Eskom	Scope of Work	Kusile Power Station

Title: **Kusile Power Station for Additional Mass Meters Scope of Works**

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Content Page

Figures

Introduction

The Kusile Power Station site is located approximately 37km northwest of eMalahleni in the Mpumalanga Province. The site is accessed from the R686 road between highways, N4 and N12. Kusile Power Station is a coal fired power station that consists of six (6) power generating units each with a design capacity of 800 MW. The coal used at Kusile Power Station is supplied by neighbouring mines via trucks and by means of a mine conveyor belt. The coal is conveyed to the mill bunkers by means of conveyor belt systems.

Coal as a fuel source for power generation is supplied to Eskom from neighbouring mines. The coal qualities and quantities are stipulated in the coal supply contracts and must always be verified before payments for the coal are made. The coal qualities are verified by means of taking coal samples for testing to a laboratory that is accredited by the South African National Accreditation System (SANAS). The Coal quantities are verified by making use of truck Weighbridges that are calibrated and certified by SANAS accredited service provider. Every truck consignment delivered to Kusile Power Station is weighed at the mine weighbridges and again weighed at the power station weighbridges Within Kusile Power station.

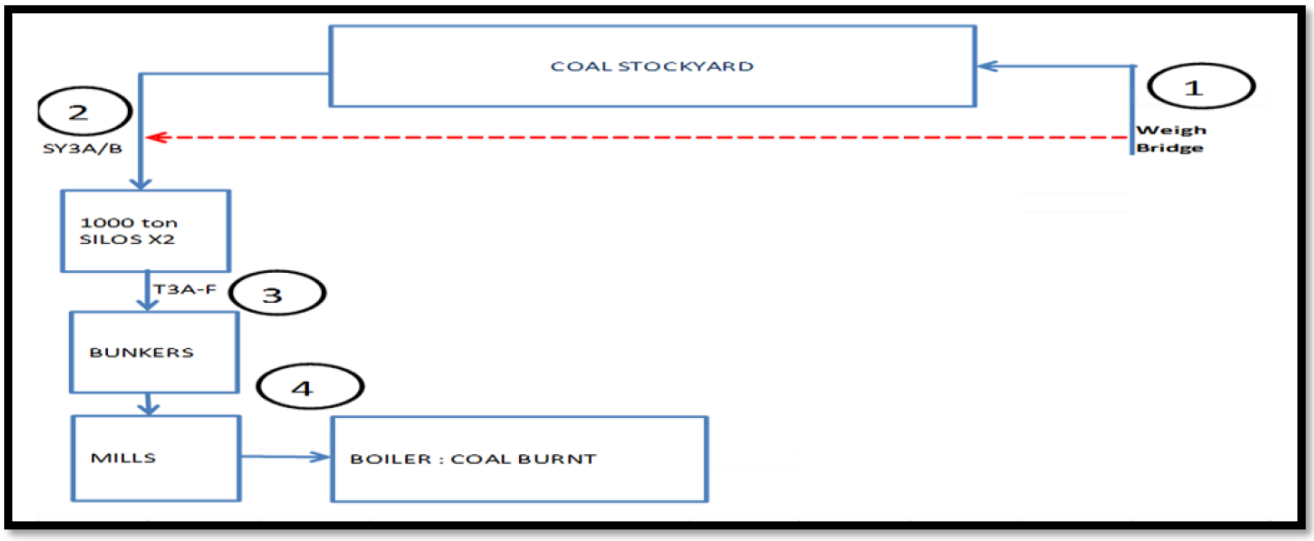

Figure 1: Kusile Power Station Coal Accounting Flow Diagram

The Coal delivered to Kusile Power Station is either stockpiled or sent to the live pile areas to be fed immediately into the bunkers. There is necessity to verify the difference between the coal burned in the boiler and coal delivered to Kusile Power Station, this process is called coal accounting and is done means of using mass meters installed in the coal conveyors, these mass meters are termed measuring points and usually up to three (3) in number. The Kusile Power Station measuring points are at the stockyard weighbridges, Link conveyors SY3s, incline conveyors T3s and the Secondary Conveyors T5s and T6s. Figure 1 above shows the Flow Diagram of the coal accounting process. There is a requirement to install additional mass meters on some of the conveyor belt system for the purpose of Coal accounting verifications.

2. Supporting Clauses

2.1 Scope

The scope of the document covers the Employer's requirements for the installation of additional mass meters at Kusile Power Station.

2.1.1 Purpose

The purpose of this document is to clearly define the scope of work for the installation of additional mass meters at Kusile Power Station.

2.1.2 Applicability

This document is applicable to Kusile Power Station only.

2.1.3 Effective date

This document will be effective from the date of its authorisation.

2.2 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

[1] ISO 9001 Quality Management Systems

[2] 36-681 Generation Plant Safety Regulations

[3] 32-727 SHEQ Policy

[4] 240-84513751: Material Specification and Certification Guideline for Power Generation Plant

[5] 240-54820279: Receive Materials Work Instruction

2.2.2 Informative

[1] 240-55864434 Storage and Handling of Conveyor Belting in Eskom Guideline

[2] 240-55864503 Belt Conveyor Mechanical Components Standard

[3] 240-55864504 Belt Conveyor Structural Steelwork and Welding Standard

[4] 240-55864505 Erection of Belt Conveyor Mechanical Standard

[5] 240-106628253 Standard for Welding Requirements on Eskom Plant

[6] 366-31570 Kusile Power Station Corrosion Protection Specification

Not applicable

2.3 Definitions

Definition	Explanation
Cataloguing	A process of describing goods, works or services in a standardised manner and assigning a unique number, description and classification to specific items. It is also known as codification. Cataloguing is based on the principles of “Fit”, “Form” and “Function”, which are used to describe a specific item. Cataloguing makes no reference to any specific brand.
Contract	An agreement duly entered between a properly authorised person, acting on behalf of Eskom and a third party, setting out the rights and obligations of the parties. Within Eskom, a properly compiled and lawfully established contract consists of documentation signed by the contracting Parties on the terms as approved by the DAA or its delegate. The contract documentation references or contains the applicable conditions of contract, which are usually standard and, amongst other elements, provides for communication requirements, steps to follow for certain circumstances and defines other rights, obligations, and risks of the parties. It also comprises documents to define the scope clearly (to the detail available at the time the contract comes into existence) and/or how it will be provided later, which typically includes specifications, drawings, and constraints. The pricing data, the data of the contract provided by the Parties (which may include additional pricing information such as fee percentages and rates applicable for Compensation Events / Claims / Variation Orders), clauses additional to the standard conditions of contract selected or to modify parts of it, written information relevant and available concerning the site or affected area, and other parts contained or referenced in the contract, also form part of the contract.
Contractor	Service provider contracted to provide a specific spares & documentation to Kusile Power Station. Referred to as the Supplier on this document.
Contracts Manager	This person is an employee of Eskom and is the DCF Holder, who is trained and has appropriate skill, knowledge and (if required) professional registration, and who is appointed in writing to ensure delivery of the contractually specified goods, services and/or works and that the contract is managed and administered on behalf of Eskom in terms of the contract itself and applicable law. This person is appointed by way of and in terms of a DCF, which is issued for each contract following approval by the relevant DAA or its delegate at the award of a contract and signed by the Contract Signatory. Where the DCF Holder is not the Eskom Agent, the DCF Holder should regularly ensure that the Eskom Agent reports, consults, and confirms decisions with the DCF Holder.
Original Equipment Manufacturer (OEM)	The entity that is the original manufacturer of goods or products or parts of a product.
Procurement	Procurement is the process whereby goods, works or services are acquired.
Procurement Practitioner	An employee within P&SCM appointed to execute functions related to the procurement of goods, works, and services on behalf of an end user. As used in this Procedure, a Procurement Practitioner includes both an Accredited Procurement Practitioner and a non-accredited Procurement Practitioner except that any adjudication function may only be performed by an Accredited Procurement Practitioner and the Procedure must be so interpreted.
Supplier	A provider, or potential provider, of goods, works or services to Eskom

2.4 Abbreviations

Abbreviation	Explanation
ISO	International Organisation for Standardisation
KPI	Key Performance Indicator
OEM	Original Equipment Manufacturer
OHS	Occupational Health & Safety
PSR	Plant Safety Regulations
SHEQ	Safety, Health, Environmental & Quality
SOW	Scope Of Work

2.5 Roles and Responsibilities

2.5.1 Contractor

a) The Contractor to procure, supply, deliver to site, install and commission additional mass meters.

b) The Contractor to procure, supply, deliver and pull and terminate mass meters power supply cables.

c) The Contractor to procure, supply, deliver and pull and terminate mass meters power control and communication cables.

d) The Contractor to conduct works on a plant availability basis as the works are to be conducted on an operational plant.

2.5.2 Employer

a) The Employer is to provide construction power connection points that are within a reasonable proximity to the work areas.

b) The Employer is to provide the services of a responsible persons for permit applications on behalf of the appointed Contractor.

2.6 Process for Monitoring

This document is governed and monitored by 32-1034, Eskom Procurement and Supply Chain Management Procedure.

2.7 Related/Supporting Documents

Not Applicable

3. Additional Mass Meter Scope of work

This document clearly defines the scope of works for the Additional Mass Meters project. The scope of works is multidisciplinary in nature as it entails the mechanical sections which are the idler frames, the idlers and the weighbridge structures. The Control and instrumentation sections entails the integrators, speed switches control and communication cables and lastly the electrical scope that covers the power supply cabling.

3.1 Mechanical Scope of works

The scope of works is to procure, supply, deliver to site, install and commission a mass meter/weighbridge structure on the each of the following conveyors belt system in the table below. The mechanical scope entails drilling, mounting of all weighbridge/mass meter components.

Table 1: List of belts for installation of Mass Meters

Belt name	Idler frame Troughing angle	Idler set spacing	Belt Width	Idler series	Belt Speed	Belt Inclination angle
CAC 1	45°	1500mm	1200mm	Series 25 @ 127	2m/s	9°
CAC 2						
CAC 3						
CAC 4						
CAC 5						
CAC 6						
T1A	45°	1500mm	1800mm	Series 30 @152	3.35m/s	0°
T1B						
SY3A	45°	1500mm	1800mm	Series 30@152	3.9m/s	6°
SY3B						
CVY2	45	1500mm	900mm	Series 25 @ 127	2.2m/s	6°
GYC1A	45	1500mm	900mm	Series 25 @ 127	2.2m/s	4°
GYC1B	45	1500mm	900mm	Series 25 @ 127	2.2m/s	4°

3.2 Electrical Scope of works

The Electrical scope of works entails procurement, supply, delivery to site and installation/pulling and termination of power supply cabling from the identified distribution board to the mass meter/weighbridge power units and other support instruments for all the conveyors listed below.

Table 2:

Belt Name	Voltage	Absorbed power	Cable Size (mm^2)	Estimated Cable Length	Power supplied from
SY3A	230VAC	15W	4	80m	0 1BLP07 GP001 (LDB-TH07)
SY3B	230VAC	15W	4	80m	0 1BLP07 GP001 (LDB-TH7)
T1A	230VAC	15W	4	50m	0 2BLP01 GP001 (LDB-S1T)
T1B	230VAC	15W	4	50m	0 2BLP01 GP001 (LDB-S1T)
CAC 1	230VAC	15W	4	80m	1 0BLP01 GP001 (LDB-TH01)
CAC 2	230VAC	15W	4	80m	2 0BLP01 GP001 (LDB-TH02)
CAC 3	230VAC	15W	4	80m	3 0BLP01 GP001 (LDB-TH03)
CAC 4	230VAC	15W	4	80m	4 0BLP01 GP001 (LDB-TH04)
CAC 5	230VAC	15W	4	80m	5 0BLP01 GP001 (LDB-TH05)
CAC 6	230VAC	15W	4	80m	6 0BLP01 GP001 (LDB-TH06)
CVY2	230VAC	15W	4	50m	0 4BLP03 GP001 (Limestone LDB)
GYC 1A	230VAC	15W	4	130m	0 4BLP04 GP001 (GYC LDB)
GYC 1B	230VAC	15W	4	130m	0 4BLP04 GP001 (GYC LDB)

3.3 Control and Instrumentation scope of works

The control and instrumentation scopes of works entails procurement, supply, delivery to site, installation of cabling to support all the newly installed mass meters listed in Table 1 above.

Component	Description	Quantity	Cable Type	Cable Length	Connection Point
Load cells	Measure the weight of material on the conveyor belt	2	Shielded twisted pair cable (4-20 mA or mV signal	50m to 100m (depending on the site layout)	Connect to Integrator's load cell input terminals
Speed Sensor	Measures the speed of the conveyor belt	1	Shielded twisted pair cable (Pulse signal)	50m to 100m (depending on the site layout)	Connect to Integrator's speed sensor input terminals
Integrator	Processes signals from load cells and speed sensor to calculate mass flow rate	1	Shielded twisted pair cable or RS-485 (if digital)	Located near the conveyor belt	Connect to DCS directly from the integrator
Power Supply (Integrator)	Provides power to the integrator and connected devices	1	Power Cable (230 V AC/ 24V DC)	<50m from nearest power distribution panel	Connect to integrator power input terminals
Signal Output (Integrator to DCS)	Transmits processed mass flow rate data to DCS	1	Shielded twisted pair or Ethernet cable (4-20mA, Modbus, Profibus, etc.)	50m to 100m (depending on the site layout)	Connect to DCS input terminal via I/O cards or direct connection
Totaliser pulse output (Integrator to DCS)	Transmit integrator totaliser pulse	1	24V	50m to 100m (depending on the site layout)	Connect to DCS input terminal via I/O cards or direct connection
Grounding and shielding	Ensures signal integrity and reduces noise	1	Grounding cable (Green/Yellow)	Varies by installation	Connected to all shielded cables and integrator chassis
Field Junction Box (Optional)	Intermediate point for cable termination	1	Junction box rated for industrial requirements	Varies by installation	Used if cable lengths exceed standard runs; may also house terminal blocks for ease of connection

Key considerations

- Cable length: Cable length should not exceed the maximum limits specified by the equipment manufacturer, especially for analogue signals like 4-20 mA, to avoid signal degradation. If distance exceed these, signal repeaters or junction box may be needed.
- Shielding: Proper cable shielding and grounding are critical to minimize electromagnetic interference, which can affect measurement accuracy.
- Redundancy: Redundant paths should be considered for critical signals (e.g., dual load cell signals) if reliability is a concern.
- Environmental Protection: Cables that are suitable for the environmental conditions (temperature, moisture, dust, etc.) of the installation site should be used.
- Calibration and Testing: Proper calibration of load cells and speed sensors after installation to verify accuracy.

The table below provides a comprehensive overview of the instrumentation requirements for the whole additional mass meter project, detailing required load cells, speed sensors, integrators and cabling length:

Belt Name	Load Cells	Speed Sensors	Integrators	Cable Length (Signal Output)
CAC 1	2	1	1	~1000m
CAC2	2	1	1	
CAC3	2	1	1	
CAC4	2	1	1	
CAC5	2	1	1	
CAC 1	2	1	1	
T1A	2	1	1	
T1B	2	1	1	
SY3A	2	1	1	
SY3B	2	1	1	
CVY2	2	1	1	
GYC1A	2	1	1	
GYC1B	2	1	1	

3.4 Description of the works

Kusile Power Station intends to install and commission additional Mass Meters on the Coal Handling Plant, Mixed Ash Handling Plant and Limestone Handling Plant.

3.4.1 Documentation

Prepare a Databook to document all the additional mass meter works from procurement of mass meters to execution of works. The data book must entail the following information.

a. Fabrication drawings and offsite QCPs
b. Onsite delivery QCPs
c. Mass meter data sheets.
d. Installation Method statement and Risk Assessment
e. Onsite installation QCPs
f. Commissioning procedures and check sheets
g. Project acceptance certificates

3.5 Material Fabrication

The offsite material fabrication processes and fabrication workshop must be ISO 9001:2015 compliant.

3.6 Site Establishment

The Employer is to allocate an area within the power station for the Contractor to establish site. The established site must comply with the General Safety Regulations as stipulated in the Occupational Safety Act of 1993.

3.7 Material Delivery to site

All materials delivered top site for the purpose of works execution must be quality checked offsite, and quality checked upon delivery to Kusile Power Station by the Eskom Quality personnel.

3.8 Consumables Required

The Supplier Contractor supply his own consumables to satisfy the requirements for scope.

4. Acceptance

This document has been seen and accepted by:

Note: Initials not acceptable

Full Name and Surname	Designation
	Maintenance Manager
	Senior Advisor
	Senior Engineer
	Senior Supervisor
	System Engineer
	C&I Engineer
	Electrical Engineer

5. Revisions

Date	Rev.	Compiler	Remarks
February 2025	1		Scope of works for Additional Mass Meters

6. Development Team

Not applicable

7. Acknowledgements

Not applicable

Appendix A – Eskom Document Hierarchy

Drawings

Conveyor belt name	Drawing No	Revision
T1A & T1B	0.90/38479	15
SY3A & SY3B	0.90/38342	12
GYC1A & GYC1B	0.90/39143	9
CAC1-CAC6	0.90/39081	5