITIONAL TOOLS TO BE BROUGHT BY THE CONTRACTOR**

ITEM	ASSET NUMBER	ASSET CLASS	COST CENTER	ASSET DESCRIPTION
1	950001348417	WE801505	327250	DRILLING MACHINE -MAGNETIC BASE 10
2	950001348418	WE801505	327250	DRILLING MACHINE -MAGNETIC BASE 10
3	950001348860	LV8000	327250	ELECTRICAL IMPACT WRENCH 1/2 INCH
	950001348861	LV8000	327250	ELECTRICAL IMPACT WRENCH 1/2 INCH
	950001348862	LV8000	327250	ELECTRICAL IMPACT WRENCH 1/2 INCH
6	950001348863	LV8000	327250	ELECTRICAL IMPACT WRENCH 1/2 INCH
7	950001348891	LV8000	327250	GRINDER ELECTRICAL ANGLE --115MM
9	950001348892	LV8000	327250	GRINDER ELECTRICAL ANGLE --115MM
10	950001348893	LV8000	327250	GRINDER ELECTRICAL ANGLE --115MM
11	950001348894	LV8000	327250	GRINDER ELECTRICAL ANGLE --115MM
12	950001348895	LV8000	327250	GRINDER ELECTRICAL ANGLE --115MM
13	950001348896	WE801505	327250	AIR COMPRESSOR 380 VOLT X 5.5KW
14	950001348897	WE801505	327250	AIR COMPRESSOR 380 VOLT X 5.5KW
15	950001348898	LV8000	327250	GRINDER ELECTRICAL ANGLE -- 230MM
16	950001348899	LV8000	327250	GRINDER ELECTRICAL ANGLE -- 230MM
17	950001348900	LV8000	327250	GRINDER ELECTRICAL ANGLE -- 230MM
18	950001348901	LV8000	327250	GRINDER ELECTRICAL ANGLE -- 230MM
19	950001348902	LV8000	327250	GRINDER ELECTRICAL ANGLE -- 230MM
20	950001348921	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
21	950001348922	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
22	950001348923	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
23	950001348924	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
24	950001348925	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
25	950001348926	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
26	950001348927	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
27	950001348928	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
28	950001348929	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
29	950001348930	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
30	950001348931	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
31	950001348932	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
32	950001348933	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
33	950001348934	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
34	950001348935	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
35	950001348936	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
36	950001348937	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE
37	950001348938	LV8000	327250	LEAD LIGHT 32/220 VOLT x 5 METRE

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