Eskom	Specification	Medupi Power Station

Title: **Medupi Power Station Performance and Testing Service Contract Scope of Work**

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1. Introduction

Medupi Power Station URS indicates that the plant must be able to achieve 92% availability, 6% planned unavailability and 2% unplanned unavailability. This can only be achieved by doing the correct maintenance at the correct time as per Medupi Power Station Plant Maintenance Strategy.

When boiler, turbine, auxiliary performance is poor, the station thermal efficiency performance (STEP) is non optimal. The non-optimal STEP will compromise plant's performance, reliability and environmental control.

Medupi plant performance, reliability and environmental control should be monitored by conducting plant performance tests in order to determine if the plant is performing according to the specification.

This document is developed to ensure that there is a contract in place for conducting plant performance tests which are required on the units.

Benefits of monitoring and perform plant performance tests:

- Maximize plant efficiency and Performance
- Minimize operating costs by identifying any shortfalls in the efficiency and providing recommendations for recovery and performance improvements
- Early indication of incorrect plant parameters
- Early indication of malfunctioning plant instruments

2. Supporting Clauses

2.1 Scope

The Scope covers all handheld performance and testing activities to be performed at Medupi plant systems, including Boiler plant, Turbine plant and Auxiliary plant.

2.1.1 Routine services

To provide plant performance, monitoring and analysis at Medupi Power Station as specified below. The services is to be provided as per SAP PM and SAP CM for the following required services:

1. PF Sampling and analysis
2. Secondary Air Duct Ash Loading Measurements
3. Fuel Oil Carry Over Test During a Cold Unit Start Up
4. Duct Traversing/Verification for Flue Gas, Air, Pressure, Temperature, Flow and Velocity
5. Air Heater Leakage test
6. Mill load line test
7. Venturi meter verification (k-factor)
8. Clean air curve test
9. Primary airflow tests.

10. Tramp air inspection.
11. Raw Coal sampling.
12. Ash sampling.
13. CEMS verification.
14. Damper stroke checking.
15. Thickness testing.
16. High and low-pressure heater performance tests.
17. Helium detection test.
18. Flow measurements and Pump performance.
19. Mill internal inspection.
20. Performance and report analysis.
21. Cegrit sampler maintenance and calibration.
22. Dew point temperature verifications.
23. Demin water consumption test
24. Vacuum decay test.
25. Temperature verifications.
26. Hydrogen sniffing.
27. Be able to execute any other P&T related activity.

2.1.2 Outage Services

2.1.2.1 Pre-Outage test (3 months prior to start of Outage)

1. Tramp Air inspection (Sealing Trough, doors etc.).
2. Air heater leakage.
3. Vacuum decay test.
4. Demin Water Make-up consumption.
5. O2 Analyser verification.
6. Hogging and Holding ejector leak test

2.1.2.2 Outage Inspections during Outage

Note: Additional resources should be made available during Outages to cater for the additional workload during outages; this will allow routine testing to continue un-interrupted

1. Mill internal inspection (Including classifier).
2. Primary air (cold and hot) damper stroking and verification.
3. Combustion air damper stroking and verification.

4. Air heater inspection –outage.
5. PF burner Inspection, verification of burner swirl position.
6. Primary/secondary air/flue gas ducts inspection.
7. PA, FD and ID fans inspection and stroke checking.
8. PJFF plant inspection.
9. Heaters-tube plates/internals inspection.

2.1.2.3 Post-Outage test

1. Air heater leakage.
2. Vacuum decay test.
3. Demin water make-up consumption.
4. O2 Analyser verification.
5. Economiser cold air velocity test (post outage).
6. Hogging and Holding ejector leak test.

2.1.3 Purpose

The purpose of this document is to outline the works information, the technical requirements, and all the contract and safety requirements for Medupi Power Station Performance and Testing Service Tests.

The proposed contract must support the station to achieve zero Environmental and Safety contraventions.

It is therefore imperative that the successful and suitably qualified Contractor aligns his/her organisation fully to these specified scope activities and processes laid down in this document as well as relevant and recognised international, national and Employer's standards and policies.

2.1.4 Applicability

This document shall apply to Medupi Power Station.

2.1.5 Effective date

This document shall be effective from the date of 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] Occupational Health and Safety Act no. 85 of 1993

[3] GGR 0992 Eskom Plant Safety Regulations

[4] 240-62196227 Eskom Lifesaving Rules

[5] 240-44175132 PPE Specification

[6] 32-520 Occupational Health and Safety Risk Assessment Procedure

[7] 32-477 SHE Training and Development

[8] 32-95 Environmental, Occupational Health and Safety Incident Management Procedure

2.2.2 Informative

[9] 240-87694581 Performance Testing Air Preheaters Standard

[10] 240-101280501 Standard for Unit Outage Inspection to be Conducted by Performance and Test

[11] 240-85498379 Medupi Power Station Milling Plant Maintenance Strategy

[12] 240-88579890 Medupi Power Station Gas Air Heater and Steam Air Heater Maintenance Strategy

[13] 240-88147045 Medupi Power Station Feed Water and High Pressure Heating System Maintenance Strategy

[14] 474-12255 Process Engineering (Coal) Group Technology Strategic Report 2020

2.3 Definitions

2.3.1 Terms:

Terms	Definitions
Availability	Operable and committable state of the system.
Contractor	A company that undertakes a contract to provide materials or labour to perform a service or do a job.
PF Sampling	Isokinetic extraction of a pulverized fuel sampling from a coal pipe.
Planned unavailability	All the planned maintenance outages/shutdowns for plant maintenance purposes.
Unplanned unavailability	All the unplanned plant shutdowns or trips/load losses.

2.4 Abbreviations

Abbreviation	Explanation
LAR	Limited Access Register
N/A	Not Applicable
OHS	Occupational Health and Safety
OPS	Operating
P&T	Performance & Testing

Abbreviation	Explanation
SAP PM	Systems Application Planned Maintenance
SAP CM	Systems Application Corrective Maintenance
PPE	Personal Protective Equipment
PTW	Permit to Work
PF	Pulverized Fuel
RWM	Routine Works Management
SANAS	South African National Accreditation System
SOW	Scope of Work
URS	User Requirement Specification

2.5 Roles and Responsibilities

Department/Responsible Persons	Responsibilities
Contractor	To perform combustion tests as per SOW. To send the detailed reports to the Employer.
Operating	Shall grant LAR.
P&T	Ensuring that all the tests are conducted as per SOW.
Risk Department	Responsible for ensuring compliance to the Eskom Health and Safety Standards.
RWM	Creating task orders, planning and scheduling SAP PMs.
System Engineer	Record keeping of all the reports received from P&T and to review maintenance strategy.

2.6 Process for Monitoring

SAP PM will be used as a process for monitoring.

2.7 Related/Supporting Documents

Not Applicable

3. Document Content

3.1 Works Information

a) The Contractor shall provide a detailed report and performance analysis after conducting a test.

Test	Area	Frequency
PF Sampling	U1 to U6	3 Monthly, pre-post mill services

Fuel Oil Carry Over	U1 to U6	On request
Secondary Air Duct Ash Loading	U1 to U6	On request
Flue Gas Traversing (Oxygen)	U1 to U6	Weekly
Air Heater Leakage	U1 to U6	3 Monthly, 3 months prior to outage
Total Combustion Air Flow Test	U1 to U6	3 Monthly
Mill load line test	U1 to U6	On request
Venturimeter verification (k-factor)	U1 to U6	On request, MGO, GO
Clean air curve test	U1 to U6	On request
Primary airflow test	U1 to U6	On request
Tramp air inspection	U1 to U6	6 Monthly, 3 months prior to outage
Raw Coal sampling	U1 to U6	On request
Ash sampling	U1 to U6	Weekly
CEMS verification	U1-U6	Bi-weekly
Damper stroking	U1 to U6	On request, Outage
Thickness testing	U1 to U6	On request
High- and low-pressure heater performance tests	U1 to U6	6 Monthly
Helium sniffing test	U1 to U6	On request
Flow measurements	U1 to U6	On request
Mill internal inspection	U1 to U6	Outage
Mill reject rate	U1 to U6	3 Monthly
PF burner inspection	U1 to U6	Outage
Airheater inspection	U1 to U6	Outage
PJFF plant inspection	U1 to U6	Outage

Primary/secondary air/flue gas ducts	U1 to U6	Outage
Economiser cold air velocity test	U1 to U6	2Y post Outage
Temperature verifications	U1 to U6	On request
Demin water consumption test	U1 to U6	1 Monthly
Vacuum decay test	U1 to U6	1 Monthly
Pump performances	U1 to U6	1 Yearly

b) The Contractor shall perform any other legitimate activities as required on Boiler, Turbine and Auxiliary.

3.2 Deliverables

3.2.1 Performance and Testing Activities

P&T tests shall be done as per the scope of work, changes to the SOW will made as and when required and between the Service Manager and the Contractor.

3.3 Service and Standards

The Contractor shall perform all services necessary to ensure that the plant is monitored, or tests are performed in accordance with agreed standards and procedures. The integrity of plant data shall continuously be checked and confirmed against history and any applicable standards.

3.4 Standby

The contractor will be expected to be on standby and work over weekends when required. Work over weekends will be attended as planned or call outs. Call outs and any other work performed outside normal working hours will be charged to the Employer as a rate as detailed in the price list.

3.5 Contract Requirements

i. The contracting company shall provide 8 Mechanical Technicians.
ii. The contracting company shall provide one (1) Mechanical Supervisor.
iii. The contracting company shall provide its own transport.
iv. The contracting company shall provide its own PPE.
v. The contracting company shall provide its own testing equipment.
vi. The Contractor shall provide adequate skilled personnel for the job execution.

vii. The Contractor shall compile a detailed report on the works completed and it must be submitted electronically within seven days from the date of completion to the Employer. The report shall contain the following:

a) Date and time of the test

b) Name of the test conducted

c) Tests results (Reports shall be made available no later than one week after testing)

d) Comments/Recommendation

e) Conclusion

3.6 Safety Requirements

a) The Contractor shall comply with Eskom Occupational Health and Safety, Environmental, Risk and Quality requirements, standards and policies.

b) The Contractor shall ensure compliance to all Eskom mandatory standards and statutory requirements.

c) The Contractor shall ensure that they use correct PPE (safety goggles, safety gloves, overalls, reflective vest, dust masks, earplugs, hardhat, safety boots) at all times.

d) The Contractor shall provide valid medical certificates.

e) The Employer shall submit the test request to Ops 24 hours before the Contractor conducts a test.

f) The Employer shall ensure that a plant in operation PTW is in place prior commencement of work.

g) The Contractor shall ensure that induction is done prior to commencement of work.

h) The Contractor shall obtain LAR and conduct risk assessment prior to commencement of work.

i) All safety regulations pertaining to the process shall be adhered to and the contracting company shall also ensure that it sends its safety file for approval with all the required documentation as per safety file checklist to Risk Department.

j) The Contractor shall have a safety file with all the required documents as per Eskom Safety file checklist.

k) The Contractor shall ensure that the vehicle to be used on site conforms to Eskom safety standards.

4. Acceptance

This document has been seen and accepted by:

Name	Designation
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5. Revisions

Date	Rev.	Compiler	Remarks
March 2025	3	VD Muthaphuli	Third issue
February 2020	2	M Mohlomi	Second issue
June 2017	1	BS Mdaki	Document is compiled to provide works information for combustion tests

6. Development Team

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

- Vhaafana Muthaphuli
- Zanele Ngubeni

7. Acknowledgements

Not applicable