	Specification	Medupi Power Station
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Title: **Medupi Power Station In-situ
Machining & Restilliting of Valves
or any other Plant Components as
and when required during Outages**

Document Identifier: **240-151679516**

Alternative Reference Number: **N/A**

Area of Applicability: **Medupi Power Station**

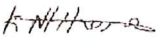
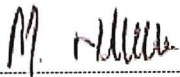
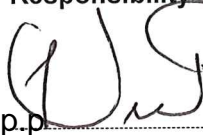
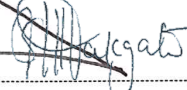
Functional Area: **Turbine and Boiler
Engineering**

Revision: **01**

Total Pages: **15**

Next Review Date: **25 February 2023**

Disclosure Classification: **Controlled Disclosure**

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1. Introduction

Medupi Power Station Management has taken a decision to outsource In-situ Machining & Restilliting of valves or any other plant components on as-and-when required to a suitably qualified, experienced and well established Contractor. This document describes the detail of the applicable plant areas, scope of work, standards, quality, requirements, specifications, terms & conditions as well as the criteria to qualify for the tender.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

The purpose of this document is to define the specified scope of work activity requirements for Medupi Power Station. The station is expected to perform at 92% UCF, 6% PCLF and 2% UCLF, and the specified In-situ machining & restilliting of valves or any plant components on as and when required during outage activities and management strategy efforts must support this requirement. 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.

2.1.2 Applicability

This document shall apply throughout Eskom Medupi Power Station for units on commercial operation.

2.1.3 Effective date

Document is effective upon authorization.

2.2 Normative/Informative References

2.2.1 Normative

- a) ISO 9001 Quality Management Systems
- b) OHSACT Occupational Health and Safety Act, 85 of 1993
- c) Occupational Health and Safety Act, 85 of 1993
- d) 36-681 Plant Safety Regulations
- e) 39-71 Quality control plan and contract quality control plan approval standard

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- f) 240-56241933 Control of plant construction repair and maintenance welding activities standard
- g) 240-77196678 Heat treatment of welded components standard
- h) 240-56247788 Weld defects classification and reporting standard

2.2.2 Informative

- a) 240-76667211 Outage Management Foreign Material Exclusion Standard
- b) 240-83539994 Standard for Non-Destructive Testing (NDT) on Eskom Plant

2.3 Definitions

- a) **Contractor:** Service provider contracted for supplying specific service to Eskom, Medupi Power Station
- b) **Employer:** Eskom, Medupi Power Station
- c) **Employer:** Representative: Any person appointed in writing by Employer as the delegated Employer representative in terms of the provisions.
- d) **Plant:** Any structure, machinery, apparatus or equipment which does not fall within the scope of the operating regulations for high voltage systems, and excludes, mobile, portable lifting equipment, domestic circuits' appliances and tools.
- e) **Outage:** An outage is a state of an item being unable to perform its required function. An outage can either be planned or unplanned.
- f) **Task Order:** is the Service Manager's instruction to carry out a Task against a contract
- g) **In-situ repair-**a statement associated with performing a machining or welding operation on a valve body or component that is still in line rather than in a shop

2.4 Abbreviations

Abbreviation	Description
OEM	Original Equipment Manufacturer
PCLF	Planned Capability Loss Factor
QCP	Quality Control Plan
SOW	Scope of Work
UCF	Unit Capability Factor
UCLF	Unplanned Capability Loss Factor
PSR	Plant Safety Regulations
QA	Quality assurance
QC	Quality Control
NDT	Non Destructive Testing
PCM	Process Control Manual
FFFR	Fossil Fuel Fired Regulation

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Abbreviation	Description
FME	Foreign Material Exclusion
KKS	Kraftwerks-Kennzeichen-System (Plant labelling)
IR	Interim Repairs
BTS	Boiler Tubes Survey
MGO	Mini General Overhaul
GO	General Overhaul
PQR	Procedure Quality Records
WPQR	Welding Procedure Quality Records
WPS	Welding Procedure Standard
ISO	International Standardisation Organisation
NRV	Non Return Valve

2.5 Roles and Responsibilities

2.5.1 The Employer

The responsibilities of the Employer include the following:

- a. Inform and issue the Contractor with the updated outage plan
- b. Ensure the SOW is issued to the Contractor in time to allow planning for the Outage
- c. Performance is measured by the Employer against those areas which contribute to the Employer's business as per the agreed contract clauses (e.g. Reliability, Availability, Environment, Quality, Safety, etc.).
- d. Areas of measurement include the Employer's key business indicators and will be redefined from time to time.
- e. Employer shall provide awareness training for PSR and any other training as deemed necessary by the Employer in line with the scope requirements.
- f. Employer to provide NDT to the Contractor where necessary.
- g. The Employer and Contractor in this SOW is committed towards the following:
 - i. Retention of critical skills
 - ii. Continuous cost reduction
 - iii. Health & Environment Safety
 - iv. Transfer of operational experience and skills

2.5.2 The Contractor

The responsibilities of the Contractor include the following:

- 1) Comply with the Employer's Environmental, Health and Safety standards, policies and procedures.

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- 2) The Contractor shall compile improvement programmes to enhance plant performance and achieve cost reductions and the Employer will approve such programmes.
- 3) The Contractor shall be responsible for all in-situ machining and stellite welding /build up repairs as per Employer's instructions, processes and systems.
- 4) The Contractor shall be responsible for the in-situ machining & restilliting of the valves (manual, pneumatic, hydraulic and motorised valves associated with this SOW or any other plant components.
- 5) The Contractor to ensure usage of FME process during repairs.
- 6) The Contractor must ensure that all spares preservation requirements are adhered to as per Employers requirements and procedures.
- 7) The Contractor shall be responsible for the inspection, of all structural and support steel work in this scope of work within their working boundaries. These areas include but not limited to:
 - a) Walkways
 - b) Grating
 - c) Handrails
 - d) Cat ladders
 - e) Hangers
 - f) Supports etc.
- 8) The following complementary services to improve Plant and labour performance can be defined as follows:
 - a) Project management
 - b) Value engineering
 - c) Procedure and documentation writing
 - d) Compile and improve task list's
 - e) Implement approved design and modification
 - f) Spares management
 - g) Technical advice
 - h) Operational and production process review
 - i) Asset management in accordance with ISO55001
 - j) Component failure analysis reporting

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- 9) The Contractor is to ensure that any service rendered does not interfere with the Employer's scheduled work and should align himself with the Employer's work control management process.
- 10) Should the Employer become aware of any changes to the activity schedule (programme of notifications), the Employer may issue the Contractor with a revised programme.
- 11) The contract entered into with the Contractor is non-exclusive and work against this contract can only be performed upon receipt of a task order.
- 12) All works will be subject to anytime inspection by the Employer.
- 13) The Contractor shall take cognisance of the fact that the contract start date can deviate.
- 14) The Contractor to provide resources required to execute this scope and any changes to the crew must be negotiated and agreed upon with the Employer.
- 15) This contract is for outage SOW and any other breakdowns that the Contractor will be required to perform within the scope boundaries of this contract.
- 16) Spillage is viewed to be very important for plant housekeeping and any spillage caused as a result of the Contractor shall be cleaned by the Contractor.
- 17) The Contractor shall ensure the integrity of plant labelling and that deficiency with regards to KKS labelling is reported immediately. All KKS removed during repairs to be put back in correct position.
- 18) The Contractor must ensure that they have Responsible Persons to take permits and supervise staff in terms of PSR for any work performed on plant. Technically qualified (above semi-skilled) Contractors personnel will be trained and authorised as Responsible Persons or Authorised Supervisors depending on the requirements.
- 19) The Contractor to provide equipment and tools required for the works.
- 20) The Contractor shall assist in the implementation, recommendations and corrective actions which are identified by the Medupi Power Station Condition monitoring programme
- 21) The Contractor shall implement a program for continuous improvement to optimise plant performance and reduce system and equipment failures.
- 22) The Contractor shall participate in improvement programs as stipulated by the employer.
- 23) The contractor shall produce a final report within 5 working days maximum after completion date per task order or any date agreed on as per Task Order
- 24) Contractor vehicles to comply with Eskom Vehicle Standards and Procedures.
- 25) During Outages it is expected that the contractor will provide on-site representation on a 24 hour basis, seven days a week if required. Shift times: 07h00 to 19h00, 19h00 to

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- 07h00 or whichever times that will be agreed between two parties. Workers registers must be kept and monthly manpower numbers must be submitted to the employer.
- 26) All additional personnel and scope of work to be clarified with the Employer prior to work being done.
- 27) If the contractor sub-contracts some of the activities this must be declared to the employer
- 28) Be in a position to make use of Primavera or any other project software for project tracking and reporting purposes as per mutually agreement between the Employer and the Contractor.
- 29) Will be required to comply with the Employers process control manuals (PCM) that outlines the outage processes.
- 30) The Contractor needs to make sure that all measurement are taken before and after machining.
- 31) PQR/WPQR and WPS to be in place before welding resumes and all welds to be done as per latest revision of the Eskom Weld Rule Book. This needs to be approved by the contractor's Welding Engineer, Eskom Welding Engineer & Eskom QC Inspector welding
- 32) The Contractor is responsible for manufacturing and supply of spares as per sample.

2.5.2.1 Re-commissioning

- a. All Plant equipment maintained shall be re-qualified as per any outage intervention.
- b. The Contractor shall be responsible or held liable for any defects arising from outage/operational faults after an intervention, provided that the equipment has been placed into service.

2.5.3 Management and Reporting

- a. The type of reports, level of detail and frequency of reporting will be mutually agreed by the Employer and the Contractor during the contract negotiation phase of this agreement. These may change from time to time on request by the Employer.
- b. The Contractor to be represented at all outage related meeting which may be daily, weekly or monthly.
- c. The Contractor to be represented at all Employer safety meetings and SHEQ contractor engagement forums.
- d. The Contractor to be represented at any ad-hoc meetings that may arise in order to address any outage planning, execution, finalisation or safety related matters.

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- e. Liaison meetings shall be held with the Employer's Representative or his/her delegate on as and when required basis to discuss any technical details, or concerns.

2.5.3.1 Contractor's Management, Meetings and Key People

- a. Before work starts on site, an inaugural meeting is held with the Contractor and the Employer, to explain in detail all requirements of the Site Regulations.
- b. The Contractor is issued with a file of current Site Regulations on arrival. The file remains the property of the Employer and the Contractor is responsible for its maintenance and updating to include new or revised regulations as issued by the Employer.
- c. The Contractor must ensure that all personnel operating mobile equipment and vehicles are authorised, this includes but not limited to:
 - i. Forklifts
 - ii. Mobile Cranes
 - iii. Cherry Pickers
 - iv. Sky Jacks
- d. The Contractor shall be responsible for the regular inspections and daily equipment checks of the mobile equipment and vehicles including record keeping while onsite.
- e. The Contractor must ensure that all personnel performing work on the plant are authorised, this includes but not limited to:
 - i. Confined space locations
 - ii. Working at heights
 - iii. Heat stress areas
 - iv. Scaffolding Compliance
 - v. Hazardous substances

Note: The contractor must ensure that gas monitors are available to be used for continuous gas monitoring in confined spaces.

2.5.3.2 Communication and Correspondence

- a. All correspondence must include the following information as a minimum:
 - i. Medupi Power Station
 - ii. Employer's Contract number
 - iii. Contract description
 - iv. Correspondence subject matter
 - v. Employer's name and contact details

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- vi. Contractor contact details
- vii. Date
- b. Where appropriate the correspondence includes the Employer's reference and is delivered as a single package or as per the agreed contract terms.
- c. All communications from the Contractor are numbered sequentially with a prefix as advised by the Employer. The Employer responds in like manner. The prefix and numbering system is decided upon at the Inaugural meeting.

2.5.4 Occupational Hygiene and Safety Requirements

- a. Applicable OHS requirements shall be stipulated in the SHE Specification issued for this scope of work.
- b. The contractor must prepare a scope specific SHE Plan in accordance with the SHE Specification.
- c. The contractor shall be responsible for own Occupational hygiene monitoring programme and this must be submitted together with the SHE Plan.
- d. Costing for the works must include Occupational hygiene and safety costs and these must be clearly listed/itemised.
- e. Proof of work force competency must be submitted with the SHE Plan .

2.5.5 Quality and Documentation Control

- a. Contractor shall comply to Eskom's Supplier Quality Management Specification 240-105658000.
- b. The Contractor to compile a specific outage quality management plan for specific SOW and will be approved by the Employer's delegated person, usually the System Engineer.
- c. The Contractor shall ensure that any witness, hold and inspection points are strictly adhered to.
- d. The Contractor to ensure that all measuring and test equipment is calibrated at all times & proof thereof must be readily available.
- e. All Quality References and Standards as stipulated in this document will be adhered to.
- f. The Contractor to comply with the Employer's quality documentation management system and processes.

2.5.6 Project Implementation

- a. The Contractor shall supply an outage execution plan per outage including at least the following in Primavera or any other project plan acceptable to the Employer:

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- i. Site establishment
- ii. Activities
- iii. Manpower plan (Resource loaded)
- iv. Organogram
- v. Skills required and associated cost per skill (e.g. artisan, site manager, etc.)

2.5.7 Manpower Requirements

- a. The number of personnel required to execute the works is to be proposed by the Contractor after his/her assessment of the scope of work and submitted to the Employer for approval.
- b. The successful Contractor shall utilise/provide skilled and suitably qualified staff with experience in the technical aspects of this SOW and supporting teams.
- c. Key staff brought onto site in connection with this work scope should be able to fluently speak, understand and write in English.
- d. Proof of qualification is to be supplied on request by the Employer for specific key resources i.e. Supervisors.
- e. The Contractor ensures that all staff being brought onto Medupi site has a valid fitness certificate based on the specified plant man-job specification.
- f. All supervisors must be trained in terms of technical skills as well as SHE legal liability and Supervisor course.
- g. Provide daily supervision of all related plant through trained and competent personnel to ensure that inspections & work activities are conducted daily during execution of the outage.

2.6 Process for Monitoring

Process will be agreed by both parties per Task Order and according to Outage process control manuals and the specific outage SOW.

3. Document Content

3.1 Works information

3.1.1 Outage Philosophy

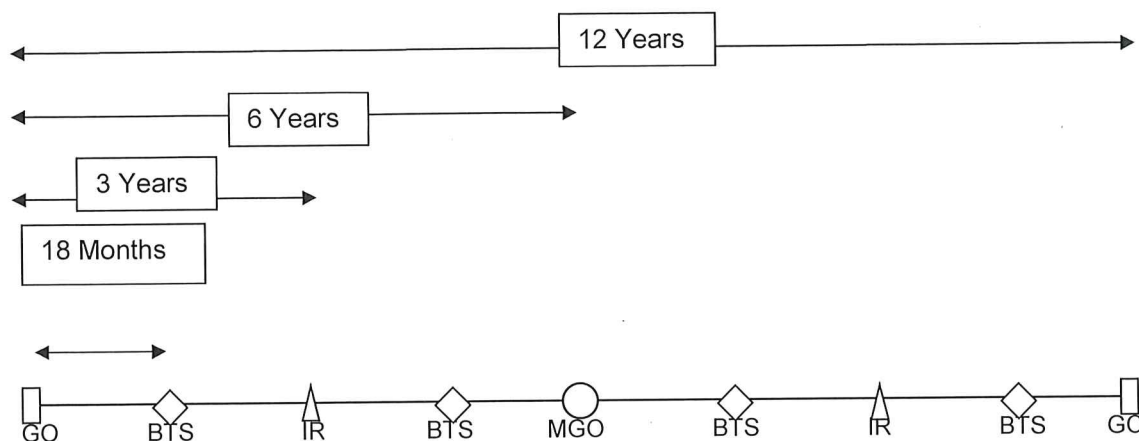
The scope of work is applicable to the In-situ machining & restilliting of valves or any plant components which may require in-situ repairs as and when required as per scope of work.

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The system is also aligned to Medupi Power Station Outage Philosophy depicted as follows and gets reviewed yearly.



Symbol	Outage Type	Interval Years	Interval Hours	Duration (days)	Main activities
	BTS	1,5	12 500	14	Boiler and Draught Group inspection Mill bin inspection Absorber, Inlet & Outlet Duct, Emergency Quenching Nozzles, Mist eliminators, Oxy-Blower and Reaction Tanks-Cleaning, Inspection and Refurbishment
	IR	3	25 000	35	Boiler and turbine auxiliaries inspection and repairs Absorber, Inlet & Outlet Duct, Emergency Quenching Nozzles, Mist eliminators, Oxy-Blower and Reaction Tanks-Cleaning, Inspection and Refurbishment
	MGO	6	50 000	42	LP cylinder overhaul Boiler statutory inspections Generator stator and rotor inspections Absorber, Inlet & Outlet Duct, Emergency Quenching Nozzles, Mist eliminators ,Oxy-Blower and Reaction Tanks-Cleaning, Inspection and Refurbishment
	GO	12	100 000	56	HP, IP and LP cylinder overhaul Absorber, Inlet & Outlet Duct, Emergency Quenching Nozzles, Mist eliminators,Oxy-Blower and Reaction Tanks-Cleaning, Inspection and Refurbishment

Figure 1: Medupi Outage Philosophy

3.1.2 Applicable S.O.W

The SOW for this contract is detailed as follows:

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- a. The work will include all planned outages and unplanned outages as per scope of work.
- b. Detailed SOW for In-situ machining & restilliting of valves or any plant components which may require in-situ repairs as and when required during Outages
- c. Failure Mode which might results to in-situ machining repairs are but not limited to:
Steam cut, pitting, scoring, skimming pinhole, surface cracks and etc.

Works Information

The following are the minimum activities expected to be carried out by the Contractor, and the final scope of work after inspection will be agreed with the System Engineer.

- a) In-situ Machining activities to be performed but not limited to are : line boring, flange facing, milling, drilling ,valve re-seating ,honing and core-drilling on the valves to prevent cut outs when repairs can be done with in situ machining.
- b) Provide the necessary resources and machines to execute any machining & re-build of the stellite surface requirements on site, which might include but not limited to NRV valve flaps and seats, Valve Faces, Flange faces, nuts & bolts, gearboxes and pumps etc.
- c) Take measurements (measure all components and record tolerances) on both seats and spindles or any other components and record it before machining.
- d) Machine out all cracks or cuts on the valve body seats or remove old stellite if there is any crack.
- e) Machine the spindle seats to size before lapping the valve body and spindle seats.
- f) Perform weld build-up on body and spindle seats with (Weld stellite) if required.
Additional stellite tolerance will be agreed by both parties.

UT will be conducted after weld build-up of the seats and the results will be used as one of the acceptance criteria

Exclusions

- a) Scaffolding and Insulation
- b) Electrical and Control and Instrumentation components
- c) Non-destructive testing
- d) Condition Monitoring
- e) Lubrication

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4. Acceptance

This document has been seen and accepted by:

Name	Designation

5. Revisions

Date	Rev.	Compiler	Remarks

6. Development Team

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

7. Acknowledgements

Not Applicable

8. Appendix A: Different types of Valves

The below table shows the different types of valves and their sizes but are not limited to:

Type	Size (mm)
Angle	600
Angle PRV	100
Ball	20
Butterfly	600
Check	400
Check	600
Check	100
Gate	350
Gate	400
Gate	100

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Gate	25
Gate	50
Globe	100
Globe	20
Globe	15
Globe	25
Globe	50
Globe	80
Globe	150
Globe	200
Globe	40

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