

 <b>Eskom</b>	<b>SOW</b>	<b>Camden Power Station</b>
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Title: **Camden C&I Overall systems  
Maintenance contract  
scope of work for 60 months**

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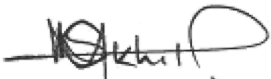

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## **1 Introduction**

This document covers the scope involved in the Control & Instrumentation maintenance contract for Camden Power Station to ensure a high degree of co-operation between the Employer and the Contractor.

## **2 Supporting Clauses**

### **2.1 Scope**

#### **2.1.1 Purpose**

The purpose of this document is to stipulate the main activities that will be required from the Contractor when performing C&I maintenance in the plant.

#### **2.1.2 Applicability**

This document is applicable to C&I Engineering, C&I Maintenance, Procurement department as well as C&I Contractors.

#### **2.1.3 Effective date**

Authorization date.

#### **2.1.4 Normative References**

The following documents are to be used together with this document:

- [1] **240/53114002** – Engineering Change Management Procedure
- [2] **004/3991** – C&I Maintenance Partnering
- [3] **Basic conditions of employment**
- [4] **SHEQ**
- [5] **240/56355731** – Environmental Conditions for Process Control Electronic Equipment used at Power Stations
- [6] **004/5602** – Business Excellence Quality Management Standard for Refurbishment, Engineering, Manufacturing, & Maintenance Works for Camden Power Station

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## 2.1.5 Informative References

N/A

## 2.2 Definitions

Term	Description
<b>Maintenance Consumable</b>	Maintenance consumables are materials and supplies used during maintenance activities that are used up in the process and not reused. They are essential for performing routine, preventative, or corrective maintenance but are not part of the actual equipment or system being maintained (e.g. Lugs, insulation tapes, electrical and lubrication sprays, Sealants, Cable ties, etc.)
<b>ES 680</b>	C&I Engineering Station.
<b>Field Equipment</b>	Equipment in the field that supplies or receives a signal, for a device that either controls or monitors. For example (Press SW, Press TX, Level SW, Level TX, Flow SW, Flow TX, Temp SW, Temp TX, Analysers, Opacity meters, Vibration Monitors, Gas Analysers, Detectors, Gauges. (Including Generator bearing vibration systems in its entirety) Thermocouples, RTD, Pyrometers in its entirety, etc.)
<b>Ft4500</b>	FtServer is a fully integrated, continuously available platform uniquely engineered to run mission-critical applications without downtime or data loss—for the enterprise data center, control room, or remote edge location—helping companies maximize productivity, quality, and revenue.
<b>First/1st line maintenance</b>	Maintenance required on specific part of plant where the contractor must do fault finding up to the point where the signal path from the equipment to the DCS (Including DCS software and HMI) can be ruled out as being the problem.
<b>Full maintenance</b>	Maintenance where the contractor is required to work on the equipment to the point where the equipment is back to normal operation
<b>Green Line</b>	Cable placed around a conveyor belt, for safety purposes (Pull wire) and could be used to trip the conveyor belt in any circumstances.
<b>MSR</b>	Computerized drawing system.
<b>OM 650</b>	Plant to operating system (operates & monitors)
<b>T2000</b>	Is a legacy Distributed Control System (DCS) developed by Siemens primarily for automation and monitoring operations in a thermal power plant. The system manages turbines, boilers and auxiliary plants, offering basic real time data acquisition, control loops, alarm handling and process visualization. T2000 is built on older generation technologies. It requires separate engineering tools for diagnostics, configuration and visualization. This system is considered outdated by

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	Morden standards.
<b>T3000(SPPA-T3000)</b>	Is Siemens' Morden distributed control system for power plant. Introduced in the mid-2000s, T3000 features centralized web-based architecture that unifies engineering, operations and diagnostic into one single platform. It supports real-time monitoring and control, advanced data analytics, seamless integration, and online system modification. T3000 is now the standard system for new installations and upgrades from legacy systems like T2000.
<b>Plant</b>	All systems that form part of Camden Power Station.

## 2.3 Abbreviations

Abbreviation	Description
<b>AC</b>	Alternating Current
<b>HMI</b>	Human Machine Interface
<b>AP</b>	Automation Processor
<b>AWR</b>	Ash Water Return
<b>C&amp;I</b>	Control and Instrumentation
<b>CCTV</b>	Closed Circuit Television

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<b>Abbreviation</b>	<b>Description</b>
<b>CW</b>	Cooling Water
<b>DC</b>	Direct Current
<b>DCS</b>	Distributed Control System
<b>EMDAS</b>	Electrical Metering Data Acquisition System
<b>ES</b>	Engineering Station
<b>FFP</b>	Fabric Filter Plant
<b>F/O</b>	Fuel Oil
<b>GO</b>	General Outage
<b>GPS</b>	Global Positioning System
<b>H<sub>2</sub></b>	Hydrogen
<b>ITP</b>	Inspection and Test Plan
<b>LAN</b>	Local Area Network
<b>LCS</b>	Local Control Station
<b>LV</b>	Low Voltage
<b>MV</b>	Medium Voltage
<b>MNT</b>	Maintenance
<b>OEM</b>	Original Equipment Manufacturer
<b>OHS</b>	Occupational Health and Safety
<b>PA</b>	Public Address
<b>PFMA</b>	Public Finance Management Act
<b>PLC</b>	Programmable Logic Controller

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Abbreviation	Description
<b>PSR</b>	Plant Safety Regulations
<b>QCP</b>	Quality Control Procedure
<b>RTD</b>	Resistance Temperature Detector
<b>RTS</b>	Return to Service
<b>SAP</b>	Systems Applications and Products
<b>SFP</b>	Steam Feed Pump
<b>SHEQ</b>	Safety, Health, Environment, Quality
<b>SOW</b>	Scope of Work
<b>SU</b>	Storage Unit
<b>SW</b>	Switch
<b>SWG</b>	Switchgear
<b>TX</b>	Transmitter
<b>V</b>	Volt
<b>WTP</b>	Water Treatment Plant

## **2.4 Roles and Responsibilities**

Department	Responsibility
<b>C&amp;I Engineering</b>	Is responsible to develop the scope of work for the maintenance contract.
<b>C&amp;I Maintenance</b>	Is responsible for setting up a C&I maintenance contractor as per the terms set- out in the SOW
<b>Procurement</b>	Is responsible for ensuring that the procurement process is properly followed by establishing the C&I maintenance contract.

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## 2.5 Process for Monitoring

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

## 2.6 Related/Supporting Documents

N/A

## 3 Scope of Work

### 3.1 Scope overview

Table 1: Plant System responsibility definition

Plant System				Type	Full Mnt	1st line Mnt
UNIT C&I	Integrated Unit control					
		HMI systems			x	
			Application Server	Stratus Ft4500		x
			Migration Server		x	
		Engineering and diagnostic systems		ES680/OM 650	x	
		Process Computer / Historian		VA View		x
		Process LAN		Scalance X212-2	x	
			MACH Router		x	
		Power supplies				
			UPS's	APC Power Saving Back UPS Pro 1500	x	
		Simulator				
			Emulator	Siemens S3000		x

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			Process Modelling	SimuPACT		<b>x</b>
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<b>Boiler system</b>						
	<i>Boiler &amp; auxiliaries</i>		Siemens T2000 & T3000 AS620	×		
	<i>Boiler Protection system</i>		Siemens T2000 AS620F & T3000	×		
	<i>Feed-pump control system</i>		Siemens T2000 AS620 & T3000	×		
	<i>Sootblower control system</i>		Siemens T2000 AS620 & T3000	×		
	<i>FFPs control</i>		Siemens T2000 AS620 & T3000	×		
	<i>Burner management</i>					
		F/O field management	Ham worthy Combustion Engineering			×
		Overall management	Siemens T2000 & T3000 AS620	×		
	<i>Feeder control</i>					
		Feeder speed	Siemens Micro-master 440	×		
		Overall control	Siemens T2000 & T3000 AS620	×		
	<i>PA flow</i>		Promecon McONair	×		
	<i>Tube leak detection</i>		Inspecta FFT	×		
<b>Turbine (and BFPT) system</b>						
	<i>Turbine Control system</i>					
		Overall control	Siemens T2000 & T3000 AS620	×		
		Turbine controller	Siemens S7-400	×		
	<i>Turbine Turbovisory system</i>		Bentley Nevada 3500	×		
	<i>Turbine Protection system</i>					
		Overall protection	Siemens T2000 AS620 & T3000	×		

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			Failsafe System	Jaquet System FT3000 3-Channel Spee d	<b>x</b>	
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			(SIL3)	Control and Protection System		
		<i>Turbine Auxiliaries</i>		Siemens T2000 AS620 & T3000	x	
		<i>Turbine Condition monitoring/analysis</i>		Bentley System 1	x	
		<i>Field</i>				
Common C&I						
	Integrated Common plant control					
		<i>WTP, LPS, Coal, CW, Ash, EOD</i>		Siemens T2000 AS620 & T3000	x	
	Emissions					
		<i>Emission Monitoring</i>				
			1.1.1.1.1 Dust Monitoring	1.1.1.1.2 SICK SB100	x	
			1.1.1.1.3 Gas Monitoring	1.1.1.1.4 CODEL GCEM4000		x
	Fly Ash Plant control system			1.1.1.1.5 Siemens T2000 AS620	x	
	Coarse Ash Plant control system			1.1.1.1.6 Siemens T2000 AS620	x	
	Coal Plant Control system			1.1.1.1.7 Siemens T2000 AS620	x	
	Conveyor Long line protection			1.1.1.1.8 CT Systems	x	
	Water treatment control			1.1.1.1.9 Siemens T2000 AS620	x	
	LP Services control system			1.1.1.1.10 Siemens T2000 AS620	x	
	Fuel oil control system			1.1.1.1.11 Siemens T2000 AS620	x	
	Fire detection system			1.1.1.1.12 Siemens-Sigma-sys M with		x

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				Sigma-plan D100 software V7.3		
	<b>H2 Plant</b>			1.1.1.1.13 Not applicable		<b>x</b>
	<b>PA System</b>			1.1.1.1.14 TOA PA System		x

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- 3.1.1** Note: The supplier will be expected to take the scope below as works instruction. duties of the supplier are not limited to the scope. Other new C&I related duties which might arise which are not defined in the scope of work, the supplier will be expected to execute them at no extra cost. The supplier is to render C&I Maintenance services at Camden power station for a period of 60 months adhering to the scope as the works instruction. The Contractor will be fully responsible for most field instrumentation systems at Camden except for systems that are maintained by the OEMs, Refer to table 1. Where a contract exists, the contractor will be responsible for 1st line maintenance. The Contractor is expected to have full knowledge of systems mentioned on the above table and proof of such knowledge in a form CV and certified copies of certificates.
- 3.1.2** Maintenance to be performed will be inspection, calibration, loop checking, stroke checking, function checking, repairing, removing, cleaning of equipment rooms' cubicles and junction boxes, replacing and testing of field-instrumentation of all C&I related plants at Camden Power Station.
- 3.1.3** The works consist of maintenance of all control and instrumentation: Maintenance is also required on Common plant that is coal, Fuel, Ash, Cooling water, water service that is Demin and portable water plant, service water, fire water, raw water, sewage plant and dams, Compressed air, Fire detection system, Low Pressure Gas, H<sub>2</sub> Plant and FFP Blower plants and any other plant which is part of Camden Power station.
- 3.1.4** The Contractor is responsible for the maintenance of the total control and field instrument system that is working on 24V. This should also include any circuits that work on voltages less than 220V AC and 220V DC.
- 3.1.5** The Employer must authorise any equipment changes (Plant) or modifications. (In all cases even if there is a need to move equipment, change equipment, or add equipment.
- 3.1.6** The Contractor shall render service with no additional cost, for any tests required by other Contractors representing Maintenance at Camden Power Station, and Camden Power Station permanent staff.
- 3.1.7** The Contractor shall render a service to C&I engineering, outage department during outages and any other related work and no additional costs will be charged.
- 3.1.8** The Site Manager shall report directly to the C&I Maintenance Manager/ Contract Manager, for the day-to-day issues. Or person acting in that position.
- 3.1.9** The Contractor must perform function checks and Calibration on the entire field Instruments and the Calibration Sheet must be filled and both Eskom and the contractor must have copies of such for filing.
- 3.1.10** The Employer will supply all the Spares needed by the Contractor to execute the scope at hand. However, proper fault finding should be performed and be demonstrated replacement of the instrument is the last resort.

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- 3.1.11** System Administration Duties on a T2000 and T3000 shall also be performed, as well as maintenance and proper fault diagnosis, refer to 3.5.1.1.
- 3.1.12** The contractor must manage the Software and Hardware of DCS, VA view and Bentley Navada.
- 3.1.13** The Contractor must assist at no additional costs other than provided in this contract, in terms of commissioning of all new plants and maintenance on new handed over plant after a modification.
- 3.1.14** The Contractor shall support modifications if approved by Eskom, which arise from an equipment change due to the currently used equipment being obsolete at no additional costs. Project related modifications will be at Eskom's cost.
- 3.1.15** The Contractor must perform Stroking of all the Actuators that is electrical (Auma, Drehmo), pneumatic and/or any other actuator that is installed at Camden Power Station.
- 3.1.16** All documents generated in the course of executing work on behalf of the Employer in accordance with this contract to be filed and stored appropriately, and to be made available for audit purposes as and when required.
- 3.1.17** The Contractor is expected to perform the Protection Checks when required and/ or after a GO, mini-GO or an IR.
- 3.1.18** The Contractor must as far as possible support local community with business opportunities.
- 3.1.19** The Contractor shall also assist with monitoring and optimisation of process parameters on a small scale where required and manage field simulations.
- 3.1.20** The Contractor shall ensure that all its employees are authorised in terms of the Fossil Firing Fuel Regulation (FFFR) and Plant Safety Regulations (PSR). At the commencement of contract at least 30% must be FFFR & PSR authorised, 70% of Unauthorised employees shall be given a period of three months to six months from the commencement of the contract to gain authorisation. Failure to adhere to the stipulated time will lead to that individual being removed from Camden Power station premises with immediate effect.
- 3.1.21** All C&I documents (either on softcopy or hardcopy) in Eskom's possession, whether it be OEM or at "Black Box Interfaces" with similar Contractors, which is required for plant operation and maintenance purposes will be made available to the Contractor.
- 3.1.22** Any tool required for maintenance work needs to be supplied by the contractor as per the minimum standard tool list (list at the last page) but not limited to the tool list.
- 3.1.23** All transportation requirements required by the contractors for their employees will be provided for by the contractor.
- 3.1.24** Workshop tools and equipment's are to be maintained, kept safe and to be as found, when lost must be replaced by the contractor.

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- 3.1.25** The Contractor is responsible for cleaning of the workshop, all equipment rooms, Public Address room and Computer rooms. It would be the Contractors responsibility to submit defects for areas that are dirty. Eskom could inspect the areas at any time.
- 3.1.26** The Equipment Rooms and Computer rooms should be cleaned at least twice a week. This is dependent on the state of the rooms, and the cleaning frequency should be adjusted accordingly.
- 3.1.27** The environmental conditions of all Equipment rooms and Computer rooms should be checked daily. The Temperature and moisture in the air should be noted and defects loaded onto SAP and brought to the attention of the appropriate people. There should also be check sheets developed in a joint cooperation between the Contractor and Eskom to look at these on a daily basis. Water ingress into the building via the roof also needs to be reported, as and when it takes place. (This shall be done in terms of 240-56355731)
- 3.1.28** All the planned weekend work to be done by the Contractor, that is Technical Supervisors, Technicians, Mechanics/Artisans, Safety officer, Quality officers, Semi-Skilled and Project Manager must be requested in writing by the Contractor and approved by the Employer. If such overtime is not pre-approved, it will not be paid.
- 3.1.29** The Equipment room should always be clean, anything that has an influence, on the cleanliness of the cubicles should be addressed immediately as far as reasonably practicable.
- 3.1.30** It is the responsibility of the Contractor to ensure, always that all equipment rooms are clean including the walls, floor and the cubicles.

The general workers should adhere to the PSR regulations when cleaning the equipment rooms, as the equipment rooms are referred to 'restricted area', and entry is permitted to a person in terms of PSR and have no effect on production.

- 3.1.31** management of the MSR system will be done by the contractor.

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### **3.2 Minimum requirements of staff**

- 3.2.1** Technicians should hold a Technicon diploma / Technical (N6 certificate with trade test) or N6 diploma in Electrical Engineering LC, have a minimum of 5 years experience in a power plant or related field (Instrumentation) experience, have background knowledge of Boiler protections, Turbine protections, T2000, MSR drawings, CT system and T3000. Must have a driver's license as standby duties are mandatory.
- 3.2.2** Artisans/Mechanician should hold N4 and Trade test certificates/ Technical Diploma with trade test / Technicon diploma in Electrical Engineering LC and a minimum of 3 years' experience in a power plant or related field (Instrumentation), have background knowledge of T2000, T3000, MSR drawings and CT system. Must have a driver's license as standby duties are mandatory.
- 3.2.3** Semi-skilled people should hold a Matric certificate and must have worked in any industrial site before, preferably in a power plant.
- 3.2.4** Site Manager should hold a Technicon/ Technical diploma with trade test in Electrical Engineering LC, have a minimum of 5 years' technical experience in the process and instrumentation environment at a Power Station and 3 years managerial work experience at any industry, preferably in a power plant.
- 3.2.5** Technical Supervisors should hold a Technicon/ Technical diploma with a trade test in Electrical engineering or any other related qualifications Have 5 years of experience working with CT or any other belt protection systems, Boiler and Turbine controls and protections, must have T3000 certificate and extensive knowledge on T2000. Experience in a power plant is preferable.
- 3.2.6** System administrators should hold a technical / Technicon diploma in Digital Engineering/ Electronics Engineering/ Computer Engineering/ IT Systems/ Process Instrumentation with a minimum of 3 years' experience as a system administrator, must have received training on T3000 Basic, administrator, Migration server or similar servers, and cyber security with proof of certificates In addition, must have worked on the following systems: T2000, Linux administration, Industrial networking, Network communications, programming and windows servers.
- 3.2.7** Quality Officer should have Electrical engineering LC or any other quality related qualifications with ISO 9001, 2015 (Introduction and Implementation) certificates and 3 years of experience in a power plant.
- 3.2.8** Safety Officer should hold a NQF 5 SAMTRAC Certificate or similar qualifications with Incident investigation level 3 and First aid level 2, level 3 certificates will be an added advantage or diploma in Safety with incident investigation level 3 certificate; must have a minimum of 3 years' safety related experience in any industrial site or power plant.
- 3.2.9** It is the responsibility of the contractor to ensure that all employees meet the minimum requirements. 75% of the staff must meet the minimum requirements at the inception of the contract. The 25% not meeting the minimum requirement will be given a period of a year from the day the contract commences, to acquire all necessary documentation and qualifications to meet the minimum requirements. If by the anniversary date of the contract there is no proof that the person has written exams and is awaiting results or graduation, the person will be dismissed with immediate effect and the contractor will be expected to replace the person with a qualifying candidate within a period of 2 months from the day of dismissal.

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- 3.2.10** CVs, Valid certified copies of qualifications (only minimum requirement qualifications), IDs, Driver's licence and appointment letters for all employed personnel should be given to the Service manager at the kick-off meeting, prior to the contract commencement.
- 3.2.11** General worker must have grade 10 and preferably worked in any industrial site before, preferably in a power plant
- 3.2.12** The structure or organogram should be as follows: 1x Site manager, 1x Technical Supervisor U1-U8, 1x Technical Supervisor common plant, 2x System Administrators, 1x Safety Officer, 2x Quality officer, 8x Technicians U1-U8, 2x technicians common plant, 1x technician outages, 8x Mechanics U1-U8, 4x Mechanics common plant, 1x Mechanician outages, 4x Technical assistants/ Semi-skilled and 3x General workers.

### **3.3 Recruitment (Human Resource)**

- 3.3.1** Staff replacement: Short listing and interviews will be done by the supplier, information of the interviews including interview questions, scoring sheets and short-listing criteria should always be forwarded to the service manager after the interviews to evaluate and to ensure transparency and fairness to all shortlisted and appointed candidates. A criminal record report (clearance certificate) from SAP or any accredited service provider of all newly appointed individuals must always be provided, with copies of CV, certified copies of qualifications (minimum requirement) and ID. Whatever profession that will be replaced shall fulfil the minimum requirements. Refer to 3.2.
- 3.3.2** In an event where an employee is employed on the current contract and resigns before the contract term comes to end/ finishes, such employee will not be allowed to be employed on the same contract again until it finishes its term.
- 3.3.3** Successful candidates should not be brought to site without final acceptance via email or any form of written communication used at that time by the service manager. That will be done to ensure all requirements stated on the scope of work are fulfilled/ met.
- 3.3.4** In an event where a candidate is given an offer of employment and brought to site without the approval of the service manager, such an employee will be taken off Eskom's premises and will not be considered as part of this contract therefore his/her payment will not be Eskom's responsibility but the suppliers. Eskom would respond in 2 weeks for approval or disapproval in writing by the service manager, in failing to do so it would default in accepting.
- 3.3.5** All employees employed; a letter (on a company letter head) of employment acceptance signed by both the supplier and the employee with commencement and end date of employment, date on which the letter was signed, agreement to do any legitimate work not stated on the scope of work, the employee has read and understood the scope of work (work instruction), the employee will respect/follow orders/ instructions from the employer/ Employer's representative and agrees to follow all Eskom's processes and procedures; should be provided to the service manager prior bringing the employee to site.
- 3.3.6** Should the employee contravene any of the contents included in the employment acceptance letter, a disciplinary process will be followed with the possibility of immediate dismissal. This clause should also be included in the employment acceptance letter.

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### **3.4 Field Instrumentation**

#### **3.4.1 Routine Work**

3.4.1.1 All the simulations shall be managed as per the local procedures 004/9477 and 004/5141.

3.4.1.2 All simulations, disablements and temporary adjustments must be recorded and approved in accordance with the "Out of Normal Condition" procedure.

3.4.1.3 The Contractor should be flexible for Hot and Cold Commissioning as well as first phase optimisation.

3.4.1.4 The Contractor should make people available for Unit light ups if requested from them.

3.4.1.5 Oil burner management, interfacing only.

3.4.1.6 Outside plant protection test and trip testing on DCS or PLC, or system used.

3.4.1.7 Outside plant sequencing testing on DCS, S7 or system used.

3.4.1.8 Trip or load loss reports to be supplied to Eskom if required with recommendations as soon as possible (directly after incident).

3.4.1.9 Unit & Outside plant fault finding from primary element up to and including of relevant DCS & AS modules (AP).

3.4.1.10 Replacing of relevant DCS and PLC modules, system fault finding from primary element up to and including relevant module.

3.4.1.11 The Contractor must inspect the Boiler Metal temperatures after Mechanical Contractor has welded them on Super heater stages, which constitutes getting inside Penthouse/Dead Space and checking if the thermocouples are welded on the correct Super Heater stage and pull them outside to the correct junction box.

3.4.1.12 All electrical actuators binary & control and setting of appropriate limits for adjusting of stroke (including cabling from equipment room to valve, and equipment room to first point of termination in SWG).

3.4.1.13 All pneumatic controllers and valves, stroke check and adjusting of pneumatic controllers where needed (including tubing on controllers up to first point of isolation away from controllers).

3.4.1.14 Soot blower system, maintain software, pressure switches and limit switches with voltage below 220V.

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- 3.4.1.15A Tube leak detection system, maintain and advise if change is required.
- 3.4.1.16FFP and associated circuits including dust monitor calibration.
- 3.4.1.17Lockheed system associated instruments.
- 3.4.1.18Outside plant binary & analogue signals on WTP (fire service, raw, demineralized, potable, effluent, water reservoirs and dams), sewage, coal, ash (course & fine), fuel oil, propane gas, compressors, CW system and H<sub>2</sub>), below 220 V.
- 3.4.1.19Sequence trip testing on Outside plant.
- 3.4.1.20Boiler & Aux. consists of all binary & analogue signals including electrical & pneumatic actuators and dampers.
- 3.4.1.21Turbine & Aux. consists of all binary & analogue signals including electrical & pneumatic actuators.
- 3.4.1.22Step & subgroup control, sequencing control of all signals from primary elements to including DCS.
- 3.4.1.23Faulty alarms should be corrected from primary element up to including DCS module.
- 3.4.1.24All coils of solenoid valves on units and outside plant below 220V AC or 110V DC.
- 3.4.1.25All electrical circuits on systems below 220V AC or 110V DC.
- 3.4.1.26Investigate into the function and reliability of primary elements.
- 3.4.1.27Advise on plant changes on Units and Outside plant and where requested implementation of changes.
- 3.4.1.28Outside plant sequence testing from primary element up to appropriate PLC, DCS or system defined module.
- 3.4.1.29All appropriate controllers or systems used on the field at the Outside plant (e.g., green line system on conveyors and appropriate protection systems).
- 3.4.1.30Responsible for all controllers and operating systems on units and outside plants.
- 3.4.1.31All temperature compensating cable and associated elements.
- 3.4.1.32Simulation of signals with the necessary written authorisation, control and removal of simulations as soon as possible.
- 3.4.1.33To maintain an acceptable access control system in C&I restricted areas when installed.
- 3.4.1.34Responsible for all connector, junction, LCS and any other similar device used in the field.
- 3.4.1.35The Contractor is to be involved in trip and load loss investigations and assist with investigations during normal working time and after hours. The Contractor must be able to pinpoint problems as well as suggest solutions.

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- 3.4.1.36 Running maintenance includes daily walk-downs to confirm the control system DCS's condition and to identify and address visible faults. All defects or potential failures will be recorded. Performance of plant in operation is monitored and optimized by the Contractor.
- 3.4.1.37 The Contractor must complete all preventative maintenance within the time span given. The Contractor should, if needed or requested, generate PM's. Where Permit to Work is required, the work will be planned with the Production Manager.
- 3.4.1.38 The Contractor is expected to give a plan for planned work with time frames every Thursday of the week, as well as a plan for emergency maintenance with time frames. Emergency maintenance lessons learned, and standby activities lessons learned to be shared in the morning/ toolbox meetings daily.
- 3.4.1.39 The Contractor must complete all notifications within the given time span, according to SAP system and Work management prioritization guide (classification of notification priority 01, 02, 03, 04, 05). The Contractor must generate notifications on Flip system when needed or required (defects and corrective maintenance). Where Permit to Work is required, the work will be planned with the Production Manager.
- 3.4.1.40 Corrective planned and preventative maintenance will be prioritized with the emphasis on the corrective maintenance or according to the priority.
- 3.4.1.41 All C&I equipment must be maintained according to the philosophies and recommendations of the OEM's or Eskom. Changes to the philosophies must be authorized by Eskom.
- 3.4.1.42 The Contractor will deliver quality maintenance according to the Camden Standard Quality Control Procedures (QCP's will be drawn up for all work to be performed by the Contractor).
- 3.4.1.43 The Contractor is to compile procedures when needed or requested by Eskom and handed over to Eskom for approval.
- 3.4.1.44 The primary elements on the MV and LV switchgear will be from the last termination point in the switchgear including the cabling to the DCS.
- 3.4.1.45 This will include the terminations in the actuators, situated inside the actuator termination box.
- 3.4.1.46 The calibration and maintenance of all temperature switches, temperature transmitters, pressure switches, pressure transmitters, level switches, level transmitters, analysers, analyser pickups (non-laboratory equipment), flow switches, flow transmitters, solenoid coils, thermocouples, RTD's and gauges, that operate on less than 220V AC and 220V DC.
- 3.4.1.47 The removal and replacement of spares (disposal if requested) of all temperature switches, temperature transmitters, pressure switches, pressure transmitters, level switches, level transmitters, analysers, analyser pick-ups (non-laboratory equipment), flow switches, flow transmitters, solenoid coils, thermocouples, RTD's, gauges, vibration pickups and limits, that operates on less than 220V AC and 220V DC.
- 3.4.1.48 The generator thermocouples from the DCS up to the junction box closest to the generator thermocouple through bushing.
- 3.4.1.49 All compensating cable that would be required on the complete plant.
- 3.4.1.50 Process computer system in its entirety, including the operating system.

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- 3.4.1.51 All alarms that are feeding through the DCS system and alarms that are fed with a voltage less than 220V AC and 220V DC.
- 3.4.1.52 The computer tube leak detection
- 3.4.1.53 Assistance with the bearing vibration system.
- 3.4.1.54 The total control system operates on 24V DC.
- 3.4.1.55 The oil burner management system interface
- 3.4.1.56 All pneumatic controllers and valves, stroke check and adjustment of controllers where needed (including tubing on controllers up to first point of isolation away from controllers).
- 3.4.1.57 Soot blower system controls and limits operating on less than 220V AC and 220V DC.
- 3.4.1.58 FFP and dust monitors, the control and calibration of appropriate instruments and circuits.
- 3.4.1.59 Lockheed system, all signals less than 220V AC and 220V DC and associated instruments.
- 3.4.1.60 All solenoid valve coils on units and outside plant below 220V AC and 220V DC, power to the coil and operation of the coil.
- 3.4.1.61 Instrumentation will be removed and replaced as requested by the mechanical group when work has to be done, to avoid the equipment damage.
- 3.4.1.62 All tubing on instruments will be done by Control and Instrumentation, only those which are control and instrumentation related.
- 3.4.1.63 All cable trunking on appropriate cabling is seen as part of Instrumentation.
- 3.4.1.64 Commissioning, investigation of faults, clarification of problem areas, AGC performance, review of planned maintenance program, specialized fault finding, parameter control and assistance during return to refurbished units and start-up on units. Optimization of the unit control system will be a continuous process and are to be reviewed during unit light-ups as well as during load changes and capabilities. The unit control system performance criteria are as per the OEM's maintenance manual performance criteria. Assistance should be given via two shifts if the need arises.
- 3.4.1.65 To supply a service free of charge to the mechanical sections (fault rectification, fault finding, calibration of gauges etc. that concern instrumentation and the effective operation of the station).
- 3.4.1.66 To supply a service to the Boiler, Turbine, Milling and outside plant sections where necessary/ needed.
- 3.4.1.67 Control and Instrumentation to render a service to electrical sections.
- 3.4.1.68 Where there is a need for the use of the Hotline facility to Germany, it is the responsibility and cost of the Contractor to ensure that assistance is acquired via that facility.

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3.4.1.69 If information is needed from the plant control and automation system, the Contractor is to assist Eskom Camden Power Station staff to obtain this information from the system. This is applicable during and after hours.

#### **3.4.2 Outage Related Work**

For outages (interims and GO's additional) staff would be used. The Contractor would make use of his maintenance staff to full fill this function. The Contractor should release staff from certain duties and plan as far as possible around these activities. The releasing of staff from maintenance duties should not compromise maintenance activities as well. The contractor is to ensure that the duties of the staff released to outage is covered by the staff remaining for maintenance services.

3.4.2.1.1 Opportunity outages should be utilised for changes and/or backups and upgrades where required.

3.4.2.1.2 ITP shall be drawn up for the agreed activities between the Contractor and Eskom with, hold and inspection points.

3.4.2.1.3 The Contractor needs to attend all the appropriate meetings for activities during outage. The contractor to give feedback on activities or issues raised at the outage meeting daily to the Eskom personnel.

3.4.2.1.4 The Contractor in conjunction with the Employer shall draw up the Outage & GO plan as part of his scope. The main aim of the maintenance is to restore the plant to a higher level of integrity. The Contractor will perform all the work according to the scope of work for the specific plant within the duration of the outage. The outage scope determination for C&I related activities shall be based on the type of outage. The Contractor will make available additional resources during that period at his own cost, if required to ensure that the full outage scope of work is covered and completed within the time constraints.

3.4.2.2 The aim of the maintenance Contractor is to correct outage defects, and to ensure that the plant is available when the unit is returned to service, with the least impact on production and business performance. This occurs typically during a boiler tube leak when the unit is shut down, either planned or unplanned. The time interval to decide to shutdown varies from hours to twenty -eight days.

3.4.2.3 The Contractor should inspect his plant system that he is responsible for before the return to service of the plant and ensure that the plant is in an operable state that will not cause unnecessary delays.

3.4.2.4 The contractor should raise notifications for himself on Flip system or SAP, after partaking on the plant walk down if there are defects identified.

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- 3.4.2.5 In the event where an upgrade or change to plant configuration is necessary the Contractor should notify Eskom, and Eskom shall make final decision. When an outage plan or knowledge of an outage is known or available, Eskom would notify the Contractor, so that planning could be done. Work that will take place over the weekend on GO, IR, and Weekend short outage must be according to the Outage program and approved by the Employer before such work can take place.
- 3.4.2.6 If an outage related defect is known, spares must be identified by the Contractor and made known to the Employer, so that the Employer can procure or reserve immediately, when an unplanned outage happens the situation can be addressed.
- 3.4.2.7 The Contractor should be flexible for Hot and Cold Commissioning as well as first phase optimisation. These are things that need to be attended to after all down time of Units and in a much broader band after an outage.
- 3.4.2.8 Boiler & Turbine protection and safety systems (trip testing)
- 3.4.2.9 Unit response tests.

### **3.5 System Administration and DCS**

Figure 1&2 below shows Unit and Common Plant DCS layout at Camden Power Station. The DCS system used at Camden consists of SPPA-T2000 and SPPA-T3000. The SPPA-T2000 uses Siemens S5 power rack modules and the SPPA-T3000 consists of the HMI and the Application server with migration servers for communication with the old obsolete SPPA-T2000 S5 power rack.

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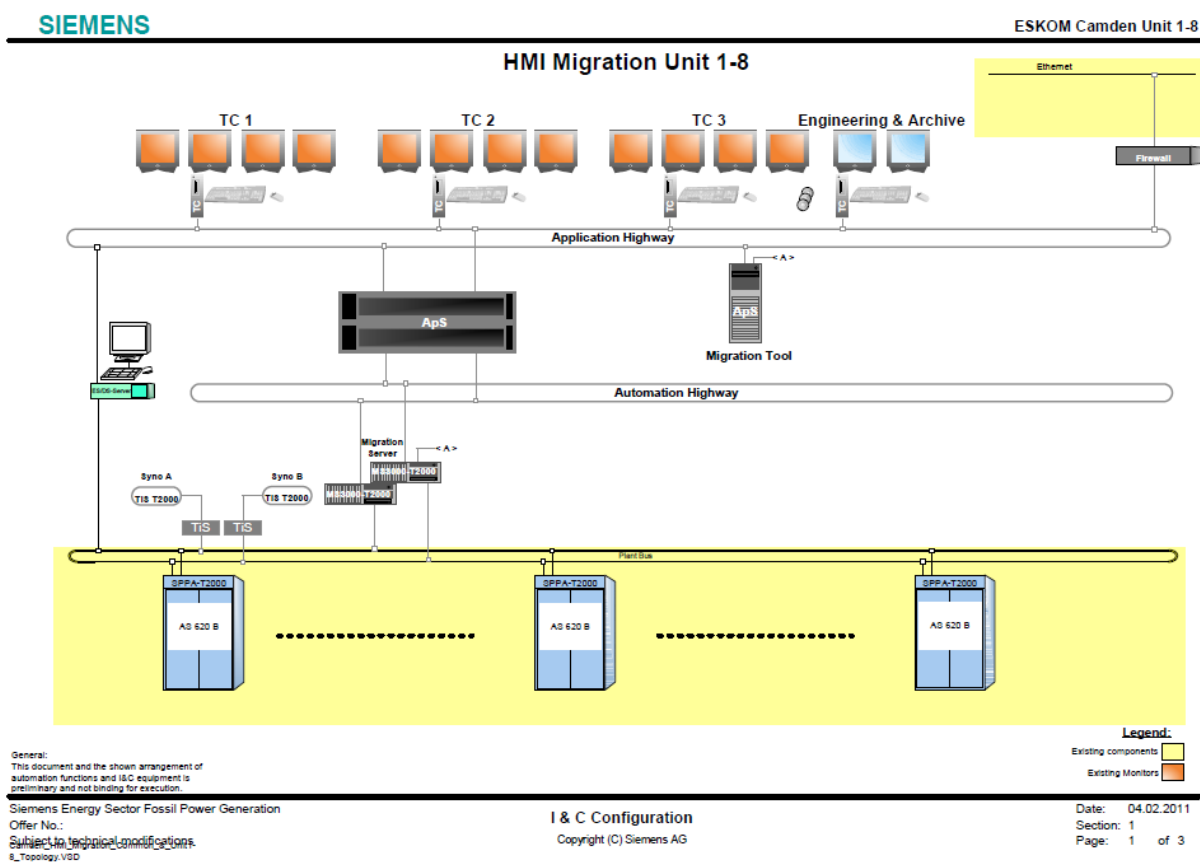


Figure 1: Camden Units DCS Layout

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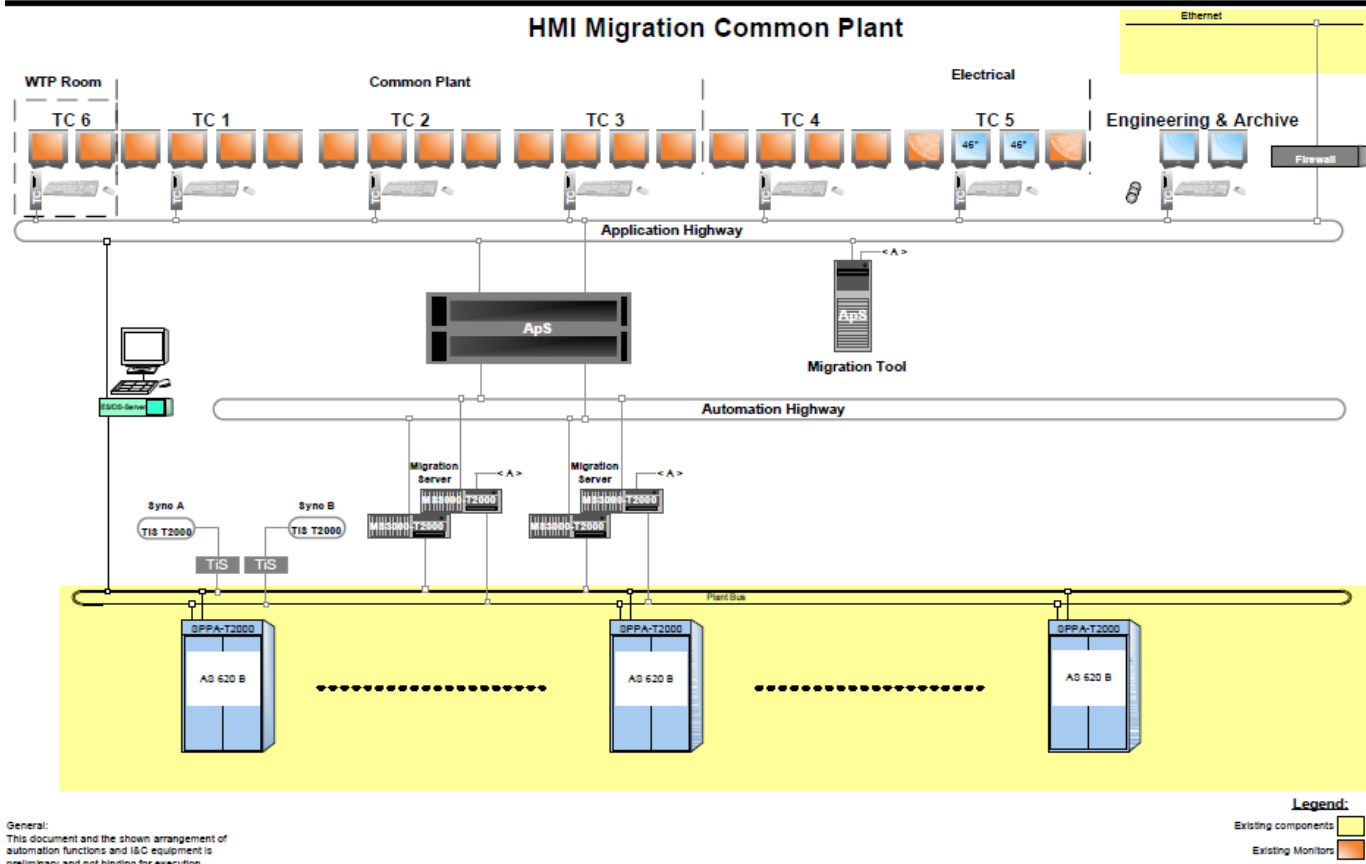


Figure 2: Camden Common Plant DCS Layout

When modifications or changes are required, it will only be done after written authorized documentation is received. A filing system with a register needs to be kept. The drawings (MSR or FUPs) before and after the changes need to be filed, with the documentation approving these changes. A report of changes needs to be given to Eskom on a monthly basis. All changes need to be approved by C&I Eskom representative before implementation.

The software on the Siemens T2000 and T3000 includes the ES and AP.

Implementing and advice on software, or change of software where requested by Eskom, and update necessary software.

Back-ups are kept of all systems under the Contractors responsibility.

Routine maintenance on application servers, migration servers, mach routers and firewall scalances.

ES hardware and software.

Bus system structure (Responsible for Coms., Processing Unit and cross talk modules (T2000 & AS).

Fault finding and replacement of appropriate modules on system.

Reload of programs / software on systems where needed and requested. Advise Eskom to replace modules (Fault reporting)

### 3.5.1 Bus system:

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- a. Terminal Bus OM 650.
- b. LAN (Local Area Network)
- c. Plant Bus.

3.5.2 OM 650 hardware and software including monitors operating terminal and all related equipment, excluding normal desktop PC's and radio system, not part of operating system (Complete control room system).

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- 3.5.3 Control and allocation of software passwords where needed.
- 3.5.4 All PLC software includes communications and processing units' modules.
- 3.5.5 UNIX, Windows and Linux operating systems.
- 3.5.6 All networking including system printers.
- 3.5.7 Virus control and prevention. The Contractor must be able to advise and implement necessary Cyber Security measures for the station.
- 3.5.8 Archiving and server data capturing (analogues, binary, sequencing and alarms).
- 3.5.9 All system alarms repairs.
- 3.5.10 All module and plant alarms due to faulty software.
- 3.5.11 Software manipulation to display counter values and motor running hours where needed (software engineering).
- 3.5.12 Database administration of engineering station (hardware & software maintenance (ES 680, OM 650, AP and back-ups).
- 3.5.13 VA system hardware and software, including necessary office PC software (excluding office desktop hardware and software).
- 3.5.14 Maintenance on complete GPS system.
- 3.5.15 Maintenance of MSR system hardware and software (Drawing system).
- 3.5.16 If need be, simulate signals with the necessary written authorisation. Control and remove simulations as soon as possible.
- 3.5.17 Maintain & updating of all MSR related drawings (including hardware drawings).
- 3.5.18 T2000 and T3000 including AS (AP) module maintenance.
- 3.5.19 Advising on Design and implementing changes, hardware and software where needed or required by Eskom.

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- 3.5.20 PLC module maintenance.
- 3.5.21 EMDAS S7 PLC module maintenance, all wiring (from first termination in PLC cubicle).
- 3.5.22 Complete S7 tube leak detection.
- 3.5.23 ET200M PLCs on Common Plant (AWR).
- 3.5.24 Step & Subgroup control.
- 3.5.25 Step & Subgroup control advice on design and implementing changes where needed and requested by Eskom.
- 3.5.26 Module alarms to be corrected.
- 3.5.27 Faulty plant alarms to be corrected in DCS and displayed correctly on operating system or advice correction of alarms where needed.
- 3.5.28 All air conditioning alarms generated from the first point of connection in the Equipment room.
- 3.5.29 Responsible for all PLC systems installed on plant.
- 3.5.30 The contractor is expected to assist in the design and maintenance as and when requested on the hardware and software of the Simulator.
- 3.5.31 Back-ups to be kept of all software used on controllers, if needed or requested, supplied to Eskom.
- 3.5.32 Parameter control is to be carried out to ensure no unauthorized simulations, as well as establishing a parameter database for control of parameters. It would become the property of Eskom, and the Contractor is responsible for keeping the database up to date.
- 3.5.33 The control system fault-finding to be carried out when faults occur on the control system and reports on major control system malfunction must be provided.
- 3.5.34 A comprehensive up to date C&I parameter list must be made available by the Contractor for quick reference fault finding. It would become the property of Eskom, and the Contractor is responsible to keep the list up to date.
- 3.5.35 The Contractor attends the daily production meeting, and all C&I related meetings as requested by Eskom as the Eskom C&I representative.

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### **3.6 Cabling**

- 3.6.1 The Contractor shall be responsible for cabling by pulling in and out any type, Length (Distance) and any size (Thickness) of new cabling which is C&I related and termination from a Junction box, Cubicle to the instrument or Local control panel. The Employer will supply the cable, and the Contractor shall execute the activity at no extra cost.
- 3.6.2 The Contractor is responsible for all cabling with a voltage of less than 220V AC and 220V DC. The replacement and removal of cables is the responsibility of the Contractor. This includes all the terminations up to and including the primary elements.
- 3.6.3 Perform all C&I tubing removal and replacement where needed or requested by Eskom.

### **3.7 Spares Management and Personal protective equipment**

- 3.7.1 All consumables used for maintenance shall be the contractors responsibly.
- 3.7.2 The Contractor shall supply all personal protective equipment, including special personal protective equipment such as acid proved overalls, clean conditions gear and Arc Flash gear which will be checked and satisfied to be the correct PPE by safety personnel.
- 3.7.3 The Employer will supply all the Spares needed by the Contractor to execute the scope at hand.
- 3.7.4 The contractor in conjunction with the Employer shall identify critical spares and submit a list detailing them. When identifying the spares, the Contractor shall keep in mind the need to minimise production risk due to spares availability, and the need to avoid wasteful expenditure of public funds in terms of PFMA by holding too many spares than is necessary. The risks involved should be listed with appropriate solutions. This action should be a joint effort between Contractor and the Employer.
- 3.7.5 The Contractor in conjunction with the Employer shall determine a minimum spare holding for the plant that will include critical spares, such holding shall be maintained, controlled and monitored by the site manager/supervisor and shall be used for standby or emergency purposes. The Contractor is to be aware that the spares are the property of the Employer. The spares shall be correctly marked and labelled.
- 3.7.6 If Spares are not available at the Eskom stores, The Contractor may, in consultation with Eskom, make temporary measures at the plant to minimise either the risk of injury to personnel or plant damage, or load loss or unit trip.

### **3.8 Workshops, Facilities and Test Equipment**

- 3.8.1 The power station Electrical department is responsible for all 220V AC supply; this includes the work area that has been allocated to the Contractor (i.e. Workshops, offices).

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- 3.8.2 The Contractor uses the Employers' facilities which are the telephones, computers and printers. External Telephone expenses will be on the Contractor's account.
- 3.8.3 The Contractor can make use of Eskom's medical facilities; however, the cost will be on the Contractor's account.
- 3.8.4 The Contractor will be provided with a Workshop. Should the Contractor need to have any changes done to the Workshop, the changes must be discussed with Eskom and approved by Eskom. The contractor will then be responsible for the costs of the changes to be made.
- 3.8.5 Portable electrical equipment registers are to be kept and updated by the Contractor. All tests done by the Contractor must be done according to Eskom regulations and standards, both the contractor and Eskom must have copies of such as proof of the tests for filling.
- 3.8.6 Test equipment and computers will be supplied by Eskom. The equipment is seen as the property of Eskom. The contractor will maintain and keep it in good working state, any losses or damage of such equipment shall be at the contractor's costs. Any theft of such equipment should be reported to the Eskom personnel as well as to the Eskom security service within 24hrs of realisation for formal investigations to be done, all negligence declared cases shall be on the contractor's account.
- 3.8.7 Test equipment should be checked and tested frequently by the Eskom representative, according to Eskom standards and sent for calibration at a national accredited source (SANAS), the contractor to give a list of all test equipment which will expire every 3 months before their expiry date for calibrations, failure to do so, a monetary penalty shall be charged to the contractor which will be negotiated as that might have a production loss implication.
- 3.8.8 The Contractor is responsible for the repairs of test equipment whereby the damages are done by its employees.

### **3.9 Hours of Work and Standby**

#### **3.9.1 Normal Working Hours**

- 3.9.1.1 Normal working hours are from 07H15 to 16H30, Mondays to Thursdays. Lunch is from 12H00 to 12H30. On Fridays the working hours are from 7H15 to 12H15. On weekends and all public holidays, only employees who are marked to be working by the roster are expected to be onsite and executing their duties.
- 3.9.1.2 Late coming will not be tolerated at all costs, there will be a sign in register every morning which is expected to be signed by every employee of the contractor and scanned to the service manager at 07:30 on weekdays. For every person who hasn't signed the sign in register by the time it gets to the service manager, the individual will be deemed not at work and his/her 8hrs for that day will not be paid; unless their late coming is communicated to the site Manager/ service manager an hour prior the normal starting time 07:15 or on the time of sending the scanned sign in register via email that the individual will be late with number of hours mentioned and the reporting time to work noted on the sign in register. It is the responsibility of the employee to inform the service manager telephonically on arrival at work when coming in late. If the employee reported the late coming and forgot to inform the service manager upon arrival, a penalty of 3 hours will be deducted from the employee's daily 8 hours. Employees on training should be indicated on the sign in register with Training, on Annual leave with

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A/L, Family responsibility leaves with F/L and Sick leave with S/L

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### 3.9.2 Standby

- 3.9.2.1 The Contractor's Scheduled 12 hours coverage crew is to be always available (24 hours 7 days a week). The Scheduled 12 hours coverage crew is to be competent on the power plant process, basic fault finding and authorized to act as a responsible person on permits as per PSR and be able to carry out simulations. Specialised crew should be available if needed. The Contractor is to decide when help is needed from specialized crew and should have no effect on production.
- 3.9.2.2 The Scheduled 12 hours coverage crew should consist of 6 people and shall always be available on onsite free from drugs, of which 3 members of the crew will cover the 1<sup>st</sup> 12 hour of the day (During the day) and other 3 crew members will cover the last 12 hours of the day (at night). The starting time for the day crew will be at 07h00 and the knock-off time will be at 19h00 daily for the period of their scheduled time as per the scheduled 12 hours coverage roster. The technical supervisor will work after hours on an emergency as and when required. Their hours worked outside of working hours will be paid for as per their bookings. They will claim only the hours they have been at work. The contractor will be expected to provide the Employer with a scheduled 12 hour coverage roster with the contact details of the person scheduled to work for that week. If changes occur on the scheduled 12 hours coverage roster the employer should be notified, and such changes must be authorised by the employer/ employer's representative. If the employer/ employer's representative did not authorise the changed then such changes cannot be implemented.
- 3.9.2.3 Travelling payments for this arrangement (Scheduled 12 hours coverage) will only be to the contractor for the standby vehicles. There will be no hours paid on travelling for scheduled 12 hours coverage crews, as their travelling will be regarded as home – work -home. It is a requirement that all employees on the scheduled 12-hour roster, reside in Ermelo.
- 3.9.2.4 The Standby roster should be submitted to Eskom at least a month prior that Scheduled 12 hours coverage Roster's execution month. The Employer/ employer's representative has a right to influence changes on the Scheduled 12 hours coverage Roster for the purpose of balancing the skills. The final draught of the Scheduled 12 hours coverage Roster should be agreed on by both Eskom and the contractor.
- 3.9.2.5 Site work execution for the crew scheduled to work will be as per the Work Management prioritization guide, which states:

**Priority 1 defect is that which,**

- Causes a load loss immediately,
- Has immediate harm to the environment and
- Has immediate safety implication to the people and equipment/ machinery.

All Priority 1 work/ notifications must be executed within 24 hours.

**Priority 2 defect is that which,**

- Will cause a load loss in 7 days,
- Will have an environmental impact in 7 days and
- Will have safety implications to the people and equipment/ machinery.

All priority 2 work/ notifications should be executed within 7 days.

**Priority 3 defect is that which**

- has no load loss, environmental and safety of people and equipment/ machinery implications.
- All priority 3 work/ notifications can be planned and executed as per the plan.

All priority 1 and 2 work done should be accompanied by a notification number.

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- 3.9.2.6 Management can book overtime not more than 3 times a month, if there is any urgent work/callout that requires their presence such work/callout shall be done within 5 hours; hours beyond the stipulated hours should be compensated by the contractor. The supervisor will work overtime only if given written authorisation by the service manager, and overtime worked without written authorisation shall not be paid.
- 3.9.2.7 This scheduled 12-hour coverage will not be regarded as shifts; therefore, shift allowance and shift rests will not be applicable, only hours worked will be booked and the resting periods will be as negotiated with the contractor upon placing of the contract. No employee will book more than 60 hours a month. Whether there is an outage or not, hours booked should be capped to 60 hours per individual. The outage technician and mechanic can only be included in the scheduled 12 hours coverage when there is an outage on-going. Should there be a different outcome during negotiations of the contract regarding booking of hours for the scheduled 12-hour coverage arrangement; the agreed terms will take precedence over this section: 2.10.2.7. Therefore, the hours booked will be as per the price list provided in the NEC contract.
- 3.9.2.8 The Contractor is expected to have system Administrators scheduled to work on a call out basis to perform system administration C&I related Breakdowns. When there is a failure where no fault could be found or not an acceptable answer for failure is determined, it would be the Contractors responsibility to liaise with Eskom personnel to obtain an answer via Siemens Germany Omnivise services which Eskom has a Contract with. The urgency to solve the problem will be determined by the notification priority.
- 3.9.2.9 Contractor to anticipate and cooperate in any audit or investigation that would involve C&I.
- 3.9.2.10 The Contractor will be responsible to ensure that skills transfer and training take place to ensure long term sustainability.
- 3.9.2.11 All C&I work that does not fall within the requirements of the permit-to-work system must be executed under the limited access register.
- 3.9.2.12 The Employer's temporary operating instructions must be used in events, which are not covered by an existing work instruction or procedure, or to cater for a particular plant condition which is unique and not likely to re-occur.
- 3.9.2.13 All Contractors should adhere to security rules and regulations and access permits will be issued by security.
- 3.9.2.14 KKS coding and pipe colour coding as per the Eskom standard is to be always applied.
- 3.9.2.15 The behaviours of the Contractor and its employees should always 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 site. All contractor employees are not allowed to do business with Eskom or its subsidiaries, should employees found guilty of such conduct; it will be an immediate dismissal.
- 3.9.2.16 When in an emergency it is requested for C&I to do certain work, it would happen as a direct instruction from the Employer. Failure to execute such instruction will result in a disciplinary procedure being followed to correct such misconduct/ deviation.
- 3.9.2.17 All Prioritised work attended to immediately must be of a production loss (Load loss), Safety, health and environmental risk. Such work must be accompanied by a notification with a priority.

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### **3.10 Overtime**

- 3.10.1 Work executed outside working hours on Mondays to Saturdays, hourly rate of 1.5 will be paid to the employee's wage.
- 3.10.2 Work executed on Sundays and Public holidays, double the employee's wage/ hourly rate will be paid for every hour worked.
- 3.10.3 Employees will only be allowed to book for work executed outside of working hours not more than 7hrs a day during the week, not more than 24 hours on weekends and 60 hours a month.
- 3.10.4 The scheduled 12 hours coverage crews and the outage crew during outages will use the planned overtime form when on duty.

### **3.11 Leave Management**

It is the responsibility of the contractor to ensure that staff is available to perform the work under this contract and Leave should be according to the labour laws.

### **3.12 Compliance, Payments and Performance**

- 3.12.1 **Compliance:** There will be monthly meetings with the supplier to review the service level agreement and to check if the supplier is still complying with the terms of the contract and the Work Information. If a contravention to the contract agreement or the service information is noticed, a penalty of 10% of the assessment value will apply to the supplier.
- 3.12.2 **Performance:** The supplier, together with Eskom representative from C&I Maintenance, are expected to develop key performance indicators. The supplier is expected to develop a performance management plan for individual performance management and monitoring of the contractor's employees. If non-performance is noticed using the performance management plan, the supplier will be expected to take actions against the poor performing employee and provide evidence to Eskom of actions taken to correct the poor performance behaviour. If the non-performance behaviour continues for more than 3 occasions with evidence of remedial actions by the supplier, during the contract period; the supplier will be expected to remove the poor performing employee permanently from Camden Power Station and replace him/her with a new employee who will also be subjected to the performance management plan as well. Such poor performing employee will no longer be part of the contract; therefore, Eskom will not incur costs for such employee. Meetings will be held monthly with the material management supervisor to discuss monthly performance of the contract and individual performance of the contract employees.
- 3.12.3 **Payment:** Eskom will send task orders in the beginning of every month and do assessments on the 25<sup>th</sup> of every month and initiate service entries on the same day. Assessments should be signed by both the supplier and Eskom representative prior initiation of the service entry for payments. Eskom will also send a payment certificate which will be accompanied by the assessment; the payment certificate also needs to be signed by both the supplier and the Eskom representative prior payments.

### **3.13 Technical and SHEQ Training Requirements**

- 3.13.1 The Contractor shall ensure that all its employees have the following technical and SHEQ training with proof prior to commencement of the contract. If training could not be done prior, then the

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Contractor shall be given a period of 1year from the contract commencement to train its employees; Failure to adhere shall lead to the Contractor to be removed from Camden premises with immediate effect. The Contractor shall also be liable to train their employees for any other SHEQ/ Quality/ Environment and technical training which might arise from audit findings, regulation changes, legislation amendments; new Eskom requirement, which were not there before etc. at the contractor's account.

**NOTE:** Technical and SHEQ training Matrix: Below is a list of training to be done within the above stipulated periods/time frame. The **x** indicates must do (Applicable) and the **–** indicates must not do (Not Applicable).

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*Table 2: TECHNICAL AND SHEQ TRAINING MATRIX*

Training course	Site manager	Technical Supervisor	System Admin	Technician& Mechanician	Quality officer	Semi-Skilled& Safety officer	Labourers
<b>T3000 Basic</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	—	—	—
<b>T3000 Advanced</b>	—	<b>X</b>	<b>X</b>	—	—	—	—
<b>T3000 System Admin</b>	—	—	<b>X</b>	—	—	—	—
<b>MS Server Certificate</b>	—	—	<b>X</b>	—	—	—	—
<b>Cyber Security</b>	—	—	<b>X</b>	—	—	—	—
<b>Cyber security awareness</b>	<b>X</b>	<b>X</b>	—	<b>X</b>	—	—	—
<b>Networking</b>	—	—	<b>X</b>	—	—	—	—
<b>Linux certification</b>	—	—	<b>X</b>	—	—	—	—
<b>FFFR</b>	<b>X</b>	<b>X</b>	—	<b>X</b>	<b>X</b>	—	—
<b>FFFR Awareness</b>	—	—	<b>X</b>	—	—	<b>X</b>	—
<b>PSR</b>	<b>X</b>	—	—	<b>X</b>	—	—	—
<b>PSR Awareness</b>	—	—	<b>X</b>	—	<b>X</b>	<b>X</b>	<b>X</b>
<b>Working at heights</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>HIRA</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>1st line Mnt Stratus Ft4500</b>	—	—	<b>X</b>	<b>X</b>	—	—	—
<b>1st line Mnt Simulator hardware</b>	—	<b>X</b>	—	<b>X</b>	—	—	—

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1st line Mnt CODEL GCEM4000	—	X	—	X	—	—	—
1st line Mnt Ham worthy Combustion Engineering/ Fuel oil.	—	X	—	X	X	—	—
1st line Mnt on VA View	—	X	—	X	X	—	—
1st line Mnt on Fire detection	—	X	—	X	X	—	—
1st line Mnt on H2 plant	—	X	—	X	X	—	—
Job Observations	X	X	—	—	—	—	—
Re-Induction	X	X	X	X	X	X	X
Environmental Systems	X	X	X	X	X	X	X
Oil Management	X	X	X	X	X	X	X
Waste Management	X	X	X	X	X	X	X
PPE	X	X	X	X	X	X	X
SHE Systems orientation	X	X	X	X	X	X	X
Noise awareness	X	X	X	X	X	X	X
Asbestos Awareness	X	X	X	X	X	X	X
Emergency preparedness/ Planning for Evacuation	X	X	X	X	X	X	X

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3.13.2 Site facilities allocated to the Contractor. The Contractor is responsible to keep it clean and up to NOSA & Eskom standards. All changes to the workspace will become the property of Eskom and will remain so until on termination of the Contractor's service.

3.13.3 Contractor to have his own monthly Safety meetings (records to be kept and made available to Eskom on request) and attend the main SHE meetings every month. (Meetings should be according to Eskom standards and regulations).

3.13.4 The Contractor provides all personal safety equipment as stipulated by Eskom safety procedures.

3.13.5 Contractors to be LV and HV regulations authorized.

3.13.6 Contractors will be required to do induction prior to the contract commencement, thereafter on a yearly basis.

3.13.7 Contractor should work according to Eskom guidelines, NOSA & OHSA.

3.13.8 Safety inspections to be done by Eskom, or an Eskom appointed party.

3.13.9 Contractor's site manager and the safety officer will always partake in SHEQ related investigations which are C&I related.

3.13.10 The Contractor is to adhere to the site quality regulations.

3.13.11 The Contractor should be environmental ISO 14001 compliant. All substances that are used must be environmentally friendly. The Contractor should adhere to all environmental regulations.

3.13.12 The contractor to ensure that it adheres to all Camden Power station Safety processes, procedures and requirements at all times including the yearly medicals of its employees that are done prior expiring. The contractor should also adhere to SHEQ regulations at all times, failure to do so will lead to the contractor removed from Camden power station premises.

### **3.14 Exclusions from the contractor's scope of work and Eskom assistance.**

3.14.1 All maintenance on telephone lines is excluded.

3.14.2 Maintenance of MSR.

3.14.3 Eskom will supply workshop facilities and contractor to upgrade where necessary.

3.14.4 Eskom will make equipment available for the contractor and the contractor will maintain and account for the equipment's handling and safety.

3.14.5 Eskom documentation centre is available for information for the contractor.

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### **3.15 Boundaries between Instrumentation and Electrical**

#### **3.15.1 Control and Instrumentation Responsibilities**

- 3.15.1.1 All cabling with voltage less than 220V AC or 220V DC.
- 3.15.1.2 The terminations up to the primary elements.
- 3.15.1.3 The primary elements on the MV and LV switchgear will be up to the last termination point in the switchgear including the cabling to the DCS.
- 3.15.1.4 This will include all the appropriate terminations in the actuators situated inside the actuator termination box. The stroke checking of the actuators, and the necessary changes to the limits.
- 3.15.1.5 The calibration of all temperature switches, Temp TX, pressure switches, Press TX, level switches, Level TX, analysers, analyser pick-ups (non-laboratory plant equipment), flow switches, Flow TX, solenoid coils, thermocouples, RTD, (all primary plant in its entirety). That is on less than 220V AC or 220V DC.
- 3.15.1.6 The removal and replacement of spares, as temperature switches, Temp TX, pressure switches, Press TX, level switches, Level TX, flow switches, Flow TX, solenoids, thermocouples, RTD, vibration pick-ups, limits, (all primary plant in its entirety). That is on a voltage less than 220V AC or 220V DC.
- 3.15.1.7 The generator thermocouples from the DCS up to the junction box closest to the generator thermocouple through bushing.
- 3.15.1.8 All compensating cables that would be required on the complete plant.
- 3.15.1.9 Process computer system in its entirety, including operating systems.
- 3.15.1.10 All alarms that are feeding through the DCS system that are fed with a voltage less than 220V AC or 220V DC.
- 3.15.1.11 Bearing vibration systems, support if required (Gen, SFP, etc.).
- 3.15.1.12 Control and Instrumentation to support all departments who needs C&I services at no extra costs.

### **3.16 SD&L Requirements**

- 3.16.1 **Subcontracting:** When subcontracting, use of NEC will be compulsory. The *Employer* may list which subcontractors or suppliers the *Contractor* is required to enter into subcontracts with. This is usually only required where specialist services need to be obtained from a particular supplier or group of suppliers in order to comply with operational standards. The employer's representative (Service Manger) will determine how subcontract tenders are to be issued, received, assessed (using a joint report) and awarded. All contractors to be used must have a minimum of 2 years of experience in a power plant doing C&I related work. Printed Purchase orders will be used as evidence of work done. A minimum of 2 references should be provided.

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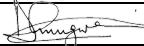

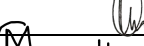
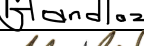


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3.16.2 Any other SD&L requirements will follow the recommendations of the SD&L practitioner and should be adhered to.

#### 4. Document Acceptance (Stakeholders)

This document has been seen and accepted by:

Name	Designation	Approval Signatures
Paul Du Plessis	Chief Technologist C&I	
Douglas Mugweni	C&I system engineer	
Gugu Hlatshwayo	Snr C&I technician	
Fikile Ngwane	Snr C&I supervisor	
Grace Mandlazi	Snr C&I technical support	
Andrew Botshe	C&I Maintenance manager	
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#### 5. Revisions

Date	Rev.	Remarks	Compiler/Reviewer
09/10/2014	0	Original Document	O. Veerasamy
22/05/2018	1	Addition of scope	O. Veerasamy
14/06/2021	2	Additional of scope	F.E Ngwane
08/11/2024	3	Additional of scope	F.E Ngwane
05/2025	4	Amendments	M Nkosi

#### 6. Development Team

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

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#### 7. Acknowledgements

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## 8. Minimum Toolbox List

Table 3: Minimum tool list

AREA: C& I MAINTENANCE				Technician name:				YEAR:				
<div>NOTE</div> <div>DO NOT” tick” use the <u>number</u> of the specific deviation given in the legend below. If the hand tool is defective, it must be tagged “Defective” and must be reported to the person responsible for the repair of equipment. If the hand tool is beyond repair, it must be destroyed and discarded.</div> <div>LEGEND</div> <div>1. Damaged – repair 2. Unsafe – replace 3. Not provided – supply 4. Guarding device missing 5. Storage facilities inadequate 6. Good condition 7.</div>												
ITEMS INSPECTED	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Long nose/Plier												
Water pump plier												
Stanley Knives												
S/D Small flat 4mm												
S/D Big flat 6mm												
S/D Small star												
S/D Big star												
Terminal S/D												
Allen keys												
Fluke multimeters												
Torch												
Side cutter												
Shifting 6”												
Shifting 10”												
R/F spanner 8mm												
10 mm ring flat												
13 mm ring flat												
17 mm ring flat												
19mm ring flat												
Brush												
2-way radio/ Pax phones												
Crimping tool												
Tool bag												
Jewelers S/D												

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