Electrical Maintenance Services Contract

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Table of contents

Page

1 Description of the Services

1.1 Executive overview

The contract is for the provision of:

- **General Electrical Maintenance Services**

For the Electrical Maintenance Department at Camden Power Station.

The Services support the Strategic objectives of, Electrical Maintenance, Support Services, Emergency Breakdown Services, and Electrical Outages for Camden Power Station Electrical Plant, as per the Service Information. Services rendered are for the duration of the contract, from the start date to the completion date.

1.1.1 General Maintenance Services

These services are for the entire Electrical Plant of Camden Power Station and associated facilities. The service is for all current and future installations which shall include all electrical outage work, routine maintenance, repairs, inspections, cleaning, support services, and emergency breakdown services.

These will include Services on Transformers, MV Motors, LV Motors, Cables, MV Switchgear, LV Switchgear, High Voltage (HV), Medium Voltage (MV), and Low Voltage (LV) Distribution Networks for AC and DC Systems, Power Station Lighting, electrical Actuators supply, switching Devices, control circuits, heater circuits, thyristor units, and small power supplies which are contained within, but not limited to the Premises of Camden Power Station.

1.1.2 Cable Services

Cable Services are for the Testing of LV cables, Tracing, and Commissioning of Power, and Control cables.
The Services are for Installation, maintenance, testing and repairs of cable and earthing (Sizes up to 35mm2) systems. The Services are for normal and Emergency Breakdown and Repair Services of Cables, and Earthing systems at Camden Power Station for Electrical Maintenance, Outages and Projects.

1.2 Definitions and Abbreviations

- **Comprehensive Report:** means a certificate as contemplated in the relevant health and safety standard incorporated internal to these Regulations.
- **Modification:** means any alteration to a plant system affecting the control, load, travel or safety thereof.
- **Operator:** means a person who is selected, trained, assessed, and authorised in terms of legislation to operate specific equipment.
- **Plant:** is defined in this Scope of Work,
- **Work/Services** is the physical activities carried out and is internal interpreted as per the definition of the NEC 3 of June 2005.

Table 1: Abbreviations.

Abbreviation	Meaning/Definition
CoE	Centre of Excellence
DOL	Department of Labour
EOD	Electrical Operating Desk
GMR 2(7)	General Machinery Regulation 2(7)
LAR	Local Access Register
NEC	New Engineering Contract
OEM	Original Equipment Manufacturer
OHS Act	Occupational Health and Safety Act 85 of 1993
PSM	Power Station Manger
PSR	Plant Safety Regulations
QCP	Quality Control Plan
SANS	South African National Standards
SAP	Systems Application Processes
SMAT	Safety Management Auditing Technique

1.3 Employer's objectives and purpose of the Service

The services are for the entire electrical plant maintenance of Camden Power Station and associated facilities. The services are for all current and future installations which shall include all related electrical project installations, outage work, routine maintenance, repairs, testing, inspections & cleaning, support services, statutory inspections, emergency breakdown services, structural repairs and defect correction during normal and abnormal plant condition or operation, to ensure the integrity of the electrical plant at Camden Power Station within the boundaries of the site.

The contractor shall through execution of the services ensure that all electrical systems are safe and operational. These will include transformers, drive motors, dampers, actuators, limit switches, control circuits, heater circuits, thyristor controller units, supply cables, and small power supplies which are contained within but not limited to the Coal conveyor plant, old and new Ash plant, Boiler plant, Water treatment plant, Coal offloading facility, Sewage infrastructure and Turbine-Generator plants and its sub systems.

This is an all-inclusive maintenance package for all Electrical Systems at Camden Power Station. The contract will include provision of support and emergency breakdown services for Camden Power Station plant as per the Service Information. Services rendered are for the duration of the contract, from the start date to the completion date.

The contractor must be authorized in terms of PSR (low voltage) and ORHVS (high voltage) to be able to perform the activities covered in this specification, failing to do so will result in a 10% will be deducted on monthly gross labour charged effective after three months when the contract is in place/signed. Continuous failure to comply will lead to NCR's and possible termination of contract as per KPI requirements.

The objective is to ensure that all electrical plant receives the highest degree of attention in quality engineering, operational and maintenance, all of which is aligned to the South Africa National Standards (SANS).

NOTE* not being fully accredited and compliant to the below ISO standards for the duration of contract will automatically disqualify the Supplier for further evaluation.

- The quality requirements are as per ISO 9001 of 2018 standard, Quality Management System.
- The requirements of ISO14001, Environmental management.
- The requirements of ISO18001, Documentation control; Occupational Health and Safety Management Standard.

The maintenance and management of such installations is to ensure that they are maintained and inspected to the highest degree in accordance with the SANS standards and the OHS Act, and to ensure that no injury or fatality will occur in relation to such installations that could have been anticipated or foreseen.

The contractor shall through execution of the services ensure that all systems are safe and operational.

1.3.1 The services shall *include the following:*

HVAC systems

- Maintenance of HVAC system power supply.

Power Electronics Power Supply

- Battery charger and rectifier units
- Uninterruptable Power supplies (UPS), Voltage Dip Inverters (DPI), and Variable Speed Drives (VSD's) units.
- Extraction fans.

Protection Maintenance

- All protection primary plant.

The Electrical Maintenance services rendered and required will interface with other departments or Service providers and still requires the disconnection, reconnection, cleaning, installation and/or removal of components, wiring, equipment, or the safe access to the systems, and is not excluded from the Responsibilities of the Service Provider.

1.4 Operating Philosophy

Camden Power Station operates on a 24-hour basis, 7 days per week in continuous load following mode or as the Employer may deem necessary to provide Sustainable Electrical Supply to the Electrical Network.

1.5 Maintenance Philosophy

The Contractor provides all services, specialized tools and equipment, specialist personnel, and all associated maintenance services to accomplish and execute the requirements of the Service Information. The Contractor provides specialist technical consulting services, which support the optimum and continuous operation of the Employer's assets on an "as and when" required basis.

The service is performed on existing and new installations and comply with good engineering and maintenance practices and standards for fossil fuelled power plants and conforms to the Legal, Environmental, Health and Safety, Quality and other Eskom specifications, procedures, standards and conditions prevailing at the Site.

In these terms, the contractor shall maintain, issue all legal documentation, and requirements, and certification to ensure compliance.

Maintenance will be carried out in the following categories and Camden follows the SAP computerised business Planning and Execution for maintenance services:

1.5.1 Corrective Maintenance

Is the maintenance carried out after a failure has occurred and is intended to restore an item to a state in which it can perform its required function.

1.5.2 Preventive Maintenance

Is the maintenance carried out at pre-determined intervals, or corresponding to prescribed criteria, and intended to reduce the probability of failure, or the performance degradation of an item.

1.5.3 Planned Maintenance

Is the work performed during a planned (scheduled) outage of the specific plant or generating unit in question.

1.5.4 Routine Maintenance

Is time-based maintenance work that is performed with the plant either ON or OFF load.

1.5.5 General Overhaul

A declared outage when a Generating unit is taken off-line. During this outage all plant having no redundancy is overhauled to ensure reliable and safe operation.

1.5.6 Mini General Overhaul

During this outage, only the following interventions will be attended to:

- Those plant items with no redundancy and which will not remain reliable up to the next General Overhaul.
- Inspections of suspect plant items.

1.5.7 Opportunity Repairs.

These are short outages between Overhauls to enable essential repairs and inspections to be executed.

For a detailed description of above-mentioned Definitions, refer to MV and LV Philosophy, 240- 143465894, and Outage Philosophy, 240-140385441.

2 Legislation and Site regulations

All contractors shall, before commencement of services ensure that all their employees are familiar with the relevant Eskom Camden, SHE documentation that is applicable to contract services.

The contractor conforms to all prevailing Legal requirements of the Republic of South-Africa, Eskom SOC Limited and Camden Power Station Site Legal requirements. With special reference but not limited to the following:

- Occupational Health and Safety Act 85 of 1993 as amended and its regulations.
- Compensation for Occupational Injuries and Diseases Act 130 of 1993 as amended.
- National Environmental Management Act 107 of 1998 as amended.
- National Environmental Waste Act 59 of 2008 as amended.
- National Water Act 36 of 1998 as amended.
- Eskom procedures and safety requirements set out in Safety, Health and Environmental specifications, Document 004 4830.

- Eskom procedure 32-95 in regards with the management of safety, health and environmental incidents
- SANS 10400: National Building Regulations
- Generation Plant Safety Regulations, Doc No: 240-150642762
- Operating Regulations for High Voltage Systems, Doc No: 240-114967625
- GGPP0592: Generation Policy: Power Station Plant Classification
- OPG 0159-02: Eskom manual: Classification Guideline
- SANS Standards as is applicable to the respective plant.
- The Constitution of the Republic of South Africa (particularly Section 24 of the Bill of Rights).
- Environment Conservation Act 1989 (Act 73 of 1989).
- Civil and Building Work Act.
- National Road Traffic Act 93 of 1996.

Any other act or procedure deemed necessary or applicable if the work includes some toxic and/or hazardous substances during normal and routine maintenance activities stipulated in this document. In this case the *Contractor* handles such hazardous substances in accordance with the applicable regulations and procedures and are disposed of by the contractor in accordance with the applicable law.

2.1.1 Plant Safety regulations (PSR) and Operating Regulations for High Voltage systems (ORHVS)

- The Contractor ensures that all employees (Supervisory and Responsible) under his/her control are authorised in terms of both Eskom PSR and ORHVS site specific regulations for the duration of the contract.
- The contractor's staff shall be authorised within 3 months from the start date of the Contract. **All** supervisors and Electricians shall be authorised int terms of PSR and ORHVS. NOTE, 100% compliance is required.
- Assistance/semi skills must be authorised in terms of PSR (Module 1 access) within 9 months.

  NB: Fully PSR training not a mandatory requirement.
- There is no cost element in this regard, the training is site specific and for the Employer.

- The contractor oversees and manages the health and safety of his/her own employees and gives access to other parties on plant and equipment under the contractor's control in terms of ORHVS.
- The contractor shall ensure that responsible and supervisory personnel are available at planned time of commencement for all work (Section 1.3) to be performed in regard to Eskom's Permit to Work system (PSR and ORHVS).
- On arrival onto an Eskom site, a Risk Assessment shall be performed by a Competent or Responsible person in order to determine the nature of the Eskom Permit to work required, and the risk to Trip or Load Loss, and preventative measures required to safely execute the work. The contractor supervises and manages the health and safety and gives access to other parties on plant and equipment under the contractor's control in terms of ORHVS.
- The contractor manages and maintains authorisation of his/her employees, maintain records of authorised employees; manages re-authorisation and report statistics on monthly site report to the Employer.
- The Regulations are continually audited, the Service provider shall assist and conform to these audit requirements, implement, and rectify findings and shortfalls.
- Any violation to these regulations shall be investigated, and immediate corrective action taken towards complying, and corrective action against defaulting/non-adhering individuals. The Service provider to take note off and adherence to the Eskom Cardinal live Saving Rules, as a non-negotiable.

2.1.2 Standards and Specifications

Table 2 below provides an indication of the SANS standards to be in the possession of the Contractor during the duration of the Contract and additional standards shall be enforced as is applicable to the plant. Table 2 is only an indication of the requirements which shall be complied to. The Employer shall provide all standards, regulations or requirements which are developed by the Employer or the Organisation.

Table 2: Standards and Specifications

Standards for Electrical systems is obtainable from the website or alternatively from the Electrical Engineering department at Camden Power Station.

Item	Description/Title	Revision
	Eskom ESKASAAU7: Quality Requirements for the Procurement of Assets, Goods and Services.	Latest
	SANS 1339 SABS 1339 2010 4 Electric cables - Cross-linked polyethylene (XLPE) insulated cables for rated voltages 3,8/6,6 kV to 19/33 kV	Latest
	SANS 1507-1 SABS 1507-1 2007 1.01 Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 1: General	Latest
	SANS 1507-2 SABS 1507-2 2007 1.01 Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 2: Wiring cables	Latest
	SANS 1507-3 SABS 1507-3 2007 1.01 Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 3: PVC	Latest
	SANS 1507-4 SABS 1507-4 2009 1.02 Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 4: XLPE Distribution cables	Latest
	SANS 1507-5 SABS 1507-5 2009 1.02 Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 5: Halogen-free distribution cables	Latest
	SANS 1507-6 SABS 1507-6 2007 1.02 Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3 300 V) Part 6: Service cables	Latest
	SANS 97 SABS 97 2010 7 Electric cables - Impregnated paper-insulated metal-sheathed cables for rated voltages 3,3/3,3 kV to 19/33 kV (excluding pressure assisted cables)	Latest
	SANS 529 SABS 529 2007 3 Heat-resisting wiring cables	Latest
	SANS 808 SABS 808 1967 1 Cable glands for use on flameproof enclosures (Ex d)	Latest

Item	Description/Title	Revision
	SANS 876 2009 1 Cable terminations and live conductors within air-filled enclosures (insulation co-ordination) for rated a.c. voltages from 7,2 kV up to and including 36 kV	Latest
	SANS 10142-1 SABS 0142-1 2009 1.07 The wiring of premises Part 1: Low-voltage installations	Latest
	SANS 10142-2 2009 1 The wiring of premises Part 2: Medium-voltage installations above 1 kV a.c. not exceeding 22 kV a.c. and up to and including 3 000 kW installed capacity	Latest
	Eskom Requirements for control and power cables for power stations Unique Identifier:240-56227443	Latest
	NWS 1220: Specification for cable junction and reduction boxes for power stations.	Latest
	Drawing 0.00/1310: Standard power and control cable code	Latest
	Eskom NWS 1058: Safety on Construction Sites: Requirements which Contractors must comply with	Latest
	Eskom NWS 1007/P: The Management of Construction, Commissioning and Hand-Over of Plant	Latest
	Outage Philosophy and Strategy for Camden Power Station Doc No: 240-140385441	Latest
	Eskom NWS 1525: Specification for Control and Instrumentation Cables	Latest
	Eskom NWS 1674: Drawing Acceptance	Latest
	Eskom NWS 1024: Specification for Panel Hardware and Components for Electronic Equipment	Latest
	Eskom GGS 0349: Quality Assurance	Latest
	Eskom GGR0992 Plant Safety Regulations	Latest
	Eskom Camden 7.1/PR/03 KKS and Labeling – Camden Procedure	Latest
	Eskom 0.54 393 Rev 22 Eskom Earthing Standard Drawings	Latest
	36-946 WI for electrical drawings and documentation	Latest
	36-944 General drawing standard WI	Latest
	GGS0315 Standard drawing practise	Latest
	36-947 WI for C&I on drawings and documentation	Latest
	GGG0450 Guideline to acceptance of contractor drawings	Latest

Item	Description/Title	Revision
	36-943 Engineering drawing office and engineering document standard.	Latest
	SANS 1574-1 Electric flexible cables with solid extruded dielectric insulation Part 1: General	Latest
	SANS 1574-2 Electric flexible cables with solid extruded dielectric insulation Part 2: PVC insulated flexible cables for domestic, office and similar environments (cords)	Latest
	SANS 1574-3 Electric flexible cables with solid extruded dielectric insulation Part 3: PVC-insulated cables for industrial use	Latest
	SANS 1574-4 Electric flexible cables with solid extruded dielectric insulation Part 4: Rubber-insulated cables for domestic, office and similar environments (cords)	Latest
	SANS 1574-5 Electric flexible cables with solid extruded dielectric insulation Part 5: Rubber-insulated cables for industrial use	Latest
	SANS 1339 Electric cables - Cross-linked polyethylene (XLPE) insulated cables for rated voltages 3,8/6,6 kV to 19/33 kV	Latest
	SANS 1411-1 Materials of insulated electric cables and flexible cords Part 1: Conductors	Latest
	SANS 1411-2 Materials of insulated electric cables and flexible cords Part 2: Polyvinyl chloride (PVC)	Latest
	SANS 1411-3 Materials of insulated electric cables and flexible cords Part 3: Elastomers	Latest
	SANS 1411-4 Materials of insulated electric cables and flexible cords Part 4: Cross-linked polyethylene (XLPE)	Latest
	SANS 1411-5 Materials of insulated electric cables and flexible cords Part 5: Halogen-free, flame-retardant materials	Latest
	SANS 1411-6 Materials of insulated electric cables and flexible cords Part 6: Armour	Latest
	SANS 1411-7 Materials of insulated electric cables and flexible cords Part 7: Polyethylene (PE)	Latest
	SANS 10198 All parts selection and handling of cables	Latest
	240-56536505: Hazardous Locations Standard.	Latest
	240-86239985: Hazardous Location Committee Responsibilities and Functions.	Latest

Item	Description/Title	Revision
	240-86239967: Management of Hazardous Locations.	Latest
	ARP 0108: Regulatory requirements for explosion-protected apparatus	Latest
	SANS 10086-1: The installation, inspection and maintenance of equipment used in explosive atmospheres Part 1: Installations including surface installations on mines	Latest
	SANS 10086-3: The installation, inspection and maintenance of equipment used in explosive atmospheres Part 3: Repair and overhaul of equipment	Latest
	SANS 10108: The classification of hazardous locations and the selection of equipment for use in such locations	Latest
	SANS 10119: Reduction of explosion hazards presented by electrical equipment - Segregation, ventilation, and pressurization	Latest
	SANS 10123: The control of undesirable static electricity.	Latest
	SANS 10142-1: The wiring of premises Part 1: Low-voltage installations	Latest
	SANS 10313: Protection against lightning - Physical damage to structures and life hazard.	Latest
	SANS 60079-0: Explosive atmospheres Part 0: Equipment - General requirements	Latest
	SANS 60079-10-1: Explosive atmospheres Part 10-1: Classification of areas - Explosive gas atmospheres	Latest
	SANS 60079-10-2: Explosive atmospheres Part 10-2: Classification of areas - Combustible dust atmospheres	Latest
	SANS 60079-14: Explosive atmospheres Part 14: Electrical installations design, selection, and erection	Latest
	SANS 60079-17: Explosive atmospheres Part 17: Electrical installations inspection and maintenance	Latest
	SANS 60079-19: Explosive atmospheres - Part 19: Equipment repair, overhaul and reclamation	Latest
	SANS 60079-20-1: Explosive atmospheres Part 20-1: Material characteristics for gas and vapour classification - Test methods and data	Latest
	SANS 60079-26: Explosive atmospheres Part 26: Equipment with equipment protection level (EPL) Ga	Latest
	SANS 60529: Degrees of protection provided by enclosures (IP Code)	Latest

Item	Description/Title	Revision
	SANS 61241-0: Electrical apparatus for use in the presence of combustible dust Part 0: General requirements	Latest
	SANS 62305-1: Protection against lightning Part 1: General principles	Latest
	SANS 62305-2: Protection against lightning Part 2: Risk management	Latest
	SANS 62305-3: Protection against lightning Part 3: Physical damage to structures and life hazard	Latest
	SANS 62305-4: Protection against lightning Part 4: Electrical and electronic systems within structures	Latest

2.1.3 Requirements

In addition to the South African National Standards applicable to electrical systems, the following will be applicable to Eskom Camden Power Station.

Any modification to a cable system or electrical installation shall automatically be regarded as a modification, due to the life safety impact, and shall follow the appropriate requirements for the specific level of plant modification (i.e. will result in any deviation from the established design base)

All breakdowns and callouts to the service provider shall be logged in a call-out register, at a manned control room (EOD), with a reference number, time, date, and nature of defect for record purposes.

All electrical plant modifications, refurbishment, replacement, and upgrades of a major component shall be managed to comply with the latest legislative requirements.

Where certain aspects of the maintenance, management, modification, or upgrade of services are contracted out, verification by experienced staff is required to ensure full compliance to legislation and applicable standards.

In cases where doubt exists, for whatever reason, in the correct identification of plant to be worked on, such plant will be proven, until it could be verified for repairs. Local isolation procedure to be followed.

All upgrades and modifications will be approved by Eskom engineering department with support documents before implementation.

The competent Service provider shall have a formal risk assessment process, identifying risks associated with the Services rendered for every service provided.

Camden Power Station have developed a maintenance strategy which include work packages (PM's) for all critical and non-critical plant system. This must be always adhered too by the service provider.

All critical and non-critical spares for electrical systems to minimise downtime are available at Eskom stores on request. If there's any special or urgent purchase required from the service provider, an approval shall be obtained from the employer.

The Service provider will implement a QCP for all activities carried out by the competent service provider.

2.1.4 Maintenance

The contractor manages and maintains the Plant by adhering to all Legal, Site Regulations, Policies, standards, and Procedures when executing work. To this end the contractor ensures the following:

- Disconnect and reconnect required power cables as per cable schedules.
- Cable replacement shall include the removal of the cable which is being replaced as per cable schedules or already identified by others to be replaced.
- All personnel, equipment, spares or any material used to perform functions as outlined in this document shall be approved for use by the Employer and shall include but not limited to certification, expiration and qualification.
- Inspect, test and repair earthing on all the Units and Common Plant, when required.
- Issue Certificate of Compliance for work done as per referenced standards.
- The Contractor must also provide knowledge and recommendations on other plant falling within his field of expertise.
- The Contractor issues a monthly report to the Service Manager as agreed between both parties. This report shall include all work done to date, work in progress (including the status) and future work if an order is already in place during the preparation of the report and any other work that the Contractor is busy with. The report also includes a copy of all the invoices issued during that month.
- Investigate, identify, and report potential plant failures as per Task order.

- Recommend actions, modifications, system, and process changes.
- Participate in investigations, and attend meetings as required.
- There shall be efficient overall organisation of personnel and services.
- Any cable that is decommissioned, unused or removed by the Contractor must be communicated to the Service Manager or authorised delegate to obtain information about storage or disposal of that cable.

3 Maintenance Requirements

3.1.1 Plant Labelling, Coding, Notices and Signage

The contractor adheres to the requirements stipulated in document 240-64550692. The supplier inspects and maintains on continuous basis, all labelling, notices and signs of electrical equipment and plant under his/her control to ensure the following:

- All electrical Plant shall be correctly labelled as per document no: 240-64550692: Label Specification and Plant codification.
- All non-labelled or defective labelling shall be reported to the Employer for replacement. This replacement function is done by engineering Support Services.
- All Notices and signs shall be affixed to the Plant, any discrepancies shall be reported, and repairs/ replacement brought in effect.
- In instances where the Employer cannot provide labelling, provisions shall be made by the Contractor to provide labelling according to Eskom requirements and specifications.
- The contractor ensures that the labelling is affixed to any replacement part of any piece of equipment/apparatus or part that is removed or replaced.
- Deviations from the approved Norm shall be defected on SAP system for repair.

3.1.2 Substations

The contractor manages, inspects, and maintains all Camden Electrical substations:

- Monthly inspections shall be carried by the contractor and report on the status of each and every Electrical substation at Camden.

- The Service provider shall have an approved “Substation Inspection Sheet” detailing the Interventions of the Inspection, with section for defects observed, and defect numbers generated. This sheet will be kept on file for the Report and submitted to Service manager.
- The inspection report shall observe as a minimum the following: Notices and Signs to be replaced, the building walls, floors, windows, doors, roofs and ceilings, water leaks, small power and lighting, cleanliness, earth leakage reporting, tripped circuitry, condition of switchgears, Earthing and cabling installation, loss, and damage due to theft, general notifications observed, and remedial action taken.
- The substation shall be cleaned, debris removed, swept, and wet mopped, and it is the duty of the electrician to give access to OPS Support personnel whom is task with cleaning activities.
- No defective equipment or defective apparatus shall remain in a substation. It shall be cleared and discarded off/ returned to, in the correct manner as per conditions prevailing at site. No electrical consumables shall be left in the substation after maintenance (defective fuses, cleaning materials, defective components, etc.)
- All lighting circuits shall be inspected and ensure all substation lighting is in working order and repaired where required. This will be executed with the monthly inspection works packages as planned in the SAP system.
- All small power socket outlets shall be in working condition, labelled, safe and securely installed, any defective circuit and equipment shall be immediately repaired.
- All small power distribution boards inspected, cleaned, maintained, labelled according to latest SANS standards, and/or prevailing site conditions. Every Distribution board for domestic, and power circuits shall be affixed with an inspection sheet on inner door, labelled ‘Earth leakage Register” and shall be current at all times as prescribed in SANS 10142- “wiring of premises”.
- Ensure after all services has been executed, all access and emergency exit doors are locked and operation of such doors and locks is in safe, reliable working condition. If the doors’ locking mechanism is defective, inform the

Service manager immediately, and generate a notification at Works management department on SAP system for civil repairs.

- Ensure that all access and emergency escape routes are clearly demarcated and kept clear of any obstruction, this shall be maintained, and rectified immediately.
- All notifications on the electrical and civil infrastructure are created, scheduled on SAP, and work executed to ensure compliance.
- Maintain a durable, neat and professional appearance of doors, floors, walls, and ceilings by repairing and painting as and when required this is executed by Civils contract; where an instruction is issued by the Service manager to bring repairs into effect, it will form part of the price List.
- Ensure demarcation of panels and electrical infrastructure and compliance to “Arc flash boundaries” as per site engineering specification. The Service Provider ensures the installation and upkeep of “back access barriers” to enforce limited access to back of Switchgear panels.
- The Service provider shall attach and maintain the “Arc Flash Boundary “stickers on all Switchgear panels. This sticker is obtained from Electrical Engineering Department, who has the correct designs. The Service provider shall at request of the Service manager, have such labels made according to the design.
- The contractor ensures and puts measures in to place, as to keep the area clean and free of dust.
- All repairs/alterations that involve modifications shall be approved through the Camden Change Management process via the Electrical Engineering department to conform to latest Legal, and Eskom requirement and specifications prevailing at the site.
- Ensure that all required safety signs and notices is available, and are applied to substations and maintained to the requirements stated in this document, Standard Electrical Safety Signs and notices will form part of the Price List
- Notices and Signs shall always be affixed at Substations, any faded and missing Notices and Signs shall be replaced. The Service provider shall note

such a defect and replace it. Notices and signs shall form part of the Price List.

- Ensure that all safety equipment required (i.e., fire extinguishers) at the substation or in the substation are available or made available (by the employer), inspected at required intervals and placed in demarcated areas.
- Ensure and enforce the use of required safety equipment and personal protective equipment when entering the substations, as per Eskom minimum requirement.
- Arc Flash overalls are manufactured at a Specific Standard, and to ensure Compliance, the Employer shall provide such overall to the Service provider. This shall be in accordance of Camden Power Station arc flash procedure (Latest revision).

3.1.3 Low Voltage Power Systems and Distribution Cubicles

The contractor manages, inspects and maintains on a monthly basis all Camden electrical distribution boards installed in the Plant, offices and buildings, and to ensure that all installations comply and conform to legislation, and SANS wiring codes of practice, whether listed or not:

- All low Voltage distribution boards are inspected, cleaned, maintained, labelled according to latest SANS standards, and/or prevailing site conditions.
- A durable, neat and professional appearance of distribution boards and sub cubicles are maintained by replacing or repairing and painting as and when required, all face plates and black plates shall be available, and doors shall be lockable with the required hinges and locking mechanisms, conforming to SANS 10142 and SANS switchgear installations up to including 10KA.
- IP Ratings as prescribed in SANS 10142 shall be always maintained, deficiencies shall be rectified.
- Demarcation and labelling of panels shall be done to ensure compliance to “Arc flash boundaries” as per site engineering specification.
- Ensuring all installations conform to requirements of hazardous zone classification,” Electrical Installations in explosive Atmospheres”.
- Ensuring that all safety covers and locking devices are affixed.

- Testing of all safety devices and earth leakage units within or feeding from the distribution boards with approved test equipment to the latest legal, and Eskom Standards.
- Ensures that the equipment is tested on regular intervals as legally specified in the Standards.
- Immediately replaces any circuit breaker or Earth leakage unit, with a comparable unit when it becomes apparent that such equipment is defective.
- Maintains a register of each distribution board wherein all data of tested or replaced devices are tabled. The register will be affixed inside the panel door of the distribution board.
- All Low Voltage socket outlets are in working condition, labelled, safe and securely installed, robust and appropriate for the intended environment and application.
- All cabling, trunkings, cable racks and support systems are securely installed, earthed, bonded and supported to the required standards.
- Installed additions are as per engineering specification and engineering change process, and issue required Certification of Compliance (CoC).
- The Service provider shall ensure that all Electrical Installations are audited for compliance, rectify deficiencies, and issue Certification of Compliance (CoC).
- All defects noted on the electrical and civil infrastructures are reported, and notifications are created on SAP, scheduled and work executed to ensure compliance.

3.1.4 Lighting

Only approved lighting fixtures and luminaires shall be installed and maintained at Camden Power Station. The approval is done by the Research Testing and Development Department (RT&D) of Eskom Holdings. Electrical Engineering Department will assist in acquiring the approval of luminaires from RT&D.

It is to be noted that certain LED fixtures might interfere with control signals, and therefore approval shall be obtained for every change request or in a new installation.

The lighting installation and associated work shall be designed and executed in accordance with Eskom Safety and site management standards, SANS codes of practice, Occupational Health and Safety Act No. 85 of 1993 and the equipment manufacturers' recommendations.

The contractor install, manages, inspects, and maintains on a continuous basis all Camden Power Station lighting systems in the hazardous locations, boiler house, turbine house, auxiliary bay, offices, switchgear rooms, substations and workshops, control room, cable tunnels, substation basements, conveyor walkways, outside areas and terrace lighting, smoke stack lighting, coal stock yard lighting and security fence to ensure that:

- All areas must conform to minimum illuminance levels as specified in **SANS 10114-1**
- All lights at Camden Power Station are to be kept in good working condition, fittings, fittings, fixtures, and lenses are cleaned on regular basis.
- All covers, fittings and fixtures and lenses are to be cleaned as per maintenance criteria specified in Eskom standard 240-55714363.
- All cabling, trunkings, cable racks and support systems are securely installed, earthed, bonded, and supported to the required standards.
- All lighting and small power design changes shall be verified and approved as per the project design change management process as stated in the site's contract. An Electrical Certificate of Compliance shall be issued for the installation in terms of the Occupational Health and Safety Act, (OHS Act 85 of 1993).
- Energy saving is promoted using Eskom approved energy efficient fittings and fixtures.
- Day-night control, photo electric control unit (PECU) and or motion detection systems on substations and outbuildings light circuits is installed and to be maintained without impairing on health and safety of people.
- All installations conform to requirements of "Electrical Installations in Explosive Atmospheres" and to the hazardous zone classification documentation for Camden where so applicable.
- Lighting installations shall be taken to include but not limited to:

- Solar lighting systems
- LED systems
- High pressure sodium and mercury systems
- Fluorescent lighting
- Floodlighting systems
- DC standby lighting systems
- Battery back-up fixtures in AC systems

4 Statutory Testing of Assets, Plant, Equipment and Earth Leakage relays

Wherever applicable to Electrical Plant:

Refer to latest revision of Document 229/12263, "Statutory Plant and Equipment', Electrical machinery Regulations- installations in explosive atmospheres (Hazloc).

All maintenance, testing and inspection of electrical installations in explosive atmospheres. The training requirements to be adhered to and valid for the duration of the contract.

The above referenced documentation is based on the requirements to comply with the Occupational Health and Safety Act No 85 of 1993. Ensure that all the Statutory Maintenance requirements are being managed and maintained.

The purpose of document 229/12263 is to remove any ambiguity as to what plant and equipment is described as Statutory Plant.

Statutory Plant and Equipment: "Means any plant safety or protection device and any plant, structure, item or equipment referred to in the OHS Act "Regulations," and for which there is a specific technical action and/or inspection periodicity".

The contractor adheres to, maintains the assets, Plant, Equipment and registers for all portable electrical equipment of the Employer to ensure that:

- Statutory inspection and testing intervals of assets as per legal requirement is carried out.
- The asset registers are current.
- Repairing of defective equipment is to its original designed state.

- Appointments of competent persons is in writing.
- Affected parties are notified before testing commences.
- Scrapping of unsafe equipment are done shall be reported to the employer whom will follow the required process.
- Replacing of any safety device, plant item, and circuit breaker or earth leakage unit, or Safety device is with a comparable unit when it becomes apparent that such equipment is defective.

4.1.1 Maintenance on 6,6kV Boards and Switchgear

Referenced Documentation

- UNIGEAR TYPE ZS1 Medium Voltage, Arc-proof, Air-insulated, Metal-clad Switchgear Manuals
- UNIFLEX Installation, Operation and Maintenance Instructions
- V-contact Medium Voltage Contactors
- HD4- gas Insulated MV Circuit Breakers

Refer to the MV and LV Philosophy Doc No: 240-143465894

The contractor inspects and maintains all Camden Electrical Switchgear. Maintenance of Switchgear will be executed during “Routine Maintenance”, “Opportunity Maintenance”, “General Overhaul”, or where an Emergency Breakdown has occurred, and the total Electrical board requires be shutting down and repairing under emergency circumstances.

NOTE: It will under no Circumstances be allowed by the Employer that when work is executed, fixtures and fasteners are removed, panels opened, wires disconnected, without the Service provider having met the following conditions: ***these are non-negotiable conditions***

- Every panel’s item will be bagged, tagged, and kept to the specific Tier of the Panel.
- No TIER/panel equipment’s, fasteners, bolts, and nuts will be mixed or interchanged with another tier on the same Switchgear panel.
- Every piece of *ITEM* removed, replaced, or used will be accounted for. For this purpose, the Service provider shall have check sheets logging all items to the specific Panel and Tier.
- On completion of a Task, no removed items shall not have been replaced, or be misplaced, or be unaccounted for.

- Good Housekeeping principles shall be observed at all times.
- The Service provider shall have an up-to-date register of all tools used and available at the worksite.
- The tool register shall be monitored and continually updated by the person in charge of the worksite.
- All tools and equipment signed into the workplace, shall at the completion of the work, be signed out and accounted for. Any tool not being accounted for shall require the works to be inspected, until such missing piece is accounted for.

4.1.1.1 Routine Maintenance Requirements-Switchgear

The Service provider shall make use of the SAP system and attend to Notifications as per arrangement with Works management process.

The service provider will carry out inspections on the externals of the Switchgear panels, and observe any defects visually, and execute repairs to these defects. The following is required, but not limited to:

- Ensure the Safety of personnel entering the Switchgear Substation.
- Wearing the correct Personal Protective Equipment (PPE).
- All surroundings to the Switchgear Panels and electrical equipment are kept clean, and dry.
- Ensuring that the Switchgear Substation is clean, and free from debris. Arrange and action the cleaning interventions with others.
- All KKS coding and Labelling is according to drawings, and all items are labelled accordingly. Defects are noted, repaired with immediate effect.
- All indication LED's for circuit-breaker position is tested and replaced if defective.
- All panels and covers are inspected to ensure it's completely closed, fastened, secure, and locked to ensure "ARC flash" type testing compliance. Any defect will be logged into SAP and repaired.
- Replace any cracked or broken "Vision panels", and Relay covers.
- Ensure all Ammeters and Voltmeters are operative, notifications to be raised on SAP for investigation, testing and repair.
- Inspection of main station Earthing system on the Switchgear panels.

- All Safety Signs, Arc Flash Boundary Stickers, and Notices regarding the Switchgear are affixed to the boards as per Site requirement.
- Ensure that there is Barriers installed at the REAR of Switchgear in order to Limited access to this area.
- Investigate individual faulted circuits, on request of Camden OPS department. Inspect and test individual Contactor and Circuit-breaker circuits when it fails to Rack in and Rack out, fails to Trip or Close a circuit, and take the necessary actions to rectify, abiding by the Site Regulations, especially the required PTW systems.
- Exchange individual Contactors, and Circuit-breakers which are proven to have failed. Follow Site process to withdraw and return failed and faulty items to the Eskom Warehouse/stores.
- Exchange auxiliary faulted equipment such as Fuses, Relays.
- Give access to others with regards to work to be executed in Switchgear Substation.
- Touch up of paintwork are done on panels with minimum thickness of 40-50µm.
- All routine inspection and repair will be executed in line with the OEM specifications.

4.1.1.2 Opportunity maintenance Requirements-Switchgear

The Service provider shall make use of the SAP system, and attend to Notifications as per arrangement with Works management process.

The Service provider will carry out inspections on the internals and externals of the Switchgear panels, and observe any defects and execute repairs to these defects.

For executing Opportunity Repairs, the Service Provider shall prepare a “Program with a detailed Scope of Work” listing the observed Defects which requires repair, and Legally could not, due to limitations, or dangers involved with the Switchgear being ALIVE, been executed on Routine repairs.

The Service Provider shall make a request for Switchgear Maintenance to the Employer, submitting the detailed Program, with interventions and durations for each Task.

The following is required, but not limited to;

The same requirements as 1.7.6.1 above.

- Repairs of main and control circuitry is done.
- Testing and repair of Breakers and Contactors.
- Testing of interlock positions on all breakers, Contactors, and Individual Tiers.
- Verifying the tightness of electrical connections on control wiring.
- Verifying the tightness of electrical connections of power circuit cables and verifying the torque settings.
- Faulty Breakers and Contactors are replaced. Exchange individual Contactors, and Circuit-breakers which are proven to have failed. Follow Site process to withdraw and return failed and faulty items to the Eskom Warehouse/stores
- Inspection and repairs of Earth Switch devices are done.
- Lubrication of moveable parts as per OEM guidelines is executed.
- Replacement of any worn parts is done.
- Repairs to “Castle key” lock-out systems is done
- Cleaning of breaker compartment.
- Cleaning of Control Circuits (relay) compartment.
- Cleaning of Breakers and Contactors, and lubricating contact tulips.
- The repair of any other identified Defect that might impair the correct functioning of any component in connection with the Switchgear being worked on.
- On any Plant or item where the Service provider fails to rectify or execute the services, the Service provider shall arrange with the OEM (Equipment Manufacturer) to repair such deficiency. The Employer shall ***only*** assess the amounts the Employer directly acquired from the OEM. The Service Provider pays the Employer.

4.1.1.3 General Overhaul, Mini Overhaul (GO) Requirements-Switchgear

The Service provider shall make use of the SAP system, and attend to Notifications as per arrangement with Works management process.

The Service Provider manages and maintains the Switchgear scheduled for the Overhaul or Outage by adhering to all Legal, Site Regulations, Policies, standards, and Procedures when executing work under Outages.

The Service provider ensures that he/she does not unnecessary keep Switchgear Plant on the PTW system, in order to assist in the prevention of Cable theft.

To this end he/she ensures that;

General requirements

- The Service provider provides resources to the Employer's Outage department for execution of the Services.
- The Service provider attends to all the Outage meetings as Scheduled by the Outage department, and represents the Employer.
- The Service provider attends all scheduled Planning meetings, and schedules the work according to the Outage Schedule
- The Service providers do not cause delays.
- Follow the due processes to remove faulty equipment, and request new equipment from the Outage department, which will be issued from Camden stores.
- The Service Provider plans the services in such manner as to minimize any delays and overtime.
- The Service Provider submits the Outage Plan, with the detailed Engineering Scope of Work for the services to be executed.
- The contractor drafts an (ITP's) Inspection and Test Plan for each Activity, for the Work, detailing the interventions or tasks, and the required signatories.
- The Service Provider shall get Engineering approval for all the ITP's before Works commence.
- The contractor notifies the Quality department, the Employer, and the Client (Engineering) of all Witness, and Hold points that needs to be signed off, before he carries on with the work.
- The Service provider immediately rectifies all deficiencies and discrepancies noted in the ITP.

- The contractor executes all work as detailed in the Engineering Scope of Work.
- The contractor provides all means to execute the services.
- The contractor strips down plant, clean, inspects, repair, replace, and rebuild the plant to its original state to restore it to a state in which it can perform its designed functions.
- The Service provider shall not interfere with or make changes to any apparatus.
- The contractor makes use of the Equipment Manufacturer Specifications and Requirements to restore plant and equipment to its original state.
- As far as reasonably practicable, the contractor shall ensure that a “Clean Condition Area” is maintained during the execution of services, whereby he will be able to always account, for all equipment, and tools used in the area where the service is executed. *Refer to the non-negotiable conditions for Switchgear maintenance in Section 1.7.6.*
- No interchanging of panels, segregations, fixtures, or items stripped-down on Electrical Switchgear. Items will be marked and replaced in its original position. Every item or fixture removed will be kept in an allocated container for the panel.
- Any missing or stripped fixture or fitting will be replaced.
- The employees of the Service provider shall not maliciously damage any part or component; greatest care shall be exercised in the execution of their duties.
- All equipment, parts, or spares that is removed or stripped down from the works shall be counted, listed, bagged, tagged, stored, and signed into, and signed out of, a predetermined outage storage area. It will be the responsibility of the contractor to account for each item of the service; *Refer to the non-negotiable conditions for Switchgear maintenance in Section 1.7.6*
- The Service provider shall have check sheets, and registers updated at all times to assist in this regard; *Refer to the non-negotiable conditions for Switchgear maintenance in Section 1.7.6*

- The Service Provider arranges with Works management Department to supply him/her with the necessary SAP documentation (PM's and WO's), and complete the service information in full, for history purposes.
- The Service provider signs off the Works Orders, detailing the condition of the Plant as found, the status after repairs, and the activities carried out to the plant to restore it to a state in which it can perform its required functions.
- Compile a detailed Outage report to the Employer, for all the activities covered in an outage and keep records (filed).
- Keep Certificates, test sheets, inspection reports available, and attached in the report.

Technical Requirements

- Removes all MV Breakers and Contactors during the start of the General Outage, assess the condition, and determine whether it should be serviced only, and/or be repaired at the OEM factory.
- Follow due processes to remove faulty equipment, and request new equipment from the Outage department, which will be issued from Camden stores.
- Ensure the Safety of personnel entering the Switchgear Substation.
- Wearing the correct Personal Protective Equipment (PPE).
- All surroundings to the Switchgear Panels and electrical equipment are kept clean, and dry.
- Ensuring that the Switchgear Substation is clean, and free from debris. Arrange and action the cleaning interventions with others.
- All KKS coding and labelling is according to drawings, and all items are labelled accordingly. Defects are noted, repaired with immediate effect.
- All indication LED's for circuit-breaker position is tested and replaced if defective.
- Conduct all circuit breaker and contactors functional tests and repairs as per OEM recommendations.

- All panels and covers are inspected to ensure it can completely close, fastened, secure, and locked to ensure “ARC flash” type testing compliance. Any defect will be repaired.
- Replace any cracked or broken “Vision panels”, and Relay covers.
- Ensure all Ammeters and Voltmeters are operative, tested and repaired if required.
- Inspection, testing of main station Earthing system on the Switchgear panels, and repair.
- All Safety Signs, Arc Flash Boundary Stickers, and Notices regarding the Switchgear are affixed to the boards as per Site requirement.
- Ensure that there is barriers installed at the REAR of Switchgear in order to Limited access to this area.
- Investigate individual faulted circuits.
- Give access to others with regards to work to be executed in Switchgear Substation.
- Touch up of paintwork are done on panels with minimum thickness of 40-50µm.
- Repairs of main and control circuitry is done.
- Testing and repair of breakers and contactors.
- Testing of interlock positions on all breakers, contactors, and individual tiers.
- Verifying the tightness of electrical connections on control wiring.
- Verifying the tightness of electrical connections of power circuit cables and verifying the torque settings.
- Faulty breakers and contactors are replaced. Exchange individual contactors, and circuit-breakers which are proven to have failed. Follow Site process to withdraw and return failed and faulty items to the Eskom arehouse/stores
- Inspection and repairs of earth switch devices are done.
- Lubrication of moveable parts as per OEM guidelines is executed.
- Replacement of any worn parts is done.

- Repairs to “Castle key” lock-out.
- Cleaning of the entire Switchgear Panels.
- Cleaning of Control Circuits (relay) compartment.
- Cleaning of Breakers and Contactors, and lubricating contact tulips.
- The repair of any other identified defect that might impair the correct functioning of any component in connection with the Switchgear being worked on.
- On any plant or item where the service provider fails to rectify or execute the services, the service provider shall arrange with the OEM (Equipment Manufacturer) to repair such deficiency. The Employer shall ***only*** assess the amounts the employer directly acquired from the OEM. The Service Provider pays the Employer.
- The contractor manages the access and permits on behalf of the Employer on plant under his control.
- The Service provider hands over the plant to the employer, ensuring that the plant will function to its desired designed state.

4.1.2 Maintenance on 380V AC Boards and Switchgear

Refer to the latest revision of the Maintenance and Engineering Strategies and RBO Process Policy Document No. 004 / 4715 and the individual plant RBO strategies.

Low Voltage AC switchgear is of the SIEMENS Jansen Type panels and is according to the supplier internal arch tested as per Eskom Specification GGSS 0086. The 380V LV boards are of the floor mounted, front operation with side cable access type.

Unit low voltage supply is derived from the respective 6,6kV Unit and Boiler Boards. Both Unit and Boiler Boards are equipped with 380V essential and non-essential boards.

The purpose of the essential boards is to ensure the safe shut down and rundown of the boiler and turbine in the case of an emergency or trip.

The contractor inspects and maintains on a monthly basis all Camden electrical Switchgear to ensure that:

- All KKS coding and labelling is according to drawings, and all items labelled accordingly. Defects are repaired with immediate effect.
- All indication LED's is operative, tested and replaced if defective.
- All panels and covers are inspected to ensure it's completely closed, fastened and secure, to ensure "ARC flash" type testing compliance. Any defect will be logged into SAP and repaired with immediate effect.
- All Ammeters and Voltmeters are operative.
- Inspection of main station Earthing on the Switchgear panels is affixed.
- All safety signs are affixed to the boards as per site requirement.
- Repairs of main and control circuitry is done during breakdown.
- Testing and repair of circuits is done during abnormal conditions.
- Faulty components are replaced on one to one.
- Lubrication of moveable parts are executed as per OEM guidelines.
- Touch up of paintwork on panels is done.
- Replacement of any worn and defective parts is done.
- Planning and execution of maintenance on non-unitised boards are done.
- All routine inspection and repair will be executed in line with the OEM specification.

4.1.2.1 During outages the following instructions will apply;

General requirements

- The Service Provider manages and maintains the Switchgear scheduled for the Overhaul or Outage by adhering to all Legal, Site Regulations, Policies, standards, and Procedures when executing work under Outages.
- Service provider shall ensure that the scope pf work issued to them conforms to Outage Philosophy and Strategy for Camden Power Station, Doc No: 240-140385441.

- The Service provider ensures that he/she does not unnecessary keep Switchgear Plant on the PTW system, in order to assist in the prevention of Cable theft.
- The Service provider provides resources to the Employer's Outage department for execution of the Services.
- The Service provider attends to all the Outage meetings as Scheduled by the Outage department and represents the Employer.
- The Service provider attends all scheduled Planning meetings, and schedules the work according to the Outage Schedule
- The Service provider does not cause delays.
- Follow the due processes to remove faulty equipment, and request new equipment from the Outage department, which will be issued from Camden stores.
- The Service Provider plans the services in such manner as to minimize any delays and overtime.
- The Service Provider submits the Outage Plan, with the detailed Engineering Scope of Work for the services to be executed.
- The contractor drafts an (ITP's) Inspection and Test Plan for each Activity, for the Work, detailing the interventions or tasks, and the required signatories.
- The Service Provider shall get Engineering approval for all the ITP's before works commence.
- The contractor notifies the Quality department, the Employer, and the Client (Engineering) of all Witness, and Hold points that needs to be signed off before he carries on with the work.
- The Service provider immediately rectifies all deficiencies and discrepancies noted in the ITP.
- The contractor executes all work as detailed in the Engineering Scope of Work.
- The contractor provides all means to execute the services.

- The contractor strips down plant, clean, inspects, repair, replace, and rebuild the plant to its original state to restore it to a state in which it can perform its designed functions.
- The Service provider shall not interfere with or make changes to any apparatus.
- The contractor makes use of the Equipment Manufacturer Specifications and Requirements to restore plant and equipment to its original state.
- As far as reasonably practicable, the contractor shall ensure that a “Clean Condition Area” is maintained during the execution of services, whereby he will be able to account at all times, for all equipment, and tools used in the area where the service is executed. *Refer to the non-negotiable conditions for Switchgear maintenance in Section 1.7.6*
- No interchanging of panels, segregations, fixtures, or items stripped-down on Electrical Switchgear. Items will be marked and replaced in its original position. Every item or fixture removed will be kept in an allocated container for the panel.
- Any missing or stripped fixture or fitting will be replaced.
- The employees of the Service provider shall not maliciously damage any part or component; greatest care shall be exercised in the execution of their duties.
- All equipment, parts, or spares that is removed or stripped down from the works shall be counted, listed, bagged, tagged, stored, and signed into, and signed out of, a predetermined outage storage area. It will be the responsibility of the contractor to account for each item of the service; *Refer to the non-negotiable conditions for Switchgear maintenance in Section 1.7.6*
- The Service provider shall have check sheets, and registers always updated to assist in this regard; *Refer to the non-negotiable conditions for Switchgear maintenance in Section 1.7.6*
- The Service Provider arranges with Works management Department to supply him/her with the necessary SAP documentation (PM’s and WO’s), and complete the service information in full, for history purposes.

- The Service provider signs off the Works Orders, detailing the condition of the Plant as found, the status after repairs, and the activities carried out to the plant to restore it to a state in which it can perform its required functions.
- Compile a detailed Outage report to the Employer, for all the activities covered in an outage and keep records (filed).
- Keep Certificates, test sheets, inspection reports available, and attached in the report.

Technical Requirements

- Removes all LV Breakers assess the condition, and determine whether it should be serviced only, and/or be repaired at the OEM factory.
- Follow due processes to remove faulty equipment, and request new equipment from the Outage department, which will be issued from Camden stores.
- Ensure the Safety of personnel entering the Switchgear Substation.
- Wearing the correct Personal Protective Equipment (PPE).
- All surroundings to the Switchgear Panels and electrical equipment are kept clean, and dry.
- Ensuring that the Switchgear Substation is clean, and free from debris. Arrange and action the cleaning interventions with others.
- All KKS coding and Labelling is according to drawings, and all items are labelled accordingly. Defects are noted, repaired with immediate effect.
- All indication LED's is tested and replaced if defective.
- All panels and covers are inspected to ensure it can completely close, fastened, secure, and locked to ensure "ARC flash" type testing compliance. Any defect will be repaired.
- Replace any cracked or broken "Vision panels" and covers.
- Ensure all Ammeters and Voltmeters are operative, test and repair.
- Inspection, testing of main station Earthing system on the Switchgear panels, and repair.

- All Safety Signs, Arc Flash Boundary Stickers, and Notices regarding the Switchgear are affixed to the boards as per Site requirement.
- Investigate individual faulted circuits.
- Give access to others with regards to work to be executed in Switchgear Substation.
- Touch up of paintwork are done on panels with minimum thickness of 40-50µm.
- Repairs of main and control circuitry is done.
- Testing and repair of Breakers and individual circuits to motor feeders.
- Verifying the tightness of electrical connections on control wiring.
- Verifying the tightness of electrical connections of power circuit cables and verifying the torque settings on busbars.
- Lubrication of moveable parts as per OEM guidelines is executed.
- Replacement of any worn parts is done.
- Cleaning of the entire Switchgear Panels.
- The contractor manages the access and permits on behalf of the Employer on plant under his control.

The Service provider hands over the Plant to the Employer, ensuring that the plant will function to its desired designed state.

4.1.3 Maintenance on LV (DC) Switchgear (Unitised)

The purpose of the 220VDC boards is only for DC back up when the AC power to the 380V Essential Board fails.

All units are equipped with one 220VDC Unit Board. All the drives (MCC) are of the fixed type.

The boards are equipped with earth fault relays and supplied from two incomer CFS units via 2 x 850AH battery banks in parallel.

Apart from this, the boards are supplied via a 400A CFS unit from the 220VDC, 1000A DC diesel generator.

Should the DC on the 220VDC board fail or fall below 197VDC, the diesel generator will start and restore the voltage to 234VDC. The 220DC Generators are redundant.

The contractor inspects and maintains monthly all Camden electrical Switchgear to ensure that:

- All KKS coding and labelling is according to drawings, and all items labelled accordingly. Defects are repaired with immediate effect.
- All indications are operative, tested and replaced if defective.
- All panels and covers are inspected to ensure it's completely closed, fastened and secure. Any defect will be logged into SAP, and repaired with immediate effect.
- All Ammeters and Voltmeters are operative.
- Inspection of main station Earthing on the Switchgear panels are executed.
- All safety signs are affixed to the boards as per Site requirement.
- Repairs of main and control circuitry is done during breakdowns.
- Testing and repair of circuits during abnormal condition, including field equipment is done.
- Faulty components are replaced on one-to-one specification.
- Touch up of paintwork on panels is done.
- Replacement of any worn parts is done.
- All routine inspection and repair will be executed in line with the OEM specification.

4.1.3.1 During outages the following instructions will apply:

- The same apply as stipulated in 1.7.7.1
- Service provider's adhere to Outage Philosophy and Strategy for Camden Power Station, Doc No: 240-14038544.
- The Service Provider manages and maintains the Switchgear scheduled for the Overhaul or Outage by adhering to all Legal, Site Regulations, Policies, standards, and Procedures when executing work under Outages.
- The Service provider ensures that he/she does not unnecessary keep Switchgear Plant on the PTW system, to assist in the prevention of Cable theft.

- The Service provider provides resources to the Employer's Outage department for execution of the services.
- The Service provider attends to all the Outage meetings as Scheduled by the Outage department and represents the Employer.
- The Service provider attends all scheduled planning meetings and schedules the work according to the Outage Schedule.
- The Service provider does not cause delays.

4.1.4 Maintenance on Transformers

4.1.4.1 All Power Transformers

Maintenance of electrical power transformer shall be in line with approved Maintenance Strategy.

This document will further prescribe what maintenance tasks need to be done based on the criticality of the equipment.

The scope excludes fire protection system operating and maintenance and electrical protection engineering and design.

The contractor shall refer to the following documents (latest revisions) to ensure compliance:

- Refer to the Maintenance and Engineering Strategies and RBO Process Policy Document No. 004 / 4715 Rev 3 of 22 April 2009.
- Camden Procedure: 229-12362 - Station Transformer Maintenance, Test, and Inspection Plan (Latest revision)
- OEM manuals. (WEG / Siemens / Ferranti/ Ansaldo / Ansaldo San Giorgio)
- Eskom GGPP1344 - Control of Works Performed on Transformers.
- Eskom GGS0178 - Maintenance of Power Transformers.
- Eskom GGS0828 - Clean Conditions for Power Transformers.
- Eskom GGG0994 - Transformers Hand Condition Monitoring Guideline.
- Eskom GGS1026 - Sampling and testing of mineral insulating oil.

- Eskom 32-406 - Mineral Insulating Oils (Uninhibited and Inhibited) Part 1: Purchase, Management, Maintenance and Testing

The contractor manages, inspects and maintains on a monthly basis all Camden transformers and ensures that:

- Arrange for, issue, and maintain PTW (permit to Work) and supervise the operations executed on transformers.
- Give access to others in connection with work on transformers.
- Inspect for all the required Notices, safety signs, and required labels on the transformers, and bays, PCB labels, to be attached, visible, and in good order.
- Develop an Inspection sheet which will be used to inspect and note any deviations.
- Transformer bays are inspected and maintained by ensuring a neat and professional appearance through cleaning and sweeping the bay areas, removing any vegetation growth.
- Enclosures, and wire fences of the bays are maintained, deviations observed must be logged and notifications must be raised on SAP system.
- Inspection of oil levels in conservator tanks are done, deviations noted, and arrange for oil top-up.
- Do Inspection for oil leaks and clean up leaks, arrange for repairs to be executed.
- Arrange access for oil top up on large transformers.
- Arrange access for oil samplers on all transformers.
- Install temporarily supplies, and temporarily lights to transformer bays, and certify the installations for the use of mobile oil purification, and outage work.
- Inspect and maintain breathers, breather seals and gaskets, replace silica gel when more than 30% discolouration is evident.
- Only use Eskom approved type silica gel.
- Inspect oil level in breather oil seal bowl. Top-up or replace oil.

- Inspect and clean Bushings. Note all defects, and repair as per maintenance strategy.
- Inspect earthing, repair earthing defects, test for Earthing continuity.
- Inspect transformer paintwork and maintain or touch-up.
- Inspect, test and maintain electrical circuits of cooling fans and oil pumps.
- Inspect and maintain Oil Flow Indicators to cooler radiators.
- Maintain oil cooler radiators by ensuring free airflow, preventing blockages, removing, and cleaning debris from the coolers.
- Remove and install electrical motors which have failed.
- Visually inspect and maintain instrumentation, relays, wiring and looms for obvious damage and cleanliness.
- Inspects and maintain Marshalling kiosk and junction boxes to ensure that the door seals are intact, door inspection windows are clean, door lock is operative, and earthing is effective, and enclosure stays vermin proof.
- Ensure kiosk lights are operative, and limit switches working.
- Inspects all wiring of all power and control circuits and ensure tight and correct connections in marshalling kiosks are maintained and on field instrumentation and equipment.
- Oil temperature and Winding temperature indicators are correctly labelled and operative.
- Oil temperature and Winding temperature indicators are set to correct alarm and trip levels (Refer to PTM).
- Inspect and maintain pipe work, valves, nozzles and rupturing bulbs. It must be in a good condition with no leaks (Fire deluge system).
- All the valves on the transformer are in the correct" In Service" operating positions, especially on oil breathers, buchholtz relays, and conservator tank.
- Provide access for oil sampling to be taken.
- Arrange access for any other parties.

- Replaces any defective or worn auxiliary equipment, such as contactors, overload relays, control, and power wiring.
- Disconnection and reconnection of all HV, MV, and LV, and Control cabling and wiring.
- Disconnect and reconnect main transformer busbar flexibles and connections.
- Maintain busbar ducting cleanliness, connections, and air pressurization system.
- First line maintenance (external interfaces including supplies loose connections and pipe work) for the online Dissolve Gas Analyzer for Power transformers.
- Report and repair any other defects observed during routine maintenance.

4.1.4.2 Auxiliary transformers

- Arrange for, issue, and maintain PTW (permit to Work) and supervise the operations executed on transformers.
- Give access to others in connection with work on transformers.
- Inspect for all the required Notices, safety signs, and required labels on the transformers, and bays, PCB labels, to be attached, visible, and in good order.
- Transformer bays are inspected and maintained by ensuring a neat and professional appearance through cleaning and sweeping the bay areas, removing any vegetation growth.
- Enclosures, and wire fences of the bays are maintained, deviations observed must be logged and notifications must be raised on SAP system.
- Inspection of oil levels in conservator tanks are done, deviations noted, and arrange for oil top-up.
- Do Inspection for oil leaks and clean up leaks, arrange for repairs to be executed.
- Supply top-up oil in 20 Litre containers, including certification, as per Eskom oil specification for top-up requirements on auxiliary transformers.

- Inspect and maintain breathers, breather seals and gaskets, replace silica gel when more than 30% discolouration is evident.
- Only use Eskom approved type silica gel.
- Inspect oil level in breather oil seal bowl. Top-up or replace oil.
- Inspect and clean Bushings. Note all defects, and repair as per maintenance strategy.
- Inspect Earthing, Repair Earthing defects, test for Earthing continuity.
- Inspect transformer paintwork and maintain or touch-up.
- Assist with oil sampling.
- Arrange access for any other parties.
- Disconnection and reconnection of all HV, MV, and LV, and Control cabling and wiring.

4.1.5 Earthing and Station earth mat

Earthing of Camden Systems forms part of the "Cabling" contract and specifics related to this Service Information is dealt with in detail in the said Service information.

- To this end the contractor manages, inspects, and maintains on a monthly, quarterly, and annual basis all Camden Earthing system in accordance and to ensure with the following:
    - Earthing and Lightning Protection Standard, Doc No: 240-56356396 (Latest revision).
- Visual inspections are carried out on all plant systems to ensure the integrity of the Earthing system.
- Visual inspections are carried out on cable racking to ensure the integrity of the earthing system.
- Correct bonding and earthing practices are maintained, and all bolted earthing systems are clean and making a tight connection.
- Reporting any defective earthing system, or missing earthing system to the employer for immediate replacement.

- Employer submits drawing/s to Contractor detailing earth mat reference points. These reference points are to be marked and clearly identified on the plant.
- A detailed (including missing and/or loose connections etc.) quarterly visual inspection report is generated and submitted to the employer timeously.
- Access is obtained to test integrity of the Earthing system as per Employer instructions and prevailing site regulations.

4.1.6 Hazardous location installations

Refer to document 004 / 4593, Classification of hazardous areas at Camden Power Station and all referenced Standards in Document 229 4593.

The contractor manages, inspects and maintains on a continuous basis all Camden installations to ensure statutory compliance to:

- The Occupational Health and Safety Act 85 of 1993 which requires,
    - that all electrical equipment installed in hazardous (flammable liquid/gasses and dust) areas shall comply with the minimum requirements of the relevant standards.
    - No person may use electrical machinery in locations where there is danger of a fire or explosion owing to the presence, manufacturing, occurrence, handling or storage of flammable gas, vapours or dust, unless the areas where the flammable gas, vapours or dust are classified in accordance with SANS 0108 and the electrical equipment installed in these areas complies with the classification of the areas.
    - Every user referred to in the above paragraph will be in possession of a certificate by an approved inspection authority stating the classification of the electrical equipment or permanent markings/plates attached on the equipment can be accepted.
    - This certificate states that the equipment has been manufactured and tested for the hazardous articles.
    - Where diverse machinery such as motor control centres and control apparatus are used, the selection, arrangement, installation, protection, maintenance and working thereof results in no less a degree of safety as when the equipment was used separately.

- No adjustments shall be made to machinery in hazardous areas unless the equipment is rendered dead.
- Where there is a possibility of static built-up under working conditions, the user shall ensure that all electrical equipment and all metal parts are earthed in such a way that all static built-up will be conveyed to the earth mass effectively.

- Annual inspections shall be carried out on all equipment operational in such areas. Evidence of such inspections shall be amended to the plant CoC's, where such certification is not available the contractor shall ensure compliance and issue the required certificate.
- The contractor shall employ on full time basis a "**Master Installation Electrician"** to comply with and enforce the requirements of the Act.
- The contractor shall, in concurrence with Electrical Engineering, make assessments and determine classification or re-classification on behalf of the Employer.
- Only employees authorised and certified to work on equipment in hazardous areas shall be permitted to work on such installations.

4.1.7 Cabling

The contractor manages, inspects, and maintains on a continuous basis:

- All cabling with a voltage above and including 220V AC and 220V DC
- Testing of LV cabling.
- Disconnecting and reconnecting of cables on "Dead end feeders" on high voltage systems and Low voltage systems.
- Disconnecting and reconnecting Auxiliary Plant transformers.
- Disconnecting and reconnecting of cables.
- Changing direction of rotation on HV and LV motors.
- Informing the Employer of cabling that is damage beyond repair and requires replacement.

- Inspection and repair of loose connections and torque checking to approved tables.
- Inspecting and maintaining of cable number and identification tags.
- Installation and certification of temporary supplies on Low Voltage systems, as per instruction of the Employer.

4.1.8 Medium Voltage and Direct Current Motors

The maintenance of Electrical motors shall follow the approved maintenance Strategy. Camden utilise the following Voltage ranges of Electrical Motors; (380/400VAC, 6.6KVAC, 110/220VDC Motors)

The contractor manages, inspects, and maintains on a continuous basis all Camden motor installations, in conjunction with the Motor contract, to ensure compliance through:

- Electrical disconnection and reconnection of motors for testing and replacement.
- Unbolting of and removal of small motors from base or structure where no mechanical intervention is required to undo a coupling, i.e., small geared, flanged mounted and motors which do not require rigging, with a weight of 30kg and less.
- Direction testing of motors in concurrence with the Site regulations.
- Routine inspections on motor terminal boxes and star points where redundant systems are available.
- Routine inspections on the earthing of the motors, glanding, and cable connections and entry into the termination boxes.
- Routine inspections and reporting on motors installed in Hazardous areas, as per the Site-Specific Instructions related to those areas;
- Opportunity based maintenance on electrical motors, including opening of terminal boxes, checking soundness of connections, and cleaning.
- Testing of Low Voltage motors and motor cabling.
- Testing of Direct Current motors and motor cabling.
- Testing of Medium Voltage motors and motor cabling.

- Note**, each motor tested will be accompanied with a “full Motor Report and Test sheet” outlining the causes/mode of failure, and test results. This is an electrical and mechanical overview of the mode of failure of the motor and findings related to the failure. Such test report shall be submitted to the Employer during the same shift.
- First line investigation and reporting on motors, including electrical and mechanical motor failure.
- Inspection and maintenance of motor earthing systems.
- Motor space heater connections, maintenance, and testing.
- Periodical electrical testing of spare MV motors as per storage procedures, Doc No: 240-36029675 (Latest revision).

4.1.9 Generator and Auxiliary Systems

The contractor manages, inspects, and maintains on a continuous basis:

- Brush gear on the generator slipring.
- Changing of slip ring brushes on load, referring to prevailing site conditions and requirements.
- Cleaning of oil contaminants on the brush gear system, generator gearbox, exciter pedestal and slip ring pedestal 6 to prevent earth fault paths.
- Testing of the earth insulation on the generator bearing pedestals, and gearboxes, as per the Engineering test sheets and specifications. Testing generator stator and rotor. All test reports shall be submitted to Engineering department for decision making and investigation. To this end the Service provider shall have the required Analogue testing equipment to measure Insulation and Voltage values.
- Vibro system power supply and Voltage and Current shaft Monitoring system maintenance.
- Earth and voltage brush inspection and brush replacement.
- Generator brush gear, and exciter filter inspection, replacement and maintenance.
- Replacements of worn parts i.e., filters, brushes, covers.

- Earthing inspection and maintenance.
- Cleaning of slipring, busbar connection flexibles and stator choke chambers.
- Cleaning, maintenance, and repairs of inline surge transformers.
- Cleaning of surge arrestor chamber and inspecting connections
- Maintenance, inspection, testing and replacement of duct chokes.
- Cleaning, maintenance of busbar ducts and its compressed air systems.
- Disconnecting, Cleaning, Testing, Repair and Reinstating Generator main Conductor Bar flexible Connectors, Insulators, Covers, busbar ducts and the respective rubber seals.

4.1.9.1 Hydrogen driers

The contractor manages, inspects, and maintains on a continuous basis to ensure full operation of the unitised hydrogen driers:

- Ensure that hydrogen leak test has been carried out before any electrical work is done.
- Perform fault finding and inspection of the electrical system.
- Replacement of all electrical components and blower motors.
- Replacement of desiccants and carbon filter media.
- Testing and replacement of heater elements.

4.1.9.2 Oil purifiers

The contractor manages, inspects, and maintains on a continuous basis to ensure full operation of the units through:

- Fault finding and inspection of the electrical system.
- Replacement of defective electrical components.
- Replacement of filters.
- Testing and replacement of heater elements.

4.1.9.3 Main Hydrogen Plant

Refer to document 004 / 4593, Classification of hazardous areas at Camden Power Station.

The contractor manages, inspects, and maintains electrical installations to ensure compliance through:

- The Occupational Health and Safety Act 85 of 1993;
- Maintain the electrical interfacing equipment with a voltage of 220V AC/DC or higher.
- Maintain plant in terms of Hydrogen Generating Plant Data Book.

4.1.9.4 Excitation and Static Excitation Systems (OFF-LOAD only)

Refer to the Operating Technical Specification Static Excitation System, document 240 – 45974159.

The contractor manages, inspects, and maintains electrical installations to ensure compliance through:

4.1.9.4.1 Static Excitation Transformers

- Cleaning of the transformer when the unit is off load.
- Inspection of earthing systems.
- Inspection and torque check of links and connection positions.
- Inspection and cleaning of transformer cubicle, signage, and other electrical devices.
- Changeover of bridge pieces from test supply to machine bar supply, as required.

4.1.9.4.2 Converter Panels

Note: If any of these panel doors are opened during machine on-load conditions, the machine will trip.

- Operation
    - The transformers feed the converter panels (100% redundant) where the 528VAC is converted to 528VDC;

- The converter consists out of 4 panels. The first panel houses the incomer 528VAC circuit breaker which on Unit 8 is fixed and on Units 1 to 7 is withdrawable.
- The second and third panels are the converter panels where the DC is converted to AC. These panels are 100% redundant.
- The fourth panel is the 280V DC to the generator sliprings. Cables are installed from this panel to the sliprings of the generator.

- Cleaning of the system panels.
- Inspection of earthing systems.
- Inspection and cleaning of cubicles, signage, and other electrical devices.
- Checking connections.
- Cleaning of Filters.

4.1.9.4.3 Air conditioner units

- Inspect and ensure electrical power supply to these systems.

4.1.9.5 Generator Isolated Phase busbar system

Overview:

- The main Bus bars from the Main Generator are internally enclosed in metal ductings, suspended below 12m level. Each Phase is individually enclosed in a ducting, from the Main Machine terminals, up to the Main Generator Transformer Primary (LV) Connections.
- These ductings are provided with Control Air, which through, an electrical control unit, maintains a Positive pressure(just above Atmospheric) inside the Ductings, to ensure that dust do not settle inside the Ductings.
- The busbar pressurisation system provides a continuous positive pressure to the three independent ducts that run the length from of the Generator to the Generator transformer, controlled through an Electrical control panel. Air supply is tapped off from the control air supply on the 8m level;
- The Flexible connections for the Generator Star point, Line side, and transformer flexible connections are situated inside the main Busbar ducting.

The contractor manages, inspects, and maintains:

- The electrical control system.
- Ensures that the system maintains a positive pressure.
- Seals the ducting covers to prevent air leaks, during unit outages.
- Search for and repair any air leaks on the ducting systems prior to the unit being on load.
- The disconnecting and reconnecting of Line and Star point flexible links.
- The disconnecting and reconnecting of surge arrestors links and clean the cubicles.
- Main earthing of the generator and subsystems.
- Cleaning of busbar ducting.
- Inspect, clean earthing transformer.
- Removal and replacement of generator and transformer side ducting covers.
- Replace any defective ducting cover holding down bolts, clamps, and damaged seals.
- Cleaning of busbar duct insulators.
- Use transition washers when connecting back busbar flexibles.
- Maintenance of busbar air pressurising system, and air supply lines.

4.1.9.6 VT room equipment

The contractor manages, inspects, and maintains:

- The cleaning of the VT room cubicles and the VT's.
- Inspect air lines for leaks within the VT cubicles.
- Maintain loading resistor cubicles.
- Check connections on main and control systems.
- Check power supply for the online condition monitoring panel (VibroSystM Panel).

4.1.10 Electrical actuators

The contractor manages, inspects, and maintains on a continuous basis the following:

- Terminations on actuators situated inside the actuator termination box.
- Supply cabling and junction boxes.
- Connect and disconnect power to all actuators.
- Fault finding and repair of above-mentioned sections.

4.1.11 Diesel generators

The contractor manages, inspects, and maintains the following:

- Maintenance of electrical systems and components on the diesel generators, excluding battery chargers, PLC's and batteries.
- Fault finding and replacement of electrical components on diesel generators.
- Maintenance off, cleaning and testing of the generators.
- Disconnection and reconnections of the generators for testing or replacement purposes.
- Brush maintenance (including the routine inspection and replacement).
- Maintenance of contactors and starter panels.

4.1.12 DC Motors

Refer to document 240/39302057, Electrical DC motors maintenance Strategy.

The contractor manages, inspects, and maintains on a continuous basis all Camden DC motor installations, in conjunction with the Motor maintenance contract, the contractor shall ensure the:

- Disconnection and reconnection of motors for testing and replacement.
- Direction testing of motors in concurrence with the site regulations.
- Routine inspections on motor terminal boxes.
- Opportunity based maintenance on electrical motors, including opening of terminal boxes, checking of connections, and cleaning.
- Brush inspection and replacement.

- First line fault finding and reporting on motors, including electrical and mechanical motor failure.
- Inspection and maintenance of motor earthing systems.

4.1.13 Electrical solenoids

- The disconnecting, reconnecting of electrical change over solenoids. (Including the power supply cable if above and including 110V ac, 220 V ac or 220 V dc) of hydraulic dampers and valves.

4.1.14 Coal plant, Conveyor Plant systems and Weighbridges

Refer to document 004 / 4593, Classification of hazardous areas at Camden Power Station.

Refer to document 004/9646, Operating Technical Specification for Camden Coal Plant.

Refer to latest revision of Document **229-12263**, “Statutory Plant and Equipment.

The contractor manages, inspects, and maintains as per prevailing site regulations and conditions the Electrical plant integrity of:

- All coal plant Electric plant which includes:
    - Sump pump motors.
    - Coal stockyard drainage and collection dam.
    - Coal Staithes.
    - Under-Staithes reclaiming conveyors.
    - Terrace coal handling conveyors.
    - Conveyor Tipper car systems.
    - Mass Meters and Sample Hammer.
    - Magnet Separators and Metal Detectors.
    - Emergency trip wires.
    - Electromagnets
    - Emergency trip switches.
    - 220 VAC control circuits

- Power supplies to weighbridge systems

4.1.15 Ex Property maintenance

The contractor manages, inspects, and maintains installations, in conjunction with others, to ensure compliance through:

- Streetlight maintenance on Oak Road connecting the site to the N2 National road.
- Sewer plant electrical installation, as well as the motor and pumping control systems.
- Permit applications, and supervision.
- Transformer maintenance as per transformer specifications.
- High Voltage Ring feed (of oil type switchgear) between Substations as per Station Reticulation drawings.
- Any other Task Instruction of electrical nature as per the Service Manager, by submitting quotations.

4.1.16 Temporary Supplies and Installations

The contractor manages, inspects, and maintains installations, in conjunction with others, to ensure compliance through:

- Ensuring the installations are safe, earthed and Bonded.
- Enforce compliance and request certification of Compliance (SANS 10142 & 10108) from other parties during outages.
- Install temporary supplies as required by Outage Department for other contractors.
- Install temporary Supplies on Site as requested by the Employer.
- Issue Certificate of compliances for each Installation.
- Submit quotations for works, other than on Camden Site, as the Employer may request for Community projects.

4.1.17 Electrical Drawings

The Contractor manages and maintains all Electrical Plant drawings under his control.

- This will include updating of electrical Wiring diagrams, Single line, Cable block diagrams and schedules, Schematic diagrams and the like, of Plant whenever any changes or replacements were affected on Plant, through an engineering instruction or modification, where the equipment was not a “One to One” replacement.
- The contractor shall “Red Line” a working Copy and submit it to the Electrical Engineering department.
- The contractor shall request a “latest revision” set of drawings from Engineering department, for each plant system, during General Outage Periods, and update the drawings, by “Red Lining” to “As Built” status of the plant and submit it to the Electrical Engineering department.
- The contractor shall ensure that the drawings are unit specific.
- The contractor ensures that drawings are available when fault finding and repairs are carried out on plant under his control.
- Contractor shall develop and (or) update drawings where none exist/does not accurately reflect the “as built” status of the plant. The creation or updating of drawings, cable schedules, schematics, single line diagrams, etc.
- All drawings developed or modified by the Contractor shall be developed on a professional CAD system according to Eskom drawing standard for submission and approval by Camden Electrical Engineering Department.

4.2 Commissioning

It will be required of the contractor to do commissioning or safety testing. It will be the liability of the contractor to draw up quality documentation and inspection sheets in order to safely commission plant under his control.

5 Works Management and Control

The contractor manages and maintains all plant under his control by ensuring that:

- The contractor adheres to the Works Management procedures.
- The contractor creates on SAP (or any other recognised method such as Operations Suite), a notification for each work activity that requires execution through the Works management Planner.
- The contractor creates notifications through continuous Plant inspections.
- The contractor schedules the work up to 4 weeks in advance, ensuring that the required equipment and spare parts are available for execution of the works.
- The contractor signs off the works orders, detailing the condition as found, the status after repairs, and the activities carried out to the plant to restore it to a state in which it can perform its required functions.

5.1 Planned Maintenance

The contractor manages and maintains the Plant scheduled for Planned Maintenance by adhering to all Legal, Site Regulations, Policies, Standards and Procedures when executing work under Planned Maintenance. To this end the contractor ensures that:

- The contractor is familiar with the condition of the Plant under his control and submits the plan of required maintenance for approval, and arrangement for Plant to become available.
- The contractor submits the plan, and in concurrence with the Employer, drafts a detailed Scope of Work for the services to be executed.

- The contractor drafts an Inspection and Test Plan (ITP) for each Critical activity to be executed on the plant. Each activity shall be consulted to determine the necessity of the ITP.
- The contractor notifies the Quality Control department, the Employer, and the Client (engineering) of all Witness, and Hold points that needs to be signed off before he carries on with the work.
- The contractor executes all work as detailed in the Scope of Work.
- The contractor provides all means to execute the services as per the Scope of Work.
- The contractor signs off the works orders, detailing the condition as found, the status after repairs, and the activities carried out to the plant to restore it to a state in which it can perform its required functions.

The Contractor ensures that the following is included into the Planned Maintenance works package, the requirements of **Corrective, Routine and Preventative maintenance requirements,** whichever part is applicable**,** is executed with the Detailed Scope of Work requirements, set out under Planned Maintenance.

The following Plant needs to be scheduled for planned maintenance, per the maintenance strategies, as it does not become available during General Overhauls:

- All HV Boards/Panels and LV Boards/Panels on the Common Plant, as per the Electrical Reticulation layout, Drawing 19.36/13672 (Latest revision)
- All HV and LV Substations on Common Plant, as per the Electrical Reticulation layout, Drawing 19.36/13672 (Latest revision).
- All transformers on Common Plant, as per the Electrical Reticulation layout, Drawing 19.36/13672 (Latest revision).

5.2 Mini General Overhauls and General Overhauls (Outages)

The contractor manages and maintains the Plant scheduled for the Overhaul or Outage by adhering to all Legal, Site Regulations, Policies, standards, and Procedures when executing work under Outages. To this end the contractor ensures that:

The contractor removes all high Voltage Breakers and Contactors during the start of the General Outage, assess the condition, and conduct fully function test as per OEM

recommendations. The contractor provides all required testing certification of the items.

- The contractor submits the plan, and in concurrence with the Employer, drafts a detailed Scope of Work for the services to be executed.
- The Contractor drafts an (ITP) Inspection and Test Plan for each Critical Activity, Plant and Level 1 Plant to be maintained. Each activity shall be consulted to determine the necessity of the ITP.
- The contractor notifies the Quality Control department, the Employer, and the Client (engineering) of all Witness, and Hold points that needs to be signed off before he carries on with the work.
- The contractor executes all work as detailed in the Engineering Scope of Work.
- The contractor provides all means to execute the services.
- The contractor strips down plant, clean, inspects, repair, replace, and rebuild the plant to its original state to restore it to a state in which it can perform its required functions.
- The contractor makes use of the Equipment Manufacturer Specifications and Requirements to restore plant and equipment to its original state.
- As far as reasonably practicable, the contractor shall ensure that a “Clean Condition Area site specific instruction, Doc No: 240-147251449 is maintained during the execution of services, whereby he will be able to always account, for all equipment, and tools used in the area where the service is executed.
- No interchanging of panels, segregations, fixtures, or items stripped-down on Electrical Switchgear. Items will be marked and replaced in its original position. Every item or fixture removed will be kept in an allocated container for the panel.
- Any missing or stripped fixture or fitting will be replaced.
- All equipment, parts, or spares that is removed or stripped down from the works shall be counted, listed, bagged, tagged, stored, and signed into, and signed out of, a predetermined outage storage area. It will be the responsibility of the contractor to account for each item of the service.

- The contractor shall have check sheets, and registers always updated to assist in this regard.
- The contractor signs off the works orders, detailing the condition as found, the status after repairs, and the activities carried out to the plant to restore it to a state in which it can perform its required functions.
- Compile an Outage report for all the activities covered in an outage and keep records (filed) with an additional copy made available to the Employer.
- Make Certificates (Calibration, test reports, etc.) available and provides copies to the Employer upon request.
- The contractor manages the access and permits on behalf of the Employer on plant under his control.

The Contractor ensures that, included into the Outage works package, the requirements of **Corrective, Routine and Preventative maintenance requirements,** whichever part is applicable**,** is executed with the Detailed Scope of Work requirements, set out under Outage Works.

6 Engineering Services as Required by Eskom Generation

The contractor is responsible for engineering services, material and labour as follows:

- Verify the performance matching requirements of replacement equipment and parts.
- Inspection and testing prior to and after repairs, recording, reporting, and making recommendations and providing the necessary information where applicable.
- The contractor is required to provide detailed breakdown reports clearly stating the contributory and root causes of the failure.
- Evaluation of parts for possible re-use.
- Select, design and procurement of new components, ensuring that replacement insulation systems and other material are compatible with the existing materials. If the replacements parts are not exactly as the originals, the Contractor demonstrate that the replacement meets or

exceeds the capability of the original in all essential requirements with approval from the Employer.

- The Contractor must ensure that the employer and others required (as determined by the Employer) are present during dismantling, testing and assessment to inspect any evidence of failure or aspects of defective design or workmanship uncovered. Ensure that correct photographic records are made.
- Establish the suitability of equipment to achieve the life extension required by the Employer. Perform all tests, investigation and calculation required for this purpose.
- Shall eliminate weaknesses. Submitting a written report recording the defects and detailing the extent of repair and work required to achieve the life extension specified by the Employer. Obtaining the Employer's prior agreement in writing for the extent of repair and work to be done.
- Where changes to designs are made, producing details of the design, working drawings, repair instructions and procedures, as well as all necessary amendments to operating and maintenance manuals; producing agreed procedures for works inspection and tests, and site commissioning and testing, all with details of acceptance criteria to be attained. Producing reports or test certificates detailing actual results attained. Producing quality plans for the activities concerned before commencing work. Producing progress reports as required periodically by the Employer.
- Submit details of the redesign, drawings, and documentation to the Employer for agreement.
- Produce a consolidated report on all aspects of the work, incorporating all reports, data, acceptance criteria, and quality assurance records.

7 Test Certificates

- Provide a data pack with complete tests and Certificates after completion of any major services as per Client's request and related standards.
- Have records of all certificates for tools and test equipment or as required by the Employer.
- Ensure that test equipment calibration is valid for the period in which work is executed and certificates available upon request. All equipment calibration (or recalibration) to be executed by an approved test facility.

8 House keeping

- All workplaces must be always kept clean, Interface with other contractors to ensure compliance.
- Discard waste in correctly allocated coloured waste bins.
- Ensure that plant worked on is cleaned before clearance of any permit.

9 Training

The Contractor provides training to his personnel in the maintenance of the plant. The Contractor provides a list, as directed by the Service Manager, of recommended training activities including duration and location for acceptance by the Service Manager.

- All relevant courses must be attended as required on contractor's account.
- All relevant courses must be attended as required on contractor's account. Training shall be determined at the Clients discretion that is applicable to the activities required to execute all the functions related to electrical work at Camden Power Station i.e., cable terminator, cable jointer, cable tester, cable fault location finding, electrical installation, boiler making, underground service scanning, working at heights, etc.
- The Employer shall only be responsible for training courses as provided by the Employers business unit. Such courses include the PSR, FFFR, ORHVS, Clean Condition Area, etc.
- Compile a required Training matrix for employees and his control.

- Attends required courses as stipulated by the Employer.

Table 3 shows the minimum training requirements in order for work to be executed without any special skills. It further highlights the responsible party who provides the training. Proof of training shall be provided as per the work being executed.

Table 3: Contractor Minimum Training Requirements

Minimum Requirements	**Contractor**	**Eskom**
First Aid Training - level one	x	
Confined space training	x	
Working at heights	x	
Risk assessment training	x	
Medical fitness certificate	x	
Power Station Training provided (required)		x
Power Station Site Safety Induction		x
Eskom LAR Training		x
Eskom Risk Assessment Training		x
Site Coaching –prepare for authorisation		x
Eskom PSR & ORHVS (RP) / Authorised. (Valid for 2 Years) Supervisor Course		x
Clean Condition Training (Valid for 2 Years)		x
Basic firefighting course	x	x
Eskom Arc flash training		x
Hazloc Compliance training	x	
Mobile equipment training i.e., Cherry Peaker Driver	x	
MV & LV Switchgear breaker and contactor training	x	
Special tool & equipment training i.e., VLF, Speed tester etc.	x	
SDL&I requirements and development of trainees	x	

The training and certification requirements shall be valid for the duration of the contract.

10 Safety Risk management

Refer to document 6.4/MA/01, Camden Health and Safety Specification.

The Camden Power Station Project Health and Safety Specifications , is generic, based on the Nosa Integrated Five Star System and the Occupational Health and Safety Act, Act 85 of 1993 85 of 1993.

It specifies “the minimum” requirements that should be met in order to obtain health and safety objectives

This Health and Safety Specifications is applicable to all Camden Power Station Project sites and Contractor site establishments will be implemented as the in-house health and safety management system. The contractors working on the Camden Power Station Project will be bound by the stipulations as set out on the document “Contractors’ Health and Safety Requirements”.

Refer to Safety, Health and Environmental Specification, Document 004/4830

This document should be read in conjunction with the Occupational Health and Safety Act (OHSA), No 85 of 1993, and its Regulations; the Mine Health and Safety Act (MHSA), No 29 of 1996, where applicable; and section 28 of the National Environmental Management Act (NEMA), No 107 of 1998, which deals with the duty of care in respect of the environment and the remediation of environmental damage.

- The Contractor is appointed to act on behalf of the Employer in terms of the Occupational Health and Safety Act no. 85 of 1993 for this contract.
- The contractor executes safety management in terms of NOSA 5 STAR requirements.
- The contractor executes all inspections as per appendices of document 6.4/MA/01
- The contractor adheres to the requirements of Document 004/4830

The contractor adheres to the following requirements:

- Basic Conditions of Employment Act No 75 of 1997.
- Occupational Health and Safety Act and Regulations No 85 of 1993.
- National Environmental Management Act 107 of 1998.
- National Road Traffic Act 93 of 1996.
- 32-37 Eskom Substance Abuse Procedure.

- 32-136 Contractor Health and Safety Requirements
- 240-62196227 Life- saving Rules.
- 32-95 Environmental, Occupational Health and Safety Incident Management Procedure
- 32-727 SHEQ Policy
- 32- 418 Working at Heights Procedure
- 240-62946386 Vehicle and Driver Safety Management Procedure
- 32-520 Risk Assessment procedure

11 Record Keeping

Record keeping shall be managed by the relevant maintenance and engineering sections to ensure retrievably archived plant history on site, to the degree of detail necessary for plant condition and diagnosis.

The necessary history information shall not be solely entrusted to off-site service providers or other off-site organisations. A copy of all records and documents shall be always made available to the Employer and shall be archived for retrieval for a period of at least 5 years.

12 Plant Safety Regulations

All contractors shall, before commencement of services ensure that all their employees are familiar with the relevant Eskom Camden, SHE documentation that is applicable to contract services.

The Contractor will comply with the minimum legislation pertaining to this contract being:

- The Constitution of the Republic of South Africa (particularly Section 24 of the Bill of Rights).
- Occupational Health and Safety Act 1993 (Act 85 of 1993) and its Regulations.
- National Environmental Management Act 1998 (Act 107 of 1998).
- Environment Conservation Act 1989 (Act 73 of 1989).
- National Water Act 1998 (Act 36 of 1998).
- Civil and Building Work Act.
- National Road Traffic Act 93 of 1996.

- Compensation for Occupational Injures and Diseases Act.
- SANS Standards – Contractor shall use the relative standards applicable to the services.

13 Completion Communication

- Completed task must be communicated to the Service Manager.
- The contractor submits end reports on all work carried out during the week. Reports shall be handed in not later than close of work every Friday.
- Contractor informs and gives daily feedback of progress on tasks or as requested by the Service Manager up to the point of completion or satisfaction of the Service Manager.
- All work done must be accompanied by signed of ITP's (as is applicable) by the relevant people at the hold and witness points.

14 Meetings

Refer to Document 229/12149, Code of Conduct for Meetings. The contractor shall adhere to the requirements as stipulated and ensure that:

- All relevant meetings must be attended.
- Attends EMD Feedback meetings.
- Attends daily Plant Focus meetings.
- Attends daily Works Management meetings.
- Attends Outage meetings during Outages.
- Attends other meetings as required and directed by the Service Manager.
- Interfaces with the Employer's internal organization (all departments).
- Interfaces with other contractors that may perform work for the Employer.
- Attends Monthly scheduled contract meeting.
- Contractor shall be given at least 1 day notice period prior to commencement of meeting.

15 Specialized Tools and Test Equipment.

- Contractor must provide all required tools to execute the requirements as is deemed necessary by regulation, standards, or the Client.

- Contractor must provide all required tools to execute the requirements.
- All tools that need certificates must have valid certificate to comply with safety requirements.
- Provide insulated tools as required.
- Warning lights x 2
- Reflective cones at least 05 meters to a meter length x 4
- Provide insulting mats as required of up to 16.5kv. dimensions 2 x 2 meters two pieces
- Blower single phase x 2
- Compressor single phase 600 litres
- Vacuum machines single phase @ 1.5kw x 2
- Single phase extraction fan 2 kw x 2
- Contractor hires any equipment (e.g., Cherry Picker) not available by submitting quotations to the employer for approval.

16 Integration with the Employer's organization

The Contractor Provides the Services in an integrated manner with the Employer's organization at Camden Power Station. To this end the Contractor:

- Performs the day-to-day planning and scheduling of all activities required.
- Maintains all required SAP and other electrical maintenance procedures.
- Attends to plant breakdowns, until completed, unless otherwise agreed with the Service Manager.
- Provides personnel on standby on a 24-hour basis, in accordance with his conditions of service. The contractor ensures that there is an emergency Standby team. No employee will work more than the allowed overtime hours in any given time.
- Provide personnel as required (Planned or Emergent work) as stated in this document, in accordance with his conditions of service to perform required services.

- Provides personnel that will be authorised, by the Employer, in Plant Safety Regulations (PSR), ORHVS, FFFR, Clean Condition area or other as is relevant to perform duties required as deemed necessary by the Employer.
- Spares requisition from the Employer's main store, in liaison with the Service Manager.
- Supply of goods that are not available in the Employer's main store, as directed by the Service Manager when requested.
- Assist in the processes to identify goods/equipment/spares needed to effectively maintain/repair the electrical plant as to minimize downtime.
- Provide technical advice and component recommendations/specifications.

17 Quality assurance requirements

Refer to Camden Document no. 240 - 105658000 (Supplier Quality Management Specification also known as QM 58, the Contractor conforms to the following Quality management requirements:

NOTE: This provide basic direction to the Power Station quality requirements.

- The quality requirements are as per ISO 9001 of 2018 standard, Quality Management System.
- The requirements of ISO14001, Environmental management.
- The requirements of ISO18001, Documentation control; Occupational Health and Safety Management Standard.
- Apart from any statutory data packages required, the Contractor also compiles a data package of the relevant drawings, and test certificates for the works which must be reviewed and signed off by the Service manager.
- The Contractor is responsible for defining the level of QA/QC or inspection to be imposed on his Subcontractors and suppliers of material. This level is based on criticality of equipment and is submitted to the Service Manager for acceptance.
- The Contractor submits the following, as directed by the Service Manager: QA plan/manual, Inspection and Test Plan (ITP's).
- The Contractor conforms to the Quality Management requirements as stipulated in the Supplier Quality Management Specification: QM 58.

- The Contractor is responsible for defining the level of QA/QC or inspection to be imposed on his sub-contractors and suppliers of material. This level is based on criticality of equipment and submitted to the Employer for concurrence.
- The Contractor utilises the Employer QA documentation forms for requesting access, erection checks etc. These request forms must be submitted to the *Employer* at least one week prior to the requested activity. Apart from any Statutory data packages required, the *Contractor* also compiles a data package of the relevant drawings, test certificates etc for each section of work which must be reviewed and signed off by the *Employer*.

18 Providing access to and interface with others

If other contractors are working in the same area as the work of this contract, in this regard, the Contractor co-ordinates his work with the Service Manager to maintain harmonious working conditions on Site.

During the progress of the works the Contractor provides access to others who also perform work in the same area, on an as and when required basis.

The Contractor makes his own assessment of the problems and difficulties which may be encountered for providing access to and interfacing with others (this includes access difficulties experienced during outages or commissioning phases) and will provide alternatives to remedy the difficulties experienced or will experience to the Employer.

19 Interpretation and terminology

Refer to appendices for abbreviations.

20 Management meetings

Regular meetings of a general nature may be convened and chaired by the Service Manager as when they are required.

Meetings of a specialist nature may be convened as specified elsewhere in this Service Information or if not so specified by persons and at times and locations to suit the Parties, the nature, and the progress of the works.

Records of these meetings shall be submitted to the Service *Manager* by the person convening the meeting within five days of the meeting.

All meetings shall be recorded using minutes or a register prepared and circulated by the person who convened the meeting. Such minutes or register shall not be used for the purpose of confirming actions or instructions under the contract as these shall be done separately by the person identified in the conditions *of* contract to carry out such actions or instructions.

21 Documentation control

All contractual communications will be in the form of properly compiled letters or forms attached to e mails and not as a message in the e mail itself.

Communication medium shall be as per agreed method in contract.

22 Safety Management

The contractor always adheres to all site safety regulations. This shall include OHSA 85 of 1993, all relevant SANS and Eskom safety regulations.

22.1 Safety Health and Environmental Requirements

The contractor will comply with the following:

- Camden Power Station Health and Safety Standards as per Camden Power Station Contractors Safety manual. This manual will be handed over on contract award.
- Adhere to the Occupational Health and Safety Act 85 of 1993 with special reference to Section 44 of this Act.
- National Environmental Management Act 107 of 1998.
- Mine Health and Safety Act 29 of 1996 (Where applicable).
- Eskom / Camden Policies and Procedures.
- Compensation for Occupational Injuries and Diseases Act of 1993 (COID);
- All staff will undergo a one-day Safety Induction training course one week before site occupation and enforce adherence.
- Adhere to Eskom and Camden Power Station’s zero tolerance for non-compliance to any of Eskom’s and/or Camden Power Station’s safety rules and regulations.
- Wear the correct (and(or) required) PPE.

- The Contractor must appoint Safety Representatives to assist but not limited to the following:
    - Identify possible hazards, dangers and risks.
    - Eliminate potentially dangerous conditions and actions.
    - Ensure a safe working environment.
    - Inspect and record findings of his workplace and submit a copy monthly to the Service Manager.

22.2 Eskom Life Saving rules.

- Open, Isolate, Test, Earth, Bond and/or Insulate Before Touch.
- Hook up at Heights.
- Buckle Up.
- Be Sober.
- Ensure you have a permit to work.

The Service Manager shall be entitled to request the Contractor to stop work, without penalty to the *Employer*, when the Contractor's personnel fail to conform to acceptable health & safety standards or contravene the health and safety sections and regulations.

The Service Manager must be informed immediately or as soon as possible but not later than the end of the shift about any injury or damage of property or any equipment by means of a flash report.

The Contractor must perform and provide to the Employer job observations and SMAT on critical tasks as identified or as required by the minimum criteria, as well as Near Miss reporting and provide proof to the Service Manager.

22.3 Minimum SHE Documentation Required from the Contractor

The Contractor shall provide and comply with the SHE policy and specification and determined by Camden Safety department.

The Contractor must ensure that he has a Health and Safety File and that it must be accepted by the Employer.

The Safety Officer employed by Camden Power Station will audit these Health and Safety Plan as required (Typically once a month) according to the NOSA

management system to ensure compliance with the provisions of the Act.

The following minimum documents must be provided by the contractor in terms of Health, Safety and Environmental performance, should the contractor not provide this information it will be assumed that it does not exist.

NB: Submission of all the required documents on yearly basis to be submitted to Eskom vendor management department for verifications.

- SARS
- Letter of Good standing
- COIDA
- CSD Registration
- BBBEE Verification
- CIPC.

- Letter of good standing with COID or a registered insurance body.
- An Organogram indicating the names of all persons that will hold legal appointments on the project in terms of the Act.
- The expected roles, responsibilities, and authority of those who are proposed to receive legal appointments as well as their proof of competency.
- The resume'(s) of the proposed Safety Officer(s) and Environmental Officer(s) his/their roles, responsibilities and authority is required in terms of the scope of work.
- Proof of environmental, health and safety awareness training (provided by a recognized training body) for all employees required to perform work at Camden. The contractor shall be responsible to ensure that his employees are trained before commencing work at Camden. Proof of training provided, i.e., attendance registers and the training content, shall be submitted to the Eskom Agents and/or Environmental and Safety Officers for approval before commencing work on-site. Failure to do so shall result in an immediate termination of the contract.
- The contractor's company Safety, Health, and Environment policy.
- Provide an overview of the system/program that is utilized to manage Safety,

Health, and Environment.

22.4 Health and Safety Plan (Construction Regulations)

The contractor must compile a Health and Safety Plan, filed in a Health and Safety File, comprising of the following:

- Proof of the contracting company's own Health and Safety Policy.
- Proof of appointments, assignments and designations as required in terms of the Occupational Health and Safety Act, No 85 of 1993 and proof of their competencies.
- Proof of Risk Assessments regarding Hazards identified, including:
- During the Risk Assessment the following need to be recorded
    - Risk/ Task assessed.
    - Date of Risk Assessment done
    - Persons involved in compiling risk assessment (to be recorded in an attendance register)
    - The identification of the risks and hazards to which persons may be exposed to.
    - The analysis and evaluation of the risks and hazards identified.
    - A documented plan of safe work procedures to mitigate, reduce or control the risks and hazards that have been identified.
    - A Monitoring plans.
    - A Review plans.
- Proof of Safe Work Procedures that derived out of the Risk Assessments.
- Proof of the contracting company's own Emergency Plan that will deal with their own emergencies on site.
- Proof of "Notification to perform Construction Work" – a copy of the notification addressed to the Department of Labour as required Regulation 3 of the Construction Regulations.
- Proof of an Induction Program. It is advised that the Camden SHE Rules as a

Guide) and an attendance register signed by its employees prior the commencement of any construction work on site.

- Proof of the contracting company's employees Medical Fitness Certificate with proof of X-Rays taken. (Must still be valid for one year and may only have been issued by an occupational health practitioner).
- Proof of medical surveillance programme, especially where employees are expose to noise, hazardous chemicals which includes, but not limited to asbestos, dust, and coal.
- Proof of contractors weekly Health and Safety Rep Inspections regarding its own site and where detached work is performed.
- Proof of Personal Protective Equipment (PPE) issued to contractor's employees according to Eskom's procedure 004 11402.
- Proof of contracting company's Accident/Incident Reporting and Investigation System.
- Proof of checklists and where applicable test certificates, regarding contractor's tools, equipment, machinery, mobile equipment, vessels under pressure and any other applicable checks required by the Act.

The principal contractor must ensure that his contractors (Subcontractors) also have a Health and Safety File and that it must be accepted by the Principle Contractor.

The Safety Officer employed by Camden Power Station will audit these Health and Safety Plan once a month according to the NOSA management system to ensure compliance with the provisions of the Act.

23 Invoicing and payment

Within one week of receiving a payment certificate from the Service Manager in terms of core clause 51.1 of the NEC document, the Contractor provides the Employer with a tax invoice showing the amount due for payment equal to that stated in the Service Manager's payment certificate.

The Contractor shall address the tax invoice to:

invoiceseskomlocal@eskom.co.za

and include on each invoice the following information:

- Name and address of the Contractor and the Service Manager.

- The contract number and title.
- Contractor's VAT registration number.
- The Employer's VAT registration number 4740101508.
- Description of service provided for each item invoiced based on the Price List.
- Total amount invoiced excluding VAT, the VAT and the invoiced amount including VAT.

Employer will reserve the right to change or modify the payment process according to the best interests of the organisation.

24 People

24.1 Minimum requirements of people employed on the Site:

The minimum requirements for people on Site for safety, administrative, support, and technical personnel shall be comprised as follows:

- All electricians' qualifications shall be of technical subjects with a "Matric or Technical N3" minimum, and a valid Trade test as electrician.
- 1 SHEQ officer with 3 years' plant related experience, National diploma in safety management studies and SACPMCP accredited. This individual is responsible for overseeing safety, healthy and quality responsibilities for the contractor.
- 1 Site manager with related Power Plant Experience as defined in the Service information, with a minimum of 5 years' experience and a tertiary education equivalent to NND or ND Electrical Power Engineering Diploma.
- 1 Certified Master Installation Electrician, with 5 years' experience with (Technical Diploma).
- 1 Cleaner for offices, ablution facilities and general work.
- 2 Supervisors with minimum National Diploma, in Electrical power engineering, and 5 years plant related electrical experience.
- 5 Electricians with valid trade test certificates in the electrical field, and wireman's' licence for 3 Phase Installations, with a valid registration at DoL, to assess, and issue CoC's. All candidates shall have a minimum of 3 years Power Plant related experience and National driver's licence, minimum code

8. All electricians' qualifications shall be of technical subjects with minimum of NQF Level 4 (Matric/N3/NC-V Level 4) or highest qualifications and a Valid Trade test as electrician.

- 5 valid trade tested electricians and certified as IE (Installation electrician) for Single Phase Installations systems, with minimum of 3 years' related experience in Power plant systems and National driver's licence at code 8 minimum. All electricians' qualifications shall be of technical subjects with a minimum of NQF Level 4 (Matric/N3/NC-V Level 4) and a Valid Trade test as electrician.
- 6 valid trade tested electricians with minimum of 3 years' related experience in Power plant systems and National driver's licence code 8 at minimum. All electricians' qualifications shall be of technical subjects with a minimum of NQF Level 4 (Matric/N3/NC-V Level 4) and a Valid Trade test as electrician.
- Eight (8) electrical skilled assistants (PSR authorised & per qualification) (PSR authorised & per qualification) with a minimum of technical NQF Level 4 (Matric/N3/NC-V Level 4) certificates at minimum with 12 months related work experience in the electrification industry related to the maintenance and installations, of lighting and power distribution of Power Stations, for the maintenance of lighting and power outlets.
- All **electricians'** personnel shall have a Minimum of 3 years' experience in the Industrial field or Power Station Environment in the electrical field after obtaining the trade test qualification.
- All wiremen shall be registered with DoL, to issue CoC's, and have Registration certification with DoL.
- The training and certification requirements shall be valid for the duration of the contract.
- The contractor shall utilise a "Back-up" Standby" team to release the first team after twelve hours of consecutive work.

  NB: Only valid certificates will be accepted. Application letters and letters of recommendation won't be accepted.

The contractor shall make provision for the training and skills development of "Local to Site" students from Ermelo and neighbouring places, the following as a minimum. This will depended on the SDL&I or CSI negotiations outcomes.

- Two (2) learner technicians for practical experience (P1 and P2 practical)
- Four (4) learner artisans in electrical trade (on job experience and training)

This shall be executed as part of the National Skills Development programme of South Africa, and managed solely by the Service provider, or as per the SD&L requirements.

25 BBBEE and referencing scheme.

Eskom supports BBBEE and gender and equity. Eskom reserves the right to select the technical best candidate as Service provider.

26 Subcontracting

26.1 Subcontractors

Contract with subcontractors are back-to-back with the main contract, using the NEC conditions of the contract and are subject to acceptance by the Service Manager prior to such contracts being entered into by the contractor.

ECC does not make use of nominated subcontracting, but the Employer may list which subcontractors or suppliers the Contractor is required to enter subcontracts with. This is usually only required where Plant and Materials need to be obtained from a particular supplier or group of suppliers in order to comply with operational standards.

26.2 Subcontract documentation, and assessment of subcontract tenders

Copies of every order issued by the contractor to his Subcontractor or by his Subcontractor to his suppliers are submitted to the Service Manager for his assessment of the amount due, within the assessment interval. Prices are required to be shown on such orders and in all respects the copies are true copies of the original order to the subcontractors.

26.3 Limitations on subcontracting

The Employer may require that the Contractor must subcontract certain specialised work, or that the Contractor shall not subcontract more than a specified proportion of the whole of the contract.

27 Plant and Materials

27.1 Plant & Materials provided "free issue" by the *Employer.*

Plant & Materials provided "free issue" by the Employer shall not be invoiced for by the Contractor.

Materials that are stock items which is required to execute the services of this contract as deemed necessary by the Employer will be made available to the contractor and shall therefore be 'free issue".

Contractor in this regard shall be liable for the replacement of materials/equipment if negligence in handling/use of the equipment is evident.

Employer shall only issue Arc Flash PPE to personnel to comply with the regulations and standards as stipulated in this document. Employer shall only re-issue Arc Flash PPE that is damaged or is required to be replaced as per Arc Flash requirements. Contractor shall ensure that old/damaged PPE is returned to the Employer prior to re-issue.

27.2 Contractor's procurement of Plant and Materials

Service Manager may direct the contractor to procure materials, where the contractor shall submit qualified quotations for approval.

27.3 Spares and Consumables

Service Manager may direct the contractor to procure spares and consumables where the contractor shall submit qualified quotations for approval invoices provided after completion of purchase. These are to be kept by the contractor and adequate stock levels shall be maintained.

28 Employer's Site entry and security control, permits, and Site regulations

The *Contractor* applies for access permits (Contractor's permit) at the Security gate on the start date of the contract. The *Contractor* personnel shall be required to be always in possession of an access permit.

To assist Protection Services with the issuing of permits and the identification of personnel on site the successful *contractor* is to supply a list of all personnel that

he/she intends using on site, at least 1 week prior to entry of the Security Area. This list must be delivered to Protection Services. The list, identified with the *Contractor's* name, is to contain the following information:

- Employee name.
- Employee ID Number.
- The *Employer's* Safety Coordinator's signature.
- Electrical Maintenance Manager signature.
- Copy of the ID book for every employee of the *Contractor.*

Access permits must be returned to protection services when the worker/s leave the site, either after completion of the *services*, or upon earlier termination of service of a worker during the contract period.

Ensure that there is a procedure or policy to comply with for security when leaving or having lost the access cards.

To speed up the process of gaining access to the site, the *Contractor* must compile detailed lists of all tools and equipment (including serial numbers where applicable) to be taken on site before arriving at the Power Station Security gate. An authorised copy of this list must be retained by the *contractor* - to be used again when the tools and equipment are removed from site after the completion of the *services.*

Any additional tools or equipment brought to site, or any tools or equipment removed during the contract period must be reported to protection services and all lists amended likewise. Gate release permits will not issue for the removal of any tools or equipment not specified on the tool list.

The *Contractor's* visitors and all personnel shall always conform to the security arrangements in force at the site. Application forms for visitors must be filled in by the *Contractor's* Site Manager and approved by the *Service Manager,* one day before the visit and submitted to the *Employer's* Protection Services office. Visitors will not be allowed on site if the necessary forms are not in the possession of the security staff.

The Chief of Protection Services may, with valid cause, remove any, of the *Contractor's* personnel from the site, either temporarily, or permanently. He may deny access to the site to any person whom, in the opinion of the said Chief of Protection Services, constitutes a security risk.

No unauthorised vehicles will be allowed on site. Only *Contractor*'s Vehicles with displayed Contract Vehicle Permits disks will be allowed on site. Contract Vehicle Applications should be directed to the *Service Manager*. It shall be at the discretion of the Service Manager/Protection Service Manager to determine the number of vehicles required.

The *Contractor* will be restricted to the *working areas* associated with his place of work. The *Contractor* is forbidden to enter any other areas and must ensure that his employees abide by these regulations.

28.1 Restrictions to access on Site, roads, walkways, and barricades.

Contractors are to adhere to all the rules and site regulations.

28.2 People restrictions on Site; hours of work, conduct and records.

Restrictions and hours of work may apply on some Sites. It is very important that the Contractor keeps records of his people on Site, including those of his Subcontractors which the Service Manager have access to at any time. These records may be needed when assessing compensation events.

Normal working hours start at 07h15 daily, end of business time is 16h30 from Monday to Thursday and 12h15 on Friday. Working hours are according to those as per Camden Power Station and shall be subject to change without notice to which the Contractor shall align.

The contractor should keep daily attendance register for each employee.

29 Publicity and progress photographs

Contractors are to adhere to all the rules and site regulations.

30 Contractor's Equipment

Contractors must keep records of Equipment on Site including whether it is owned or hired. The records will include safety testing, load testing, calibration etc:

30.1 Tools and Equipment

The Service Provider shall have his/her own tools and equipment. Where an expectation is raised that the Employer must pay for such equipment, the equipment will become the property of the Employer, defective equipment shall then be replaced at the Service providers' cost.

The Service provider shall ensure that, at the "***Technical Evaluation Stage"*** of the Contract to have available for Inspection the following tools and equipment, as a minimum, but not limited to; - This should be part of the Evaluation criteria and they should have it for the duration of the contract.

TOOLBOXES FOR THE FOLLOWING EMPLOYEES ON EVALUTION STAGE

- Master installation electrician
- Electrical Artisan
- Skilled assistants (PSR authorised & per qualification) Electrician

Test equipment's

- Multimeters-Fluke 1770 series True RMS digital Multimeters, for each technical employee- calibrated.
- HV/MV Voltage tester, 1KV range to 16.5 KV with a 6 meter proximity fibre stick- calibrated, minimum of 2.
- HV/MV Fluke / Megger testers 5KV, 2 minimum
- Amp meters, Clamp on meters, fluke 325 or similar per employee.
- TOP T1832 Insulation Tester – analogue.
- Micro Ohm meter
- Digital VLF Tester
- Fluke 62 MAX, infra-red thermometer, 2 minimum
- DC Earth fault locator tester, minimum 1.
- Humidity meter Fluke 971 minimum 1.
- Digital LUX meter, Fluke 941, or UNI-T light meter 20k Lux, minimum 1
- Multifunction Installation tester
- Circuit breaker speed test/analyser
- Binoculars
- Compliance tests equipment for Hazloc areas as additional to normal test equipment's (Testers with red covers).

NB: The tool list is not limited to the above.

POWER TOOOLS

- Heavy-duty magnetic drill
- Heavy duty electric demolition jack hammer concrete drill / breaker
- Light duty hammer drill x 2

- Corded Impact drill x 2
- Cordless / Battery operated impact drill x 2
- Electric angle grinder 2200 wats preferably x 2
- Electric baby grinders x 2
- Electric heat guns x 2
- Hydraulic cable crimpers complete with dice from 10 to 240mm sq x 2.
- Electrical Compressors x 2
- Industrial Electrical Blowers x 4
- Industrial Electrical Vacuum Cleaners x 2
- Single Phase Electrical Extraction Fans x 2

Hand Tools

At minimum, the following tools shall be provided:

- Fully furnished Electricians Toolboxes for each technical employee.
- Brother handheld labelling machine 9 to 38 mm cartridge.
- Cable core cutters x 2
- Measuring wheel
- Distance meter x 2
- A frame 8 step ladders aluminium x 2
- A frame 6 step ladders fibre glass x 2
- Torque wrench– calibrated.
- Screwdrivers- Phillips and Flat
- Wire strippers
- Spanners Gedore – open ended and ring (6mm-32mm)
- Socket wrench with extension bars gedore (6mm-32mm)
- Combination Pliers
- Nose pliers
- Side cutters
- Fish tape
- Tape measure
- Torches
- Stanley knifes.
- Drilbits and drill sets.
- Ballpen Hammers

- Files-course, medium, smooth
- Electrical extensions with reels
- Marking chalk

Other Equipment

- A 25m height Cherry picker
- Note: This equipment shall be on “AS and WHEN REQUIRED” basis and shall only have a hourly/day rate, inclusive of the operator or test person.

31 Equipment provided by the Employer.

NOTE: There’s an electrical maintenance workshop and offices provided by the employer.

- The Employer provides critical spares as predetermined and available in Stores.
- Consumables which are stock items shall be provided by the Employer.
- Arc Flash PPE
- All equipment, tools, property, site establishment, services, etc. paid for by the Employer for the Contractor to use or execute his duties shall become the property of the Employer. Any item paid for as stated which is damaged by the contractor through negligence, mistreatment, or any other method, shall be replaced by the contractor at the contractor’s own cost.

31.1 Potable Water

The contractor may utilize water points on Site. Where no supply is available the contractor makes his own arrangements.

31.2 Electrical Power

Existing 3 Phase 380V and single phase 220V power on site may be utilised by the contractor. Where no supplies are available the contractor supplies his own source. The employer does not guarantee uninterrupted supply.

31.3 Sanitary Facilities

Permanent facilities to serve the Power Station terrace are provided by the Employer.

31.4 Waste Removal

Household waste removal to the bins, as provided on the Site by the employer, is the responsibility of the Contractor. The contractor complies with Employer's policy for waste management on Site, policy. 004/4100.

The Employer will provide and empty special colour coded bins for refuse disposal.

The Contractor will be responsible for refuse bins for his own site.

The Contractor ensures that all workers under his control strictly adhere to the correct use of refuse bins:

For the full duration of the services, the Contractor is responsible to keep the work area clean of any rubble, and to place all refuse into the bins provided.

31.5 Telecommunication

Connections are available. The contractor applies via the Service Manager for a connection. Connection fees and calls are for the Contractor's account.

If connections are unavailable or not possible, the contractor shall provide his own means of obtaining communication services.

The Contractor shall provide everything else necessary for providing the Service.

32 Facilities provided by the *Contractor:*

- The Contractor is to provide vehicles and office equipment.
- The Contractor has to ensure own cleaning of Protective Clothing.
- The Contractor also has to provide own cleaning of the offices, kitchen, stores in the Workshop area and yard.

33 Excavations and associated water control

In all areas, if it is required to be excavated, an excavation permit will be required. Existing electrical cables, fibre optic cables and underground services may be exposed, or interfered with during the commencement of excavation work in all areas. Ensure the routing of cables, and underground services is identified prior to starting of any excavation.

34 Commissioning

It will be required of the contractor to do commissioning on existing and new plant after overhaul and inspection. It will be the liability of the contractor to draw up quality documentation and inspection sheets to safely commission the plant.

35 Start-up procedures required to put the *works* into operation.

ITP/QCP, Test procedures, inspection check sheets ect.

36 Take over procedures.

N/A

37 Access given by the *Employer* for correction of Defects.

Defects shall be attended to as per works management guidelines.

38 Fire precautions

Any tampering with the Employer's fire equipment is strictly forbidden and is a criminal offence.

All exit doors, fire escape routes, walkways, stairways, stair landings and access to electrical distribution boards must be kept free of obstruction, and not be used for work or storage at any time. Firefighting equipment must always remain accessible.

In case of a fire, report the location and extent of the fire to the Electrical Operating Desk at extension 3471/2/3 or dial emergency No: 7911.

Take the necessary action to safeguard the area to prevent injury and spreading of the fire.

39 Reporting of Accidents

The Employer follows an accident prevention policy that includes the investigation of all accidents involving personnel and property. This is done with the intention of introducing control measures to prevent a RE-OCCURRANCE of the same incidents. The Contractor is expected to fully co-operate to achieve this objective. The Service Manager must be informed immediately of any incidents and any damage to property or equipment must be reported within the same shift.

NOTE: This report does not relieve the Contractor of his legal obligation to report certain incidents to the Department of Labour, or to keep records in terms of the

Occupational Health and Safety Act, and Compensation for Occupational Injuries and Diseases Act.

40 Accommodation and catering

The Employer does not provide accommodation.

The Contractor or any of his employees or subcontractors will be allowed to use the Employer's dining facilities.

The Contractor or any of his employees or subcontractors may also buy meals from the fast food's outlet on Site. Lunch time is from 12:00 to 12:30.

Accommodation cannot be the responsibility of the Employer, and charged against, as the Employer supports "Local to Site" Employees first.

40.1 Provided by the Contractor

The contractor shall provide vehicles, office equipment and all required measures to execute the given Services. The contractor shall collect what belongs to the contractor upon completion of the contract.

41 Control of noise

Full PPE shall be worn at all times when entering the plant.

42 Hook ups to existing works

- Eskom Cardinal Rules shall apply.
- Contractor shall provide safety harnesses.
- Tests and inspections
- Description of tests and inspections.
- Safety equipment shall be tested/ calibrated and inspected before use by the Contractor, a record/ certificates shall be kept by the contractor and available upon request.

43 Materials facilities and samples for tests and inspections

N/A

44 Key Performance Indicators (KPI's)

Performance shall be measured, and a Non-Conformance Report issued where deemed necessary.

The contractor shall be measured on performance on the following criteria:

- ORHVS and PSR authorisation – target 100%
- ORHVS and PSR compliance and audits – target 100%
- Call out response time – 1 hour reporting to site.
- Quality and Safety audits – 100%

Under Works management section the following criteria will be met:

- Electrical UF – above 85% (unit availability to generate power)
- Electrical UCLF – below 10% (unit unavailability to generate power, including load losses and trips)
- Electrical OCLF – 0 % (external factors leading to unavailability, lightning strikes, cable theft causing trips)
- Electrical TRIPS – 2 PA, target 0 (unit unavailability due to any electrical failure or trip)
- Electrical PCLF – below 4% (planned electrical work where unit is required to be off load or opportunity outage)
- Schedule Compliance – 100% (execution of PMs on time versus submitted plan to execute. 4-week plan)
- PM Compliance – 100% (close out of PM's scheduled)
- Statutory Violations – 0 violations (statutory PMs executed on time)
- QC Compliance – 100% ITPs for critical tasks
- Rework Report – 0 Rework in 90-days cycle

NCR – Non-Conformance Report

A NCR report will be raised leading to an investigation and close out for non-adherence to the KPI criteria. A total of 4 NCR reports raised in a financial year will lead to contract cancellation at the discretion of the Employer.