	Scope of Work	Camden Power Station
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Title: **Fuel Oil Plant and Burners
Maintenance Scope of Work**

Document Identifier: **240-140836620**

HBS / Functional Location): **HJA, HJF, EGD, EGB**

Area of Applicability: **Boiler – Fuel Oil Plant and
Fuel Oil Burners**





Functional Area: **Engineering**

Revision: **1**

Total Pages: **11**

Next Review Date: **N/A**

Disclosure Classification: **Controlled Disclosure**

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Date: 05/02/2025	Date: 05/02/2024	Date: 05/02/2025	Date: 11/02/2025

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1. Introduction

Camden Power Station (CPS) is a fossil fuel fired power station which consists of eight generating units, each capable of producing 200MWe. The boilers are front fired with a steam/water drum. The lower half of the furnace contains twenty PF burners, twenty FO burners and twenty gas igniters all situated at the front wall of the boiler. There are 5 rows of burners (A to E) and each row consists of 4 burners (burner 1 to 4). The boiler has 5 dedicated coal milling units (A to E) and each mill supplies a row of PF burners. During normal operation, only four mills are in service and one always on standby.

Three types of fuels are used in the CPS boilers and these are; LPG, HFO 150 and PF. LPG is used during oil burner start-up and it is supplied via a lance within each burner and is ignited electrically. FO is used during start-up and shut-down of the boiler, when a mill is placed in or taken out of service and also to support the boiler firing during unstable PF combustion.

The fuel oil plant and burners are a critical plant at Camden Power Station. Fuel oil burners are required during unit light-ups, shut downs, mill changes and during times of unstable combustion. It is ultimately the last means of keeping the Boiler on load. Mechanical maintenance of the fuel oil plant and burners is essential in terms of ensuring available and reliable plant and hence the need for a maintenance contractor.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

The purpose of this document is to supply scope of work required to deliver maintenance services for the Fuel Oil Plant and Fuel Oil Burners at Camden Power Station for 5 Years.

2.1.2 Applicability

- Boiler Engineering
- C&I Engineering
- Boiler Maintenance
- Procurement
- Prospective contractor

2.1.3 Effective date

Authorisation date

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2.2 Normative/Informative References

2.2.1 Normative

- ISO 9001 – Quality Management Systems.
- OHS Act - Occupational Health and Safety Act and Regulations (Act No.85 of 1993)
- 240-105453648 – Fossil Fuel Firing Regulations Standard
- NFPA 85 – Boiler and combustion systems hazard code
- Pressure Equipment Regulations (PER 2009)
- 0.36/13902 – Fuel Oil Plant East LP Pump System P&ID
- 0.36/13904 – Fuel Oil Plant East HP Pump System P&ID
- 0.36/13905 – Fuel Oil Plant West LP Pump System P&ID
- 0.36/13906 – Fuel Oil Plant West HP Pump System P&ID
- 0.36/16808 – Unit 1 Fuel Oil Burner Supply and Return System P&ID
- 0.36/13910 – Gas Reticulation and Distribution P&ID
- 474-11601 - Fuel Oil Group Technology Strategic Report 2018
- 004 4570 - Fossil Fuel Firing Regulations Camden Specific

2.2.2 Informative

N/A

2.3 Definitions

N/A

2.4 Abbreviations

Abbreviation	Explanation
BMS	Burner Management System
C&I	Control and Instrumentation
CPS	Camden Power Station
FFFR	Fossil Fuel Firing Regulations
FO	Fuel Oil
FOP	Fuel Oil Plant
GO	General Overhaul
HFO	Heavy Fuel Oil
HP	High Pressure
IR	Interim Repair
LP	Low Pressure

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Abbreviation	Explanation
LPG	Liquefied Petroleum Gas
MBSA	Maintenance Basis Standardisation Application
MGO	Mini General Overhaul
NOx	Nitrogen Oxides
PF	Pulverised Fuel
PLL	Partial Load Loss
PSR	Plant Safety Regulations
SANAS	South African National Accreditation System
SOW	Scope of Work
SSR	Successful Start-up Rate
UCLF	Unplanned Capability Loss Factor

2.5 Roles and Responsibilities

- Boiler Engineering - Is responsible to draw up the scope for the maintenance contract.
- Boiler Maintenance - Is responsible to set-up a maintenance contract as per the terms set-out in the SOW
- Procurement - Is responsible to ensure that the procurement process is properly followed in setting-up and awarding the respective maintenance contract.

2.6 Process for Monitoring

The Procurement process ensures that the maintenance contract is set-up according to the terms given in the SOW.

2.7 Related/Supporting Documents

N/A

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3. Scope of Work

3.1 Objectives and Purpose of the Works

The objective of this contract is to perform Mechanical and Control and Instrumentation Maintenance on the Fuel Oil Plant and burners in a safe, efficient and effective manner in order to meet the production demands of Camden Power Station.

The Employer and the Contractor shall be committed to the following:

- Safety- A zero harm policy
- Zero Fuel Oil Plant and Burner UCLF
- Zero Fuel Oil Plant and Burner PLL
- Continuous reductions in oil burner trips
- A prevention of Unit/Boiler trips during transients/combustion instabilities.
- A SSR of 90% is to be achieved and sustained.
- Continuous cost reductions (both fuel oil cost and fuel oil maintenance cost)

The performance of the contractor shall be measured against the above criteria as well as the timely execution and quality of all planned activities. It is of critical importance that these goals are actively pursued over the long term to meet Camden's performance targets.

3.2 Description of the service for the Fuel Oil Plant and Burners

- The objective of this contract is for the contractor to provide a comprehensive Mechanical and Control and Instrumentation Maintenance for Camden Power Station Fuel Oil Plant and Fuel Oil Burners.
- The controls and instrumentation is solely for the oil burners and the respective BMS. The contractor is to have full knowledge of this system and proof of such knowledge. The maintenance to be performed will be inspection, SANAS traceable calibration, loop checking, stroke checking, fault finding, function checking, repairing, removing, replacing and testing of field instrumentation of all control and instrumentation related to the oil burners.
- The contractor performs inspections, maintenance, repair, optimization, implementation, commissioning, investigations and specialised fault finding such that the fuel oil plant is available and reliable.
- The contractor performs planned, corrective, preventative, opportunistic and outage based maintenance.
- The contractor provides a base crew which is to be based on site. This will be specified on the Price List.
- The contractor is also required to work shifts as well as to be on standby as per the production demands of Camden Power Station.
- The contractor is also required to execute the Outage SOW for the fuel oil plant and burners.

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- The contractor provides qualified and competent teams as per specifications outline in the technical criteria (qualifications, work experience etc...)
- The contractor provides the teams with all necessary equipment and tools. Spares are to be supplied by the employer.
- The Employer will supply all the Spares needed by the Contractor to execute the scope at hand. However, a proper fault finding should be performed and demonstrated until replacement of the component is noted as the last resort.
- The contractor performs all planning and scheduling associated with the plant in line with the Eskom Works Management Process.
- The contractor has an effective quality management system in place and is to be ISO 9001 approved.
- The contractor is registered with the Construction Industry Development Board (CIDB) for Mechanical Engineering Works. The contractor is to provide certified copies of the respective CIDB certificate.
- The contractor is to have full knowledge of the oil combustion process and its effect on Boiler operation.
- The Contractor shall ensure that all its employees are trained/authorised in terms of the FFR depending on their respective positions.
- The Contractor shall ensure that its employees are authorised in terms of the PSR and can take their own plant permits.
- The contractor is to ensure stringent housekeeping particularly when working with fuel oil and any spillage thereof should be prioritised.
- The contractor complies to all the safety, health, environmental and security requirements within Camden Power Station.
- The contractor is to ensure that all employees are medically fit and supplies the required PPE.
- The behaviour of the contractor should be professional and ethical as per the Eskom code of conduct and ethics procedure. Failure to comply with Eskom's requirements in this regard could lead to removal of the Contractor or the removal of the guilty employee from the site.

3.3 Employer's requirements for the service on the Fuel Oil Plant and Burners

The Works supplied by the Contractor with reference to the Plant Boundaries is Maintenance and will include:

3.3.1 Execution of maintenance and condition monitoring activities:

- The relevant Routine plant inspections and maintenance as indicated in the Camden Maintenance Strategies:
 - 240 35651193 Fuel Oil Plants Maintenance Strategy
 - 240 35651177 Combustion Plant Maintenance Strategy
 - Unit 8 GO Oil and PF Burners SOW T-6_rev 1

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- Unit 8 GO Fuel Oil Plant SOW T-6_rev 1
- Maintenance tasks as per updated MBSA tool.
- Breakdown maintenance
- Planned maintenance
- Opportunity maintenance (often on weekends)
- Unit preparation and commissioning for unit light ups (often on weekends)
- Outages (GO, MGO, IR)
- Outages: Burner Setup and Commissioning
 - Outages: Dry Runs
 - Outages: First fires (heat soaking, refractory curing etc..)
- Using the test-rig to ensure blocks and tips are fully functional.

3.3.2 Special activities

- Assistance with alignment of motors, inclusive of being responsible for the condition of the complete coupling where applicable (alignment done by Others)
- Pressure and flow impulse lines up to and including the last isolating device before the field instrument where applicable.
- Routine lubrication and greasing of mechanical equipment where applicable
- Weekly and monthly reports indicating plant status, failures/defects, risks and respective corrective actions.
- Provision of welding services for all the fuel oil plant – level 2 SAIW Certified welder is needed.
- Venting gases in the oil.
- Trouble shooting and identifying problems in the fuel oil plant and burners.
- Cleaning oil spillages after working.
- Stripping and assessing valves. Writing repair recommendations on fuel oil plant valves.

3.3.3 C&I activities:

The controls and instrumentation is solely for the oil burners and the respective BMS. The contractor is to have full knowledge of this system and proof of such knowledge. The maintenance to be performed will be inspection, SANAS traceable calibration, loop checking, stroke checking, fault finding, function checking, repairing, removing, replacing, testing and commissioning of field instrumentation. This is also to include knowledge of the respective interlocks and protections.

3.3.4 Excluded activities:

- Electrical maintenance and condition monitoring of motors and gearboxes

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- Electrical connection / disconnection of electrical motors
- Lubrication and greasing of electrical equipment

3.4 Boundaries

The boundaries of the plant where maintenance is to be performed will cover the following high-level plant areas:

Fuel oil supply and burners:

- The fuel oil offloading plant and pipework to the storage tanks
- The fuel oil storage tanks
- The LP fuel oil pump station
- The inline fuel oil heaters
- The HP pump fuel oil suction strainers
- The HP fuel oil pump station
- The unit fuel oil feed regulation station
- The fuel oil burner (oil lance, burner block, modular end assembly)
- All piping from the storage tanks to each respective oil burner including all valves, connections, strainers, gauges, flow meters, flexible piping and auxiliary equipment

Core air supply:

- Core air fans
- Core air dampers and ducting
- Core air fan damper actuator

Propane supply and gas igniter:

- The propane gas reticulation and distribution systems from storage bottles to the igniters (excluding propane bottles and the change out thereof)
- The gas igniter

Control air supply:

- The control air and propane mixing station
- The control air piping (fixed and flexible), valves and connections from the unit isolating valve to each individual burner
- Purge air system
-

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Electrical and C&I components:

- The oil burner junction box
- The oil burner control panel
- The oil burner flame scanner (viewing head and amplifier)
- The gas igniter control cu6 cards
- Burner Management System

Core air swirlers:

- Core air tube swirlers (PF burners: Type 'R')
- Carrier tube and swirlers (PF burners: Low NOx burners)

Outside Plant:

- Fuel Oil Burner Workshop
- Fuel Oil Burner Test Rig x2. The maintenance contractor must be able to maintain the Fuel oil burner test rig and provide a complete data pack.

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4. Acceptance

This document has been seen and accepted by:

Name	Designation
R Rampedi	Fuel Oil plant Engineer
N Khumalo	Maintenance supervisor
Ivan Hartman	Specialist

5. Revisions

Date	Rev.	Compiler	Remarks
05 Feb. 25	1	V Vilakazi	Original Issue

6. Development Team

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

- Velaphi Vilakazi
- Raymond Rampedi
- Nkosinathi Khumalo

7. Acknowledgements

N/A

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