	<b>Specification</b>	<b>Medupi Power Station</b>
---	----------------------	-----------------------------

Title: **Medupi Power Station Continuous Emissions Monitoring System Correlation and Parallel Test Specification**

Document Identifier: **240-119985018**

Alternative Reference Number:

Area of Applicability: **Medupi Power Station**




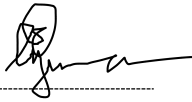
Functional Area: **Performance & Testing**

Revision: **3**

Total Pages: **10**

Next Review Date: **N/A**

Disclosure Classification: **Controlled Disclosure**

Compiled by	Supported by	Functional Responsibility	Authorized by
			pp 
<b>M Mohlomi</b> <b>Senior Technician Engineering</b>	<b>PM Langa</b> <b>System Engineer</b>	<b>TT Mukenga</b> <b>P&amp;T Manager</b>	<b>JC Mkhathshwa</b> <b>Engineering Group Manager</b>
Date: 2022-07-24	Date: 2022/07/25	Date: 2022/07/26	Date: 2022/07/27

<b>Content</b>	<b>Page</b>
1. Introduction.....	3
2. Supporting Clauses .....	3
2.1 Scope.....	3
2.1.2 Purpose.....	3
2.1.3 Applicability .....	3
2.1.4 Effective date.....	4
2.2 Normative/Informative References .....	4
2.2.2 Normative.....	4
2.2.3 Informative.....	4
2.3 Definitions .....	4
2.4 Abbreviations .....	5
2.5 Roles and Responsibilities .....	6
2.6 Process for Monitoring.....	6
2.7 Related/Supporting Documents .....	6
3. Works Information .....	6
3.1 Description of the Works .....	6
3.2 Technical Specifications .....	7
3.3 Drawings .....	8
3.4 SHERQ Requirements .....	8
3.5 General Requirements .....	9
4. Acceptance.....	9
5. Revisions.....	10
6. Development Team .....	10
7. Acknowledgements .....	10

**CONTROLLED DISCLOSURE**

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

## **1. Introduction**

Medupi Power Station has installed an Automated Measuring System (AMS) on the multi-flue stack for the monitoring of particulate and gaseous emissions in order to comply with the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).

Each unit of Medupi Power Station is equipped with particulate abatement technology. Medupi uses pulse jet fabric filters (PJFFs) to remove particulates from the flue gas. The flue gas desulphurisation plant will later be retrofitted with an aim of bringing the emissions to a minimum.

Emission monitors are the cornerstone of Eskom's emission management system. They provide vital data, which informs the formulation of environmental policy and compliance to relevant standards and monitoring requirements.

## **2. Supporting Clauses**

### **2.1 Scope**

The Scope of this document is to provide the objective and details scope of work breakdown for continuous emissions monitoring correlations (dust monitoring systems) and parallel (gaseous monitoring systems) tests. In addition to the former, the document provides information on various aspects such as time, cost, quality and SHEQ requirements which must be considered when conducting work is limited to the Medupi Power Station.

#### **2.1.2 Purpose**

The purpose of this document is to define the functional and technical requirements for the particulate emissions monitor correlation tests, gaseous monitor parallel tests and isokinetic and emissions measurement on the auxiliary boiler to be performed at Medupi Power Station by SANAS accredited suppliers. The tests are done in order to ensure compliance to legal and other requirements.

#### **2.1.3 Applicability**

This document shall apply to all persons performing the emissions testing tests at all Units (including the auxiliary boilers) at the Medupi Power Station. It is also applicable to all employees and contractors at Medupi Power Station who are tasked with the responsibility of performing the activities.

### **CONTROLLED DISCLOSURE**

#### **2.1.4 Effective date**

The effective date is the date of contract placement.

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

The following documents contain provisions that, through reference in the text, constitute requirements of this document. At the time of publication, the editions indicated were valid. These documents are subject to revision and users are responsible to ensure that the most recent editions of the documents listed below are used / referenced.

#### **2.2.2 Normative**

- [1] ISO 9001 Quality Management Systems
- [2] Eskom Air Quality Strategy (32-1143)
- [3] Eskom Plant Safety Regulations (PSR) - GGR 0992.
- [4] Occupational Health and Safety Act No. 83 of 1993.
- [5] 240-62196227 Eskom Lifesaving Rules
- [6] 32-520 Occupational Health and Safety Risk Assessment Procedure.
- [7] 32-95 Environmental, Occupational Health and Safety Incident Management Procedure.
- [8] Eskom Atmospheric Emission Management Policy (32-419)

#### **2.2.3 Informative**

- [1] The individual station specific Atmospheric Emissions Licence (AEL)
- [2] Eskom Standard for Emissions Monitoring and Reporting (240-56242363)
- [3] Continuous Emission Monitoring System Selection Specification (240-56242850)
- [4] Fabric Filter Plant Bag Specification (240-53113965)
- [5] Consistent Data Set for Eskom Generation Plant (36-623)

### **2.3 Definitions**

<b>Terms</b>	<b>Description</b>
Accuracy	Output credibility of a monitor
Availability	Operational capability of a monitor

#### **CONTROLLED DISCLOSURE**

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

<b>Terms</b>	<b>Description</b>
Continuous Emission Monitor	Continuous Emission Monitors refer to all equipment used in the measurement of flue gas constituent and parameters including particulate monitors, gaseous monitors and flue gas process monitors such as oxygen, velocity, temperature, pressure etc.
Dust Correlation	The process to correlate the particulate matter emissions concentration with the output of the dust monitor by means of isokinetic dust sampling.
Parallel Tests	The process to validate the gaseous emissions concentration with the output of the gaseous monitor by means of parallel sampling.

## **2.4 Abbreviations**

<b>Abbreviation</b>	<b>Explanation</b>
Am <sup>3</sup>	Actual Cubic Metres
Am <sup>3</sup> (w)	Actual Cubic Metres on a wet basis
AMS	Automatic Measurement System (i.e. permanently installed CEM)
°C	Degrees Celsius
CEM	Continuous Emissions Monitoring
Dp (dP)	Differential pressure
FD	Forced Draught
FFP	Fabric Filter Plant
HIRA	Hazard Identification and Risk Assessment
kPa	Kilo Pascal
LAR	Limited Access Register
l/min	Litre per minute
mg	Milligrams
Nm <sup>3</sup> (d)	Normal Cubic Metres on a dry basis
Nm <sup>3</sup> (w)	Normal Cubic Metres on a wet basis
OPCR	Outside Plant Control Room
PPE	Personal Protective Equipment
ppm	Parts per million
P&T	Performance & Testing
QAL	Quality Assurance Level
SRM	Standard Reference Method
UCR	Unit Control Room
VT	Verification Test

### **CONTROLLED DISCLOSURE**

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

## **2.5 Roles and Responsibilities**

<b>Roles</b>	<b>Responsibilities</b>
C&I Maintenance	To ensure that the monitors and field instruments are maintained and calibrated to yield required availability and accuracy
Performance and Testing Function	To fulfil the applicable duties regarding continuous emissions monitor correlation tests
Contractor	To fulfil the conditions of the continuous emissions monitor, correlation tests and the activities outlined therein

## **2.6 Process for Monitoring**

Not Applicable.

## **2.7 Related/Supporting Documents**

Not Applicable.

## **3. Works Information**

### **3.1 Description of the Works**

The scope of work is for the Continuous Emissions Monitoring System Correlation and Parallel Test at Medupi Power Station over a period of 5 years. The particulate emissions monitor full correlation test will be done on the CEMs analysers installed at 150 metre level of the smoke stack on a yearly basis. The parallel test for the gaseous will be done on a yearly basis. The tests will be performed at 180 metre level where three ports for testing are located. Additional particulates correlation test may also be done on request after the replacement of fabric filter bags or replacement of continuous emissions monitors. Provision for Dust Spot measurements and Gaseous Verification measurements will also be done on as needed basis.

The scope also covers emissions testing on the auxiliary boilers 1 – 3 for velocity, gas volume, pressure, temperature, moisture, particulate matter, sulphur dioxide, oxides of nitrogen, carbon monoxide, carbon dioxide and oxygen on a yearly basis.

### **CONTROLLED DISCLOSURE**

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

Test	Functional Location	Description	Quantity	Frequency
Full Correlation Test	60 HNE10 CQ006, 50 HNE10 CQ006, 40 HNE10 CQ006, 30 HNE10 CQ006, 20 HNE10 CQ006 and 10 HNE10 CQ003 Unit 1 – 6 Smoke stack	Full Correlation Test for dust monitors (Dust Meter)	6 Units	1 yearly
Parallel Tests	60 HNE10 CQ006, 50 HNE10 CQ006, 40 HNE10 CQ006, 30 HNE10 CQ006, 20 HNE10 CQ006 and 10 HNE10 CQ004 Unit 1 – 6 Smoke stack	Verification of the gaseous monitors (QAL2/3)	6 Units	1 yearly
Emissions Measurements	Aux boiler smoke stack	Traversing for velocity, gas volume, pressure, temperature, moisture, particulate matter, CO, SO <sub>2</sub> , NO, O <sub>2</sub>	3 Boilers	1 yearly
Spot Measurements	60 HNE10 CQ006, 50 HNE10 CQ006, 40 HNE10 CQ006, 30 HNE10 CQ006, 20 HNE10 CQ006 and 10 HNE10 CQ004 Unit 1 – 6 Smoke stack	Particulate Emission Monitors Correlation Spot Check	6 Units	On request
Spot Measurements	60 HNE10 CQ006, 50 HNE10 CQ006, 40 HNE10 CQ006, 30 HNE10 CQ006, 20 HNE10 CQ006 and 10 HNE10 CQ004 Unit 1 – 6 Smoke stack	Gaseous Emission Monitors Verification Check	6 Units	On request

### 3.2 Technical Specifications

- 1) The full dust correlation test and gaseous parallel will be done at 60, 80 and 100% boiler MCR.
- 2) Dust spot test and gaseous verification test will be done as a steady load condition.
- 3) The monitors will be properly calibrated by qualified personnel as close as possible to the commencement of the correlation tests.
- 4) The calibration certificate for equipment used to perform the correlation of the monitors to be handed over to Performance and Testing section before correlation can be executed.

#### CONTROLLED DISCLOSURE

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

- 5) The isokinetic measurements will be in accordance with an Eskom approved equivalent (VDI, EN or ISO Standards) as reference in the Emissions Monitoring and Reporting Standard and in compliance with the MES and AEL requirements. This requires the use of a calibrated gas meter, standard pitot tube, thermocouple instrumentation and simultaneous flow measurement and sampling.
- 6) The test includes a technical report. Supplier shall provide a technical report (within two weeks after the test) for every test (correlation/parallel/spot) conducted at no additional cost and this will include report rework due to data/faulty instruments (no charges for reporting).

### **3.3 Drawings**

- 1) 0.84/12002 – Steel stack. Rev AB
- 2) 0.84/8379– 220m triple flue chimney Units 4 – 6

### **3.4 SHERQ Requirements**

- 1) *Contractor* shall comply with the SHERQ requirements and shall comply with policies of Medupi Power Station and Eskom Holdings SOC limited.
- 2) The *Contractor* shall be required to conduct a comprehensive HIRA including the following;
  - Identifying reasonably foreseeable hazards that could give rise to the risk.
  - Eliminating the risk so far as is reasonably practicable.
  - If it is not reasonably practicable to eliminate the risk, minimise the risk so far as is reasonably practicable by implementing control measures in accordance with the hierarchy of controls.
  - Maintaining the implemented control measures so that they remain effective.
- 3) Reviewing, and if necessary revising risk control measures so as to maintain, so far as is reasonably practicable.
- 4) Induction programme must have been completed before work on site may commence.
- 5) Employees of the contracting company shall have a valid medical fitness certificate.
- 6) The *Contractor* shall issue PPE to his employees.
- 7) Fall protection plan shall be required from the *Contractor* if work is to be carried out on elevated levels.
- 8) The Principal *Contractor* shall ensure that his subcontractors have a health and safety file and that it must be accepted by the Principal *Contractor*.
- 9) The *Contractor* shall have emergency plan that will effectively deal with emergencies on site.

### **CONTROLLED DISCLOSURE**

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



### **3.5 General Requirements**

- 1) The *Contractor* will be required to fill in the limited access register at the UCR for unit 1 – 6 and OPCR for auxiliary boilers before commencing with the tests and the LAR issued to him/her must be returned upon completion of the day's work.
- 2) The contracting company is required to provide its own test equipment.
- 3) The contracting company shall carry a two way radio which is compatible with radios used at Medupi Power Station at all times.
- 4) The contracting company shall provide its own transport and ensure compliance to the Eskom vehicle policy.
- 5) The contracting company shall provide its own PPE before commencing any activity on site.

## **4. Acceptance**

This document has been seen and accepted by:

<b>Name</b>	<b>Designation</b>
Benji Rahlogo	Chief Engineer
Danny Phosa	Snr Technician P&T
Ebrahim Patel	Senior Engineering Consultant
Lerato Mashele	Senior Adviser P&T
Lerato Sehume	C&I Maintenance Manager
Lindi Vilakazi	Senior Emissions Scientist
Moyahabo Makgai	Snr Technician P&T
Nthabi Mashigo	C&I Engineering Manager
Petri De Kock	C&I System Engineer
Sithokozile Hlongwa	Boiler Engineering Manager
Tankiso Mpebe	C&I Maintenance Supervisor
Thys Britz	C&I Maintenance Supervisor
Zanele Ngubeni	Snr Technician P&T

### **CONTROLLED DISCLOSURE**

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

## **5. Revisions**

<b>Date</b>	<b>Rev.</b>	<b>Compiler</b>	<b>Remarks</b>
September 2018	1	KC Nchabeleng	Original document
October 2018	2	JS Mokwatlo	Transferred to the new template and added normative
October 2021	3	M Mohlomi	Third Review

## **6. Development Team**

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

- Danny Phosa

## **7. Acknowledgements**

Not Applicable

**CONTROLLED DISCLOSURE**

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