

	<b>Scope of Work</b>	<b>Generation</b>
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Coal Handling Plant  
Maintenance Scope of Work.**

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## **Content**

	Page
1. Introduction.....	4
2. Supporting Clauses .....	4
2.1 Scope.....	4
2.1.1 Purpose.....	4
2.1.2 Applicability .....	5
2.1.3 Effective date.....	5
2.2 Normative/Informative References .....	6
2.2.1 Normative.....	6
2.2.2 Informative.....	6
2.3 Definitions .....	6
2.3.1 Welding Artisan .....	6
2.3.2 Classification .....	6
2.3.3 Client.....	6
2.3.4 Engineer.....	6
2.3.5 System .....	7
2.4 Abbreviations .....	8
2.5 Roles and Responsibilities .....	8
2.6 Process for Monitoring.....	8
2.7 Related/Supporting Documents.....	8
3. Background .....	9
3.1 Need Statement .....	10
4. Scope .....	11
4.1 Facilities .....	11
4.2 Buildings.....	11
4.3 Structure and infra-structure maintenance.....	12
4.4 Electrical and Instrumentation Maintenance .....	12
4.5 Mechanical maintenance – Conveyor belts .....	19
4.6 Rigging Equipment.....	27
4.7 Drainage systems:.....	27
5. Quality Control.....	27
5.1 Procedures, Guidelines & Other Documents .....	28
6. General .....	28
7. Man power:.....	30
9 Price list:.....	32
QTY 34	
PRICE 34	
8. Acceptance.....	36

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9. Revisions ..... 36  
10. Development Team ..... 36  
11. Acknowledgements ..... 36

Figures

N/A

Tables

N/A

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## **1. Introduction**

Terrace Coal Handling plant in Tutuka Power Station starts at the ground floor level of the Mine Transfer House, combine a sequence of coal conveyors until at the Bunker Distribution conveyors wherein they discharge coal load into the Mill Bunkers.

The 2 twin conveyor belts, Silo Inclined 6A&B receives coal from the Overland 17A&B conveyors through the MTH chute system. They each convey and distribute coal to all 6 Silos through the twin conveyor belts, short and long Over-silo (named 1A&B to 5A&B).

The Unit Reclaim conveyor belts, each reclaims coal from the Silo through the hopper underneath the Silo and convey it to an associated Unit Inclined conveyor belt.

The conveyor belt is, each driven by a drive train consisting of an electric motor, constant fill fluid coupling and a gearbox that directly drives the pulley, except for the Unit Reclaim conveyor belts that are each driven by a power pack and hydraulic motor assembly.

This is a huge plant employing the services of preventative maintenance strategy, whose activities are to be on schedule and on par with the operations of the plant. The plant maintenance, PM orders are issued on regular basis for various plant areas and plant components. Adherence to PM's time frames is paramount to the effective and compliance to the maintenance strategy; moreover, quality of the executed work is paramount and cannot be compromised in whatever manner.

This document details plant areas and activities required to done during the maintenance, notwithstanding the fact that each PM that is issued further detail the safety requirements and the activities to be executed, time frame associated with the activity and signing off.

## **2. Supporting Clauses**

### **2.1 Scope**

#### **2.1.1 Purpose**

The purpose of this scope is to stipulate an overview of work to be performed during the maintenance execution on plant equipment as instructed and directed by the existing PMs and by the Senior Supervisor or any other personnel authorized to do so. The execution of plant maintenance in the Terrace Coal Handling Plant includes the following:

- Cleaning of all facilities and plant components.

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- Maintenance (Mechanical / Electrical / Instrumentation / Civil etc) of all the coal conveyors and associated equipment idlers, Idler frames, pulley plummer blocks, pulleys, pulley lagging, silos, transfer chutes, flopper gates, flopper actuators, electric motors, Silo hoppers, gearboxes, fluid couplings, power pack, conveyor belt tension stations, dust extractors, grizzly bars, gantry house cladding, electromagnet separators, MTH sump and sump pump and tramp bin.
- Maintenance of Shuttle Conveyors and associated rail (pinion and rack).
- Maintenance of conveyor belts, unreeling new belt, installation, reeling of redundant belt.
- Maintenance on lagging of pulleys and greasing of associated Plummer blocks.
- Maintenance on replacement of worn-out idler rollers and idler brackets.
- Maintenance on patching, lining and cleaning of chutes and flopper gates inside the chutes and maintenance on actuators.
- Execute all Plant Maintenance (PM) orders (Conveyor Platform Maintenance).
- Maintenance of all emergency arising belt misalignment, ripping, loose skirting, back-plates.
- Maintenance of all civil associated components, silo sumps and drains leading to and including South Settling Ponds, MTH sump and pump, all drainage around MTH and from MTH to Steinmuller Dam, East Settling Ponds and the electrical pumps in South Settling Ponds.
- Maintenance of hydraulic power pack and all its associated equipment.
- Maintenance of air extractors and all its associated components.
- Maintenance on Silo hopper and Silo discharge profile plate.
- Maintenance on all the control & instrumentation protections associated with the Terrace CHP components.
- Maintenance of all components (mechanical, civil, electrical and instrumentation) on coal stacker reclaimer machine

### **2.1.2 Applicability**

This document shall apply to Tutuka Power Station only.

### **2.1.3 Effective date**

The effective date is the authorisation date.

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## **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] Maintenance Execution Strategy, Unique Identifier : 15ENG AUX STR 0044

### **2.2.2 Informative**

[2] ISO 9001:2015 Quality management systems and standards.

[3] 32-7 - Quality Management Policy

## **2.3 Definitions**

### **2.3.1 Welding Artisan**

Competent person who is qualified as welder and has underwent through the process of examination.

### **2.3.2 Classification**

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

### **2.3.3 Client**

A person for whom repair work is being performed.

### **2.3.4 Engineer**

- a) A competent person who-
  - i. Prepares a design;
  - ii. Checks and approves a design;
  - iii. Arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is the *Employer*; or
  - iv. Designs temporary work, including its components;

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### **2.3.5 System**

An integrated set of constituent pieces that are combined in an operational or support environment to accomplish a defined objective. These pieces include people, hardware, software, firmware, information, procedures, facilities, services and other support facets.

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## **2.4 Abbreviations**

<b>Abbreviation &amp; Acronyms</b>	<b>Description</b>
AKZ	Anlagenkennzeichnungssystem
NDC	New Denmark Colliery
MTH	Mine Transfer House
PM	Plant Maintenance Order
QCP	Quality Control Procedure
SHE	Safety, Health & Environmental
TPH	Tons per hour

## **2.5 Roles and Responsibilities**

- Designer:
- As per OHS Act (85/1993),
  - Performs calculations, compiles drawings, design details and specifications (structures and plant must be resistant to corrosive environment),
- Tutuka Operating:
- Ensure system is operated according to the procedure to be developed by the designer
- Tutuka Maintenance:
- Ensure the plant is maintained as per PM's developed by designer

## **2.6 Process for Monitoring**

- Method Statement.
- Quality Control Plan.
- Splicing procedure.
- Fluid coupling filling procedure
- Shaft Alignment procedure

## **2.7 Related/Supporting Documents**

N/A

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### **3. Background**

The Tutuka Power Station coal supply to the boilers is a 24/7 continuous process that requires a healthy, reliable and effective plant operation. The sustainability of coal conveyance is the key priority in meeting the production demands and to achieve and maintain that objective, reliable maintenance has to be rolled-out to all the components of the coal plant in Tutuka Power Station.

There are various maintenance strategies for various plant components in 86 conveyor belts of different sizes; different tension sizes; different sizes of loading and discharge chutes; different sizes of drive trains; different sizes of inclination; different sizes of protection devices etc. The various strategies for various conveyor belt components exists and detail to dictate what needs to be done, when and where. The plant areas herein covered by this scope are:-

- All conveyors, feeders and stacker reclaimer machines at coal stock yard (CSY)
- All terrace conveyors supplying coal to the station including conveyors 11, 12, 13, 14, 15, 16, 17, and 18
- All coal sampling equipment and/or plant and mechanical sampler and online analyser as equipped by the *Employer*
- All required repairs on water reticulation infrastructure within the CSY area
- Mine Transfer House (ground floor, drains, sump, sump pump and associated East Settling Ponds including drainage to Steinmuller Dam).
- Silo Inclined Conveyor belts (A&B streams) and associated discharge chutes.
- Over-Silo 1- 5 conveyor belts (A&B streams) and associated on-loading and discharge chutes.
- Over-Silo 1- 6 Dust Extraction
- Silo 1- 6 and associated drainage and sumps up to and including South Settling ponds.
- Under-Silo Hopper 1- 6.
- Under-Silo Hopper Spile Bars 1- 6
- Unit Reclaim 1- 6 and associated discharge chutes.
- Unit 1 – 6 Hydraulic Power pack.
- Electromagnet Separator 1 – 6 and associated tramp bins.
- Unit Inclined conveyor belts 1 – 6 and associated on-loading and discharge chutes.
- Shuttle conveyor belt 1- 6 and associated discharge chutes.
- Shuttle Car 1 – 6.
- Vibro Chutes 1 – 6 and associated vibratory motors.
- Cross conveyors 1 – 6 and associated on-loading and discharge chutes.
- Bunker Feed Inclined 1- 6 (A & B streams) and associated on-loading and discharge chutes.

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- Bunker Distribution conveyors 1 – 6 (A, C, D & F) and associated on-loading and discharge chutes.
- Bunker Distribution chutes 1 – 6 (B & E)
- All chutes aforementioned, 2-way and 3-way chutes each have flopper gate and flopper driving actuator.
- All conveyor belts each have protection devices (blocked chute detectors, belt rip sensors, belt speed sensors,
- Conveyor gantry / cladding houses.
- All Holdback devices on all Inclined conveyor belts.

### **3.1 Need Statement**

Intensive and reliable plant maintenance is the key need for the Terrace Coal Handling Plant in compliance and adherence to the existing PM orders and as and when requested by the *Services / Contracts Manager* (MMCP senior supervisor) to execute any non-documented maintenance duties associated to the Terrace CHP. These non-documented maintenance duties include but not limited to:-

- Belt scraper maintenance (cleaning, replacement, adjustment and repairs).
- Belt component maintenance (replacement of ploughs, skirting, idlers, flopper gates, flopper actuators, bearings, couplings, greasing, oiling, installation of brackets for scrapers, replacement of grease nipples and chute deflector (impact) plates.).
- Power tool belt maintenance activities (grinding, welding, cutting)
- Bolt Torque maintenance (torqueing Vibro motors, Gearboxes and Electrical motors). The contractor to provide its own torqueing tools and to be permanently on site during the duration of the contract.
- Manual maintenance services (rolling up and unrolling of conveyor belts during conveyor belt replacement. This includes the manual conveyance of conveyor belt to and from the plant area, and the manual transportation of working tools and spares to and from the plant.

#### **N.B.:**

- The contractor shall provide its own standard tools and toolbox for each artisan and must be easily identifiable and be safely kept on site for the duration of the contract.
- The contractor will be required to undergo Eskom required PSR training which will be provided by Eskom.

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## **4. Scope**

The scope of work entails the terrace CHP inspections and subsequent recording of all defects on a daily basis. The *contractor shall* maintain the defect record list for the period of the contract and track the similar failure defects. The contract shall provide Eskom *Contract / Services Manager* with the weekly report of all reported defects and inspection conducted. The *contractor* will be provided with the template of the report upon the commencement of the *contract* to which the Eskom *Contracts / Services Manager shall* influence in agreement with the *contractor* for it to be validated and authenticated.

All plant at the plants under CSY and Terrace CHP are available for operation at all times (24/7), except for maintenance when one line at a time will be standing as scheduled to carry out either scheduled or emergency maintenance.

The following are typical, but not limit to, the inspections required per the inspection check sheet, maintenance strategy and philosophy provided by the employer:

### **4.1 Facilities**

This section covers the buildings and structures utilised by the *Employer* and the *Contractor* at the In Tutuka:

The following buildings and structures form part of the scope of the *works*, to be maintained by the *Contractor*:

### **4.2 Buildings**

In the CSY and Terrace CHP:-

Mechanical:

- Drive and transfer houses.
- Conveyor structures and cladding
- Hydraulic power pack house.
- Workshop (CSY Workshop and facilities, MMCP, MBBS, + Offices)
- Silo House.

Electrical:

- Workshop (MEBN, MEOE + Offices)

Control & Instrumentation:

- Workshop (MIOP+ Offices)

Civil:

- Workshop (MCIV + Offices)

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The *Contractor* ensures that;

- Inspects on a monthly basis, all structures under *contractor's* control to determine the condition and corrective action to be taken and performs all wear and tear related maintenance.
- Reports major structural faults to the *Contractor / Services Manager* who determines further action.
- All crawl beams on the plant to inspect and load test once a year by the *Employers* sub-contractor.
- All cat walks and cat-ladders to be inspect and repaired
- All roofs and gutters are cleared of debris, annually.
- All walls and ceilings are repaired and painted, when necessary.
- Structures are cleaned, repaired and painted to the color coding of the *Employer*.
- All the statutory tests are carried out.

#### **4.3 Structure and infra-structure maintenance**

The *Contractor*

- Drive and transfer houses
- Conveyor structures and cladding (Cladding done by Thermal)
- Workshop (MMCP , MMWS, MBBS, MEBN, MEOE, MCIV + Offices)
- All drainage systems.
- All dirty water settling sumps and silt ponds.

#### **4.4 Electrical and Instrumentation Maintenance**

The *Contractor* provides the electrical maintenance, repairs and inspections in accordance with the details and inspection frequencies indicated below, including that which the *Contractor* stipulates in his Works Information. This will be executed in conjunction with the Eskom Electrical Maintenance assigned officials on electrical related activities and with the Eskom Control & Instrumentation Maintenance officials for control and instrumentation related activities.

All safety circuits e.g. hooters, trip wires, under-speed switches, detrain switches, block chute detectors, emergency stops, local stops, take-up car limits and hydraulic coupling limit switches are operated and inspected for correct operation by the *Contractor*, at least once a month.

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## **Motors**

The *Contractor* inspects and ensures that motors:

- Are kept clean and free from any coal spillage and dust, at all times;
- Are not to run if wet, and
- Are not submerged in mud or coal slurry.

In the event of any of the above happening, the motor is thoroughly cleaned, dried out and serviced, before being made operational and Eskom Electrical Maintenance officials to be informed of the situation before it could be attended to;

The *Contractor* inspects and records motor parameters during weekly inspections.

In addition, the *Contractor* ensures that:

- Monthly tests are carried out to monitor electrical current and vibration levels; and
- The findings of the tests are documented to determine when the motor must be serviced, or overhauled;
- Motors are not to run with abnormal vibrations; and
- In the event of abnormal vibrations being detected, the motor is rectified immediately;
- Motors are not to run when the cooling system is not in operation, or defective; and
- An abnormal rise in temperature is attended to;
- The thermal rating of the motor is not exceeded;
- Bearing temperatures to be monitored.

Motors are not started more than that specified by the manufacturer of the motor, within a given time frame.

## **Switchgear**

The *Contractor*

Inspects and maintains all switchgear in accordance with OEM specifications.

Monthly inspect the following:

- Inspect the general condition of the switch room to see that it is clean, dry and adequately heated and ventilated.
- Look for compound leaks, if compound filled cable boxes are fitted.
- Listen for any audible discharge.
- Note any unusual smell.

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Should anything be amiss, investigate the cause and correct it.

- Clean down the outside with cloth having no loose fibres or metallic thread
- Lubricate the visible mechanism parts with a light mineral oil.
- Remove and check all fuses
- Clean and examine the relays and protective equipment in accordance with the marks instruction.

Two yearly overhaul all switchgears according with OEM specification.

## **Power Supply**

The *Contractor* is responsible for the total Stockyard/ash conveyor electrical reticulation, excluding the 11kV incoming feeders from.

For 11kV conveyor board 1A, 1B, 2A, 2B and all sub stations on ash disposal maintenance, the *Contractor* is responsible for arranging the high voltage permits.

All the UPS on the plant to be service on a three monthly bases

The transformers are fed by an 11kV line from the New Denmark Mine and Tutuka Power Station grid, and reduced to 3,3kV, 400 & 380V from the transformers.

Power supplies to all connections as above are:

- Kept free of dust; and
- Cleaned.

## **Junction boxes**

The *Contractor* inspects and ensures that:

- All junction boxes are kept closed at all times;
- Junction boxes are cleaned weekly;
- The hinges and locking devices are maintained and if found defective, repaired immediately.

## **Lighting**

The *Contractor*:

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- Replaces defective lights on a daily basis;
- Keeps continuity when replacing lights using the same type throughout the plant;
- Verifies and maintains the OHSA required light intensity (lux) per area every 6 months;
- Cleans all lighting boards;
- Cleans all light fittings and lenses.

### **Pull key and trip wire system**

The *Contractor* inspects and ensures weekly that:

- lids on switches remain on tightly;
- switches are sealed to prevent dust or water from entering the electronic circuits;
- pull key switches are mechanically and electrically in working condition; and
- Pull wires are well maintained and can move freely.

### **Rotating speed sensors/switches**

The *Contractor* inspects and ensures weekly that:

- The friction slots on the pickup wheels are clear of dust build up and debris, to ensure wheel traction on the belt at all times.

### **Belt alignment switches and Belt rip switches**

The *Contractor* inspects and ensures weekly the functionality of:

- Mechanical rollers
- Activating arms
- Spots on belts that can damage this equipment are immediately repaired.

### **Block chute detectors**

The *Contractor* inspects and ensures that:

- The sensors; and pickups are cleaned on a weekly basis to prevent trips of the belt; and that
- The functionality of the pick-ups and sensors are maintained at all times.

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### **Belt tension detector**

The *Contractor* inspects and ensures that:

- The belt tension detector is functional at all times and inspected weekly.
- The connector between the cell and the transmitter is dry and dust-free at all times; and
- An approved calibrating laboratory (for example, SA Scale) calibrates the load cell used to measure the tension of the belt;
- The test is conducted every 12 months;

### **Protections**

The following are examples of protections:

Alarm/hooters, trip wires, under-speed switches, detrain switches, block chute detectors, emergency stops, local stops, take-up car limits , hydraulic coupling limit switches and belt rip switches

In addition to the monthly test for correct operation, the *Contractor* inspects and ensures that:

- All above plant are operational at all times;
- Repaired immediately when defective;
- Cleaned;
- The status is recorded on a weekly basis.

All high voltage protection will be done by PTM.

### **Floppable Chutes (2-ways, 3-ways and Shuttle)**

The *Contractor* inspects and ensures that:

- Actuators are in good operational condition; and
- Actuator limits are operational and functional.

### **Conveyor belt scale**

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The *Contractor* inspects and ensures that:

- Scales are in good operational condition; and
- Scale readings are operational and functional.
- Weigh flask test on scales to be done two weekly.
- Yearly Weigh flask calibration on conveyor 11A&B.

### **Magnet conveyor system**

The *Contractor* inspects and ensures that:

- Magnet conveyor systems are in good operational condition at all times.
- Repair immediately when defective.

### **DB Boards**

The *Contractor* inspects and ensures that:

- All DB Boards are on list, operational and functional at all times.
- Repair immediately when defective.
- Carry out earth leakage test monthly on board and the status is recorded.
- All DB Boards must have COC certificates and copies display in the DB Board.

### **LV Equipment**

The *Contractor* inspects and ensures that:

- All LV Equipment is on list, operational and functional at all times.
- Repair immediately when defective.
- Do monthly inspection on all LV Equipment and the status is recorded.

### **Sub stations**

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The *Contractor* inspects and ensures weekly that:

- The areas are cleaned;
- Lights are maintained.

The *Contractor*, every 3 months, inspects and cleans vacuum breakers (11kV and 3,3kV breakers) and when doing so, obtains a permit to work and ensures that the vacuum breaker is racked out when the front panel is removed.

The *Contractor*:

- cleans the breaker motor;
- visually inspects for the appearance of moisture in the vacuum tubes; glossy silver colour for normal conditions and milky white or transparent colour indicating deterioration; and replaces it if defective;
- inspects all insulated parts for cracks;
- inspects current carrying components for corrosion and cleans if corroded;
- tightens all connections and bolts;
- inspects mechanism for free moving parts;
- inspects and cleans auxiliary contacts;
- inspects electrode for wear;
- inspects cable connections at back of panels for security;
- cleans panel, (excluding PLC panel);
- Visually inspects all contactors and relays for free movement.

## **Instrumentation**

The *Contractor* maintains all instrumentation, indicators, pressure switches, and flow switches on the plant.

## **Truck Weight bridge**

The *Contractor* inspects and ensures weekly that:

- Clean all panels
- Inspect cable connection at back of panels for security.
- inspects current carrying components for corrosion and cleans if corroded;
- Inspect and make sure all signal indications are working.
- Inspect UPS system

## **Batteries and UPS systems**

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The *Contractor* inspects and ensures Monthly that:

- Batteries are correct.
- Chargers are correct.
- The indications on the UPS are correct and working.

#### **Air conditioners**

The *Contractor* inspects and ensures Monthly that:

- Filters are clean.
- Gas pressure check.
- All repair on air conditioners

#### **Transformers**

The *Contractor* inspects and ensures Monthly that:

- Silica Gel
- Temperature

The *Contractor* inspects and ensures two yearly that:

- Condition of the insulation
- HV bushings
- Balance line connections
- Oil fill
- Valves
- Transformer venting
- Bucholz relay tests
- Temperature gauges
- Transformer earthing

The Contractor provides the routine maintenance and repairs

#### **4.5 Mechanical maintenance – Conveyor belts**

The *Contractor* provides the routine mechanical maintenance, repairs and inspections in accordance with the details and inspection frequencies indicated below.

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### **Gearboxes**

The *Contractor* inspects all gearboxes weekly for;

- Oil leaks
- Excessive operating temperature
- Loose bolts
- Vibrations
- Excessive noise
- Worn seals;
- Defective bearings; and
- Defective gears.
- Oil levels
- Breather condition

The *Contractor* performs condition monitoring of all gearboxes, performs fault diagnosis when Faults are detected; and tops-up oil, whenever necessary and do alignment.

### **Fluid Drive (Constant-Fill) Couplings**

The *Contractor* inspects weekly for:

- Uneven running due to damaged components
- Uneven running, due to alignment and bearings
- Oil levels of tank
- Tank breathers
- Inspect cooling system for any signs of oil leaks or coal build-up
- Oil leaks
- Inspect for coal build-up under the guard

The *Contractor* inspects monthly for:

- Removes covers and inspect for faulty couplings
- For non-functional fusible plugs, due to low oil level or overload.

The *Contractor*:

- Realigns where necessary; and
- Replaces bearings, where necessary.

### **Holdback Units**

The *Contractor* daily: Performs visual inspections

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- Inspects for oil leaks; and
- Visually inspects backstops and labyrinth seals for damages and or faults;

The *Contractor*, once a monthly:

- Replaces seals, where necessary;
- Does oil changes to the unit;
- Greasing of bearings

The *Contractor* monthly cleans internals with degreasing agent and inspects stop lugs for wear/damage. If lugs are damaged/worn, replace with new. (Never use grease for internal lubrication of backstops.)

### **Conveyor Idlers**

The *Contractor* daily inspects for:

- Bearing noise
- Worn shells
- Worn end caps and spindles
- Broken bases
- Material build-up
- Clean dirty areas
- Replaces worn or defective idlers

Idler frames are stencil marked by the *Contractor* for unique identification for idler replacement purposes.

### **Wire Ropes**

The *Contractor*, every two weeks:

- Inspects monthly for fibre damage and corrosion.
- Cleans and grease.
- Replaces elongated or worn rope, when the diameter of the rope is reduced by 6%.

### **Pulleys**

The *Contractor*, twice a month, inspects for:

- Noisy bearings or bearings running at high temperature.
- Coal build-up on pulley

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The *Contractor*:

- Replaces worn bearings, faulty seals and replaces pulley if necessary.
- If the lagging is damaged it needs to be replaced. Lagging is done by a separate contractor appointed by the *Contracts / Service Manager*. The *Contractor* prepares the pulley for lagging replacement.

The *Contractor* lubricates all bearings in accordance with the accepted planned maintenance schedule.

### **Routine Belt Maintenance**

The *Contractor* visually inspects all conveyor belts weekly.

The following faults need special attention;

- Belt misalignment: In such event the *Contractor* immediately trains the belt.
- Splice separation: In such event the *Contractor* immediately adjusts the scraper or repairs the splice. If splices start to pull apart, the complete splice must be replaced.
- Other belt damage. The root cause needs to be determined before additional belt damage occurs.

Belt Scanning - Non-destructive testing needs to be done yearly on all the steel cord belts. The *Contractor* requests the tests that will be done by a separate contractor appointed by the *Contracts / Services Manager*. The *Contractor* will request the recommended repairs to be done after the report was received and evaluated.

### **Belt Splicing**

All conveyor belt splices are done by a separate contractor appointed by the *Contracts / Services Manager*.

All conveyor belt splicing is subject to accepted industry standards, the standard and procedure employed being subject to acceptance by the *Contracts / Services Manager*.

The *Contractor* will carry out all the preparation work until the correct position and length is available for splicing. The *Contractor* will carry out quality control on the agreed format. Each splice will be marked with a unique number which will be used for reference in the Splicing Register kept and maintained by the *Contractor*. The *Contractor* provides the format of the register for acceptance by the *Contracts / Services Manager*.

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Damaged splices need to be cut out and kept for analysis purposes. Damaged or cut out conveyor belt pieces must be removed by the *Contractor* and taken to the *Employer's* facility for scrap conveyor belt.

## **Scrapers**

The *Contractor* inspects weekly for improper belt cleaning by scrapers.

In such an event the *Contractor*:

- Immediately replaces the blade when worn/damaged;
- Adjusts blade tension.
- Ensures when tensioning the scraper that damage to conveyor belt is avoided.

## **Rubber skirting**

The *Contractor* inspects weekly for material build up and gaps.

In such an event the *Contractor*:

- Adjusts skirting to prevent spillages or replace damaged skirting rubbers.

## **Chutes**

The *Contractor* inspects on a weekly basis:

- For coal build-ups.
- Inspects chute liners / tiles for wear and erosion and repairs if necessary.
- Inspects for missing liner / tiles fastener caps and replaces if necessary.
- Unblocks chutes and clears all blockages and coal/ash build-ups.
- Inspect the sump at the MTH, pump empty and dredge the settled coal slimes.

## **Counter Weight (Tension Station)**

The *Contractor* inspects on a daily basis for failures;

- Cleaning around the take-up area

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The *Contractor* inspects on a weekly basis for failures;

- Coal build up along the take-up cart
- Cables for any damage
- Take-up cart movement. Inspect wheels
- Inspect brake drum system

In such an event the Contractor: The *Contractor* repairs any failures.

- The sheave wheels are greased fortnightly.

The *Contractor* inspects on a monthly basis for failures;

- Grease all the bearings on the take up trolley

### **Pulley nip guards**

The *Contractor* inspects on a weekly basis:

- That all nip guards are in position and clearly marked.
- The guard condition - repaired when loose or broken.
- That all guards are properly secured and that guards comply with legal requirements.

### **Coal feeders within CSY and CHP**

The *Contractor* inspects on a weekly basis:

- All components on coal feeders including grey feeders, buffalo feeders and any other additional feeders that may be installed in the plant for coal supply
- Conducts routine greasing and belt or chain tensioning on the feeder equipment and/or alert the *Employer* of critical condition that may require appointed third party contractor and/or OEM for the affected plant
- Performs condition monitoring on feeder equipment such as chain measurements and belt conditions unless otherwise instructed by the *Employer*
- Ensures plant cleaning activities are raised accordingly to ensure optimum plant operation by raising notifications for relevant appointed parties to attend.

### **Coal sampling plant**

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The *Contractor* inspects on a weekly basis:

- Conduct routine inspections and required PMs on coal sampling plant ensuring its availability and operability
- Conduct necessary repairs to ensure compliance with the sampling standard

The *Contractor* inspects on an annual basis:

- Prepare the plant for the required annual Bias Test as and when required by the *Employer*
- Avail required resources for the sample collection, labeling and packaging as directed by the senior Metallurgist Engineer provided and/or appointed by the *Employer*
- Transport and deliver the collected samples to an appointed authorized coal lab for analysis appointed on request for the *Employer* or by the *Employer*

### **Terrace CHP conveyor belt and drive house cladding**

The *Contractor* inspects on a weekly basis:

- All the cladding and see-through plates. The *Contractor* arrange for repairs by a separate contractor appointed by the *Contracts / Services Manager*.
- All maintenance activities on above mentioned equipment available in the CHP i.e. gearboxes, pulleys, tension weight or take ups e.t.c

Cladding is removed to do maintenance work on plant areas, which are difficult to access, and is replaced immediately after completion of the work. This is done by the separate contractor appointed by the *Contracts / Services Manager* (This excludes the dog sheeting).

### **Hydraulic Power Packs**

The *Contractor* inspects on a weekly basis:

- Conduct weekly inspections on all hydraulic pipes and connections to ensure no leaks occur
- Perform all required PMs for the allocated plant for mechanical scope

### **Walkways**

The *Contractor inspects on a weekly basis:*

- All walkways, platforms and handrails. Repairs must be done immediately.

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- All drip trays to be inspected and repaired or replaced when necessary.

### **Safety signs**

The *Contractor*:

- Ensures that all safety loading signs and general safety signs are visible and clean at all times,
- Ensures that the “NO UNAUTHORISED ENTRY” signs at drive houses are displayed at all doors, and
- Repaints or refits signs whenever damaged or faded.

### **Cleaning**

The contractor inspects daily the spillages on the plant and attends to them immediately:

- The cleanliness under the belts
- The cleanliness at the yard conveyor sump area
- The cleanliness at the MTH and the sump
- The cleanliness at the sample plant
- The cleanliness on all the V-ploughs at the tail end of the belts.

### **Access Control**

The *Contractor*:

- Ensures that all the main doors at the bottom and the top levels of drive houses are always closed and kept locked when no work is in progress;
- Ensures that duplicate keys are available in the control room at all times.

### **Magnet Conveyor system**

The *Contractor*:

Ensures that all magnet conveyor systems are operational and functional at all times.

The *Contractor* inspects all magnet conveyor systems weekly for;

- Belt alignment
- Gearbox oil leaks

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- Plummer block and bearing
- Conveyor belt and clips and replaces:
- Retrain the belt.
- Replace worn seals
- Replace of damaged plumber blocks and bearings.
- Replace damaged belt or clips.

Any repairs, scarper cleaning and adjustments, idlers' replacements, skirtings' replacements, plumber blocks greasing, pulley laggings replacements, belt replacement etc should be planned with the relevant Production Manager.

#### **4.6 Rigging Equipment**

The *Contractor*:

- Ensure that all rigging equipment are operational and functional at all times.
- Do monthly inspection on all lifting equipment.
- Yearly load test on all lifting equipment will be done by a separate contractor appointed by the *Contracts / Services Manager*.
- Repair all defective equipment.

#### **4.7 Drainage systems:**

The contractor will do the following 3 monthly inspections:

- Inspect and clean drains (open and underground drainage systems)
- Open drains from MTH to Steinmuller Dam to be dredged and cleaned once per year.
- Open drains from Silo Sumps to Ash and Coal Settling Ponds (South Settling Ponds) to be dredged and cleaned once per year.
- Drainage along the Silo Inclined 6A&B conveyor belts to be dredged and cleaned once per year, including dredging underneath the overland portion of these conveyor belts.

### **5. Quality Control**

The contractor shall prepare a method statement for each and every to be executed and quality control document which are required to be sent for approval before any work can be executed. The *Eskom Contract / Services Manager* of the area shall give a good ahead for any repair and installation that will be required.

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All conveyor belt splicing *shall* have quality control plan and be inspected by *Eskom Contract Supervisor* to ensure the quality work of the splice. The bolts and nuts *shall* always meet the design specification. If the *contractor* is not sure about the specification, he/she should consult with the *Eskom Engineer* of the area. All splicing of the belt *shall* require the splicing procedure and quality control plan to be sent for Eskom review and approval.

All welding repairs and structural repairs must be done in accordance to Eskom latest version of welding rule book and *shall* be signed of by the *Welding Coordinator* or the *Structural Engineer*. All design standards must be adhered to and Welding Procedure Specification (WPS) must be approved. Welding Procedure Specification (WPS) must be supported by welding qualification records and welder's qualifications.

The *Maintenance* shall include as a minimum the following activities and interventions:

- Approval of Method Statement and quality control plan – hold point for relevant plant Engineer (s).

### **5.1 Procedures, Guidelines & Other Documents**

- Quality Control Plan.
- Method Statement.
- Splicing procedure submitted by the contractor.

## **6. General**

The *contractor* must have enough artisans and labourers to maintain the inside and outside running plant.

The *contractor* is also responsible for the general site cleaning and workshop cleaning.

The *contractor* must have at least eight responsible persons who can take out plant isolation permits and he/she must supply sufficient manpower for standby purposes. The working hours during plant breakdowns must not exceed the hours as specified by law. The *contractor* must be able to replace tired workers. There should be sufficient personal that the *Contractor* can work at four places at the same time. Each team needs to work independently from other teams by have its own responsible person and artisans. The artisan of each team will communicate among the different teams and with operating and to his/her supervisors with two-way radios. The *contractor* should have two supervisors.

The *contractor* is responsible to dispose scrap metal in the correct bins and the spares and tools have to be safe keeping in the stores in a neatly manner.

The contractor personal has to be transported in buses with safety belts and the *contractor* may not transport his personal behind bakkies (LDV).

The *contractor* must perform tool box meeting every morning before any work can start and the contractor must also inspect the tools for safe usage.

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The *contractor* is to perform a risk assessment before any task is performed and he/she is to refer to the attached "Safety and health & environmental requirements for contractors" to insure safe working environment.

The *contractor* is responsible for lifting slings and chain blocks inspection. All lifting equipment must be inspected by Eskom and the contractor is responsible to take it to the riggers' work shop for testing and inspection.

In case for replacements of any gearbox, pulley and fluid drive, the *contractor* must take the defected gearbox, pulley or fluid drive to Eskom's Main Stores for repairs. All spares, including belts must be handled by the *contractor*. The contractor may use the crane with the operator and the tractor and trailer from Eskom. He/she has to make all the arrangements.

- Contractor to provide rigging equipment up to 15 Tons
- *Contractor* to provide Hydraulic bearing puller on an "as and when required" basis to perform work
- Alignment Technicians must be able to perform laser alignment and provide certificates after every alignment activity
- All work will be issued via SAP Maintenance system.
- The *Employer's* Lifesaving rules, Safety rules / procedures to be adhered to.
- Standby crew to attend to breakdowns on an "as and when required" basis.
- All Artisans to be authorized in terms of Plant Safety Regulations (PSR) within 6 months after the contract has been awarded.
- The *Contractor* must provide Quality Control Plan documents for approval by *Service Manager* prior to performing any activity.
- The *Contractor* to provide proof of experience (CVs) and qualifications for all personnel.
- The Artisan must have a Red Seal qualification (section 28 will not be allowed)
- In the case of absence for more than two days (Sick or Annual Leave) a substitute must available to maintain the plant.
- In the case where one or more employees of the *Contractor* are requested to leave site for other reasons than Annual leave or negotiated leave with the *Service Manager*, The personnel must be replaced immediately with the same skill level, qualifications and experience
- Rigging tools and electrical equipment to be inspected regularly and filed as per the OHSACT requirement.
- All PPE to be provided by *Contractor*.
- Good housekeeping at all times. The *Contractor* must clean and remove all debris after completing a task.
- All communications must be printed and filed on *Service Manager's* file.
- Timesheets to be logged and signed by Contract / Services *Manager* and *Contractor*.
- Daily attendance register must be submitted on a daily basis to the Contract Supervisor
- *Contractor's Site Manager* to provide weekly plant status report
- Provide SANS approved Safety harnesses as per the Safety Requirements of the *Employer*.
- Yearly induction must be attended all personnel.

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- Workshop portable tools to be provided by the *Contractor*.
- *Contractor* to provide QCP's and programme
- Safety Officer to provide monthly safety report

## **7. Man power:**

- 1 x Site Manager
- 2 x Supervisors,
- 1 x Safety Officer,
- 1 x Instrument Technician
- 2 x Instrument Mechanician
- 1 x Electrical Technician
- 2 x Electricians
- 15 x Artisans qualified Fitters, Each artisan with PSR. (belt training, bearings, hydraulics, 5 ton rigging, belt scrapers, gearboxes, couplings, fluid couplings, idlers, stacker/spreader, chain and belt feeders, etc
- 2 x Riggers with a red seal,
- 15 x Semi-skilled,
- 12 x Assistants,
- 1 x Boiler maker
- 1 x Welder
- 1x Planner and/or Expediter

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## **8 Tools and equipment:**

- Eskom Standard Complete tool box set per artisan. Refer to artisan toolbox list.
- Torque wrenches
- Hydraulic pullers , 50 tons and 100 tons
- Hydraulic power pack with four 100 ton jacks
- Jacks, 25 mm, 50 mm, 100 mm, 200mm and 300 mm
- 2 x Mobile Welders on trailers set.
- Generator 220/380V , 60 A
- 4 x 200 Watts Spot lights on stands
- 15 ton crane to handle heavy equipment.
- 4 – ton truck to transport any equipment on site.
- 2 x trailers for idler handling
- 4 x belt stands, two 10 tons and two 4 tons
- Angle grinders.
- Laser Alignment equipment and clock gauges for conveyor drives alignments. (Prufteknik)
- Two way radios with batteries and chargers.
- 2 x Long feeler gauges, 729865 B for pulley bearings
- 2 x HN 4-16 Hook spanner adjustable for pulley bearings
- 2 x TMFN 23-30 Impact spanner for pulley bearings
- 2 x TMFN 30-40 Impact spanner for pulley bearings
- 2 x TMFN 40-52 Impact spanner for pulley bearings
- 2 x TMJL 100- Hydraulic pump 100 MPa for pulley bearings
- 2 x 7298619 E – Hydraulic pump 150 MPa for pulley bearings
- 2 x Copper hammer, THO527 – 0160 – 25 mm for pulley bearings
- 2 x Copper hammers, THO527 – 0161 – 32 mm for pulley bearings
- 2 x Lock spanner set, TMHN 7 for pulley bearings
- 2 x Hydraulic nut, HVM 34E for pulley bearings
- 2 x Hydraulic nut, HVM 36E for pulley bearings
- 2 x Hydraulic nut, HVM 38E for pulley bearings
- 2 x Hydraulic nut, HVM 44E for pulley bearings
- 2 x Hydraulic nut, HVM 48E for pulley bearings
- 2 x Hydraulic nut, HVM 52E for pulley bearings

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- 2 x Axial lock nut socket, TMFS 11 for pulley bearings
- 2 x Axial lock nut socket, TMFS 16 for pulley bearings
- 2 x Axial lock nut socket, TMFS 17 for pulley bearings
- 2 x Axial lock nut socket, TMFS 20 for pulley bearings
- 750 kg chain blocks per artisan.
- 2 x Mobile cutting torch trailers with spare wheels and fire extinguishers.
- Belt clamps. 4 x 750 mm, 4 x 1200, 4 x 1800.
- HDPE class 16 pipe welding machines, from OD 63 to OD 355.

### **9 Price list:**

<b>Item</b>	<b>Description per Unit</b>	<b>Unit</b>	<b>Expected Quantity</b>	<b>Rate</b>	<b>Price</b>
<b>1</b>	<b>Monthly fixed cost</b>	/ month	96 months		
	1 x Site Manager	Hr			
	2 x Site Supervisors	Hr			
	1 x Safety Officer	Hr			
	1 x Technician Electrical	Hr			
	1 x Technician Instrumentation	Hr			
	2 x Electricians	Hr			
	2 x Instrument Mechanician	Hr			
	15 x Qualified Fitters	Hr			
	1 x Riggers	Hr			
	15 x Semi-skilled	Hr			
	12 x Assistants	Hr			
	1 x Boiler maker	Hr			
	1 x Welder	Hr			
	1x Planner and/or Expediter	Hr			
<b>2</b>	<b>Saturday/Sunday/PH Overtime</b>				
	Site Supervisor	Hr			

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	Safety Officer	Hr			
	2 x Fitter	Hr			
	Mechanician	Hr			
	2 x Semi- skilled	Hr			
	Assistant	Hr			
	Electrician				
<b>3</b>	<b>Standby allowance for 1 team</b>	/week			
	a) Fitters 1 Off				
	b) Electrician 1 off				
	c) Mechanician 1 off				
	d) Technician 1off				
	e) Semi –skilled 1 Off				
	f) Supervisor 1 Off				
	g) Assistant 1 Off				
<b>4</b>	Site establishment	Sum	1		
<b>5</b>	Artisans tool box sets	Sum	8		
<b>6</b>	Other tools and equipment as per section 8.	Sum	1		
<b>7</b>	Site de-establishment	Sum	1		
<b>8</b>	Compilation of safety file + Safety induction	Sum	1		
<b>9</b>	Personal transport	Sum	96 months		
<b>10</b>	Cable Jointing	EA	120		
<b>11</b>	Laser Alignment team	EA	144		

- Accommodation and traveling will be included in hourly rates.
- Total cost breakdown must be submitted by the *Contractor*
- In the case where the *Contractor's* site has already been developed no Site establishment will be applicable

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**ARTISAN TOOLKIT - MECHANICAL:**

QTY	DESCRIPTION	SIZE	MAKE	PRICE
1	TOOLBOX	5 TIER	AUDELL	
1	PADLOCK	50MM	VIRO	
1	IMPERIAL ALLEN KEYS	1/16" – ½ "	FUHR	
1	METRIC ALLEN KEYS	1,5 – 12MM	FUHR	
1	HAMMER (BALL POINT)	300G	LASHER	
1	HAMMER (BALL POINT)	900G	LASHER	
1	SHIFTING SPANNER	300MM	GEDORE	
1	SHIFTING SPANNER	150MM	GEDORE	
1	DIVIDER	150MM (50/6)	GROZ	
1	FEELER GAUGE	26 BLADE	BOKER	
1	CENTER PUNCH		GEDORE	
1	STEEL RULE	300MM	S/STEEL	
1	STEEL RULE	150MM	S/STEEL	
1	HACKSAW FRAME	300MM	ECLIPSE	
1	TIN SNIPS	250MM	WISS	
1	VICE GRIP	137/250MM	GEDORE	
1	WATER PUMP PLIERS	145/250MM	GEDORE	
1	ENGINEERS INSULATED PLIERS	200MM	MTS	
1	FLAT BASTARD FILE	250MM	PFERD	
1	FLAT 2 <sup>ND</sup> CUT FILE	250MM		
1	FLAT SMOOTH FILE	250MM		
1	FLAT 2 <sup>ND</sup> CUT FILE	200MM		
1	FLAT SMOOTH FILE	200MM		
1	FLAT 2 <sup>ND</sup> CUT FILE	150MM		
1	FLAT SMOOTH FILE	150MM		
1	BOBBEJAAN SPANNER	350MM	GEDORE	
1	CHISEL FLAT	16 X 150MM	MITCO	
1	TAPE MEASURE	5M	STANLEY	
1	SCRIBER	150MM	GROZ	

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8	FILE HANDLES (PLASTIC)		PFERD	
1	PAINT BRUSH	25MM		
1	SOFT FACE HAMMER (NYLON)	40MM	WERA	
1	COMBINATION SPANNER SET	6 – 32MM (18)	GEDORE	
1	ENGINEER SQUARE	100MM	GROZ	
1	PIPE WRENCH	227/350MM	GEDORE	
1	INSULATED ENGINEERS PLIER	200MM	MTS	
1	BLACKTIP SCREWDRIVER SET	6 PIECE	WERA	
1	VERNIER 530-102	200MM	MITUTOYO	
1	MICROMETER	0-25MM	MITUTOYO	
1	SCREW CUTTING GAUGE		GROZ	
1	SCREW PITCH GAUGE		GERMAN	
1	RADIUS GAUGE	26M	M&W	
1	HAMMER	4LB	LASHER	
1	DRIVE C19 TMZ SOCKET SET	½"	GEDORE	
1	TOMMY BAR	450MM	AFTOOL	
	OTHER TOOLS & EQUIPMENT: Refer to section 8 to see the other tools and equipment list.			

Notes: Each artisan to have his own toolbox as per tool list above.

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## **8. Acceptance**

This document has been seen and accepted by:

<b>Name</b>	<b>Designation</b>
Monyane Mokoena	Tutuka Auxiliary Engineering Manager
Ntombifuthi Ngcobo	Tutuka Engineering Manager
Egard Janse Van Rensburg	Tutuka Senior Engineer
Rhulani Lowani	Tutuka Mechanical Maintenance Manager
Hanerike Koekemoer	Tutuka System Engineer

## **9. Revisions**

<b>Date</b>	<b>Rev.</b>	<b>Compiler</b>	<b>Remarks</b>
April 2021	0.1	H Koekemoer	Initial scope for 5 years
May 2022	1.0	D. Matjipa	Edited scope for 8 years

## **10. Development Team**

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

- Hanerike Koekemoer
- Dipolelo Matjipa

## **11. Acknowledgements**

- N/A

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