	Scope Of Work	Camden Power Station
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Title: Cabling and Electrical Fence  
Maintenance Scope of Work

Document Identifier: **240-94065312**

Area of Applicability: **Eskom**

Functional Area: **Electrical Maintenance**

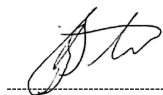
Revision: **02**

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Next Review Date: **01 January 2025**

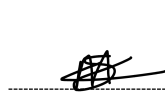
Disclosure  
Classification: **Controlled Disclosure**

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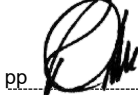
**G.C. Botma**  
**Contracts Manager**

Reviewed by



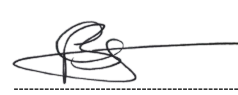
**M Mkhize**  
**System Engineer**

Approved by



**D. G. S. Drotsky**  
**Electrical  
Engineering  
Manager**

Authorised by



**B Mthethwa**  
**Electrical  
Maintenance  
Manager**

Date: 09/12/2021

Date: 09/12/2021

Date: 2021-12-09

Date: 21/12/2021

Reviewed by



**R Grobler**  
**Senior  
Technologist**

Received by



**Procurement  
Manager**

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Date:

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## 1 Description of the Service : Cable work

### Cable Services

#### 1.1 Executive overview

The contract is for The Supply, Delivery, Installation, Testing, Tracing, and Commissioning of Power, control, and telecommunications cables, Earthing systems, and Emergency Breakdown Repair Services of Cables at Camden Power Station for Electrical Maintenance & Projects.

This is an all-inclusive maintenance package for Cabling. 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.

#### 1.2 Employer's objectives and purpose of the service

**Note:**

The Contractor must be authorized in terms of PSR (low voltage) and HV (high voltage) to be able to perform the following activities covered in a scope of work, failing which a 10% will be deducted on monthly Gross labour charged effective after three months when the contract is in place/signed.

The service is the supply; delivery and installation of electrical cables and equipment as listed in Section 1.7 in the services, at all plant that is related to Camden Power Station and its boundaries. Specification in Table 1 must be adhered to.

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

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.

And this service shall include all projects, outage work, routine maintenance, repairs, structural repairs, inspections & cleaning, support services, emergency breakdown services, statutory

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inspections, and defect correction during normal and abnormal condition or operation, to ensure the integrity of the installed cabling systems at Camden Power Station.

The contractor shall through execution of the services ensure that all systems are safe and operational. These will include but not limited to all cabling systems and its sub system components.

Camden Power Station operates on a 24-hour basis, 7 days per week in continuous load following mode.

### 1.3 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 Services are performed on existing, and new installations and complies with good engineering and maintenance practices and standards for fossil fuelled power plants and conforms to the legal, environmental and other Eskom specifications, procedures, standards and conditions prevailing at the Site.

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

Maintenance will be carried out in the following categories:

#### 1.3.1 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.

#### 1.3.2 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.

#### 1.3.3 Planned Maintenance

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Is the maintenance performed during a planned (scheduled) outage of the specific plant or generating units.

#### 1.3.4 Routine Maintenance

Is time based maintenance work that is performed with the plant either on or off load.

#### 1.3.5 General Overhaul

During this outage all plant having no redundancy is overhauled to ensure reliable and safe operation.

#### 1.3.6 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.

#### 1.3.7 Opportunity Repairs

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

### 1.4 Definitions

**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 interpreted as per the definition of the NEC 3 of April 2013.

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## 1.5 Legislation and Site regulations

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.
- SANS 10400: National Building Regulations
- Plant Safety Regulations (PSR) 36-681 – Generation Plant Safety Regulations
- GGPP0592: Generation Policy: Power Station Plant Classification
- OPG 0159-02: Eskom manual: Classification Guideline
- 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
- 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 is disposed of by the contractor in accordance with the applicable law.

**Table 1. Standards and specifications**

Item	Title	Revision
1	Eskom ESKASAAU7: Quality Requirements for the Procurement of Assets, Goods and Services.	Latest
2	SANS 1339 SABS 1339 2010 4 Electric cables - Cross-linked	Latest

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Item	Title	Revision
	polyethylene (XLPE) insulated cables for rated voltages 3,8/6,6 kV to 19/33 kV	
3	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
4	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
5	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
6	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
7	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
8	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
9	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
10	SANS 529 SABS 529 2007 3 Heat-resisting wiring cables	Latest
11	SANS 808 SABS 808 1967 1 Cable glands for use on flameproof enclosures (Ex d)	Latest
12	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
13	SANS 10142-1 SABS 0142-1 2009 1.07 The wiring of premises Part 1: Low-voltage installations	Latest
14	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	Latest

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Item	Title	Revision
	to and including 3 000 kW installed capacity	
15	Eskom Generation GGS0386 Rev 5 Requirements for control and power cables for power stations	Latest
16	NWS 1220: Specification for cable junction and reduction boxes for power stations.	Latest
17	Drawing 0.00/1310: Standard power and control cable code	Latest
18	Eskom NWS 1058: Safety on Construction Sites: Requirements which Contractors must comply with	Rev 5
19	Eskom NWS 1007/P: The Management of Construction, Commissioning and Hand-Over of Plant	Rev 2
20	Eskom NWS 1525: Specification for Control and Instrumentation Cables	Rev 3
21	Eskom NWS 1674: Drawing Acceptance	Latest
22	Eskom NWS 1024: Specification for Panel Hardware and Components for Electronic Equipment	Latest
23	Eskom GGS 0349: Quality Assurance	Rev 2
24	240-150642762 Generation Plant Safety Regulations	Latest
25	240-109607332 Plant Labelling Standard	Latest
26	240-56356396 Earthing and Lightning Protection standard	Latest
27	36-946 WI for electrical drawings and documentation	Latest
28	36-944 General drawing standard WI	Latest
29	GGS0315 Standard drawing practise	Latest
30	36-947 WI for C&I on drawings and documentation	Latest
31	GGG0450 Guideline to acceptance of contractor drawings	Latest
32	36-943 Engineering drawing office and engineering document standard.	Latest
33	240-56536505 Hazardous Location Standard	Latest
34	240-56227443 Requirements for Control and Power Cables for Power Stations Standard	Latest

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

- The contractor ensures that all Supervisory and responsible employees under his/her control are authorised in terms of Eskom ORHVS (Operating Regulations for High Voltage

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Systems) and PSR (Plant Safety Regulations) 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. 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 regards to Eskom's Permit to Work system (PSR and ORHVS).

- The contractor supervises and manages the health and safety, and gives access to other parties on equipment under the contractor's control in terms of these Regulations.
- The contractor maintains records of authorised employees; manages re-authorisation and report statistics on monthly site report.
- On arrival onto an Eskom site, an Initial 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.

## 1.7 Requirements

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

- Any modification to a cable system or 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., That 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 cable modernisation, refurbishment, replacement and upgrades of a major component shall be managed so as to comply with the latest legislative requirements.
- Where certain aspects of the maintenance, management, modification or upgrade of cable 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 a cable to be worked on, such cable will be proven by all means, including "Spiking" until it could be verified for repairs. Local isolation procedure to be followed

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- All upgrades and modifications will be approved by a professional engineer registered with ECSA, with experience in the field.
- The competent Service provider shall have a formal risk assessment process, identifying risks associated with the Services rendered.
- Camden power station shall develop a maintenance strategy which shall include critical spares for the cable systems in order to minimise downtime.
- The power station will ensure that the Service provider will implement a QCP for all activities carried out by the competent service provider.

## 1.8 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 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.
- Design, supply and install all new cable racks and mark up drawings. Only vertical runs are permitted when suspended in air.
- Supply, deliver & install new cabling, cable joint terminals & termination kits.
- 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.
- Repair, test, trace and join all 6.6 kV<sub>AC</sub>, 380V<sub>AC</sub>, 220V<sub>AC</sub>, 24V<sub>DC</sub>, 220V<sub>DC</sub> cables as per cable schedules, including 22kV cable from Uitkoms to Station transformers.
- Re-terminate existing cable ends (previously disconnected by others) on all new or replaced panels as & when required.
- All Cables 6.6 kV<sub>AC</sub>, 380V<sub>AC</sub>, 220V<sub>AC</sub>, 24V<sub>DC</sub>, 220V<sub>DC</sub> from Units 1 to 8 and Common Plant installed, repaired and removed MUST be tested first, the test results MUST be within the specification and the employer must accept the result first before any work can continue.
- Inspect, test and repair earthing on all the Units and Common Plant, when required.
- Remove and replace 16.5/6.6KV Unit transformers Bus bar taping when required.

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- All cables, joint terminals and terminations supplied, must be in accordance with all applicable requirements for standard and specification listed in Table 1. Issue Certificate of Compliance for the work done.
- 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, and system and process changes.
- Participate in investigations as required.
- There is efficient overall organisation of personnel and services.
- Any cable that is decommissioned or unused by the Contractor must be communicated to the Supervisor or his delegate to obtain information about storage or disposal of that cable.
- All removed cables shall be taken to the electrical storage yard.

### 1.8.1 Cables

The below data describes the minimum requirements of cables and accessories that is required at Camden Power Station. The objective is to have the equipment available at the supplier, readily available for use at Camden Power Station.

It also describes the accessories, installation, and replacement of the equipment at all levels: below ground, above ground, horizontal, and vertical position, in various formation laid (as per SANAS approved Standards)

#### 1.7.1.1 Medium Voltage Cables

Armoured for 11KV/6,6kV system (individual copper screen tape). 7.2KV XLPE stranded copper conductor cable fixed/laid in all positions, to all heights above floor level, and to all areas, as well as buried below ground.

- 50mm sq. x 3 Core (DXE03MCV)
- 70mmsq. X 3 Core (DXE03NCV)

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- 95mmsq. X 3 Core (DXE03PCV)
- 120mm sq. x 3 Core (DXE03QCV)
- 185mm sq. X 3 Core (DXE03SCV)
- 300mmsq. X 3 Core (DXE03UCV)
- 500mm sq. x 1 Core (DXE01WCV)
- 630mm sq. x 1 Core (DXE01XCV)

### Joints

Inline filled transition through joints, terminals complete for 7.2KV XLPE stranded copper conductor cables to PLIC belted screen cable

- 16mm sq. to 50mm sq. x3 core
- 50mm sq. x 3 Core (DXE03MCV)
- 70mmsq. X 3 Core(DXE03NCV)
- 95mmsq. X 3 Core(DXE03PCV)
- 120mm sq. x 3 Core (DXE03QCV)
- 185mm sq. X 3 Core(DXE03SCV)
- 300mmsq. X 3 Core(DXE03UCV)
- 500mm sq. x 1 Core (DXE01WCV)
- 500mm sq. x 1 Core (FXE01WCV)
- 630mm sq. x 1 Core (DXE01XCV)
- High Voltage Terminations (Cleats)

### 1.7.1.2 Low Voltage Cables

Armoured Cabling, for DC systems and 220/380V, 525V AC systems 600/1000V grade PVC/PVC/SWA/PVC insulated stranded copper conductor cable fixed/laid in all positions, and to all heights above floor level, underground, and to all areas.

- 1,5mm sq. x 3 Core (BVX03CCV)
- 1,5mm sq. x 4 Core (BVX04CCV)
- 1,5mm sq. x 12 Core (BVX12CCV)
- 1,5mm sq. x 48 Core (BVX48CCV)
- 2,5mm sq. x 2 Core (BVX02DCV)
- 2,5mm sq. x 3 Core (BVX03DCV)
- 2,5mm sq. x 4 Core (BVX04DCV)
- 2,5mm sq. x 7 Core (BVX07DCV)
- 2,5mm sq. x 12 Core (BVX12DCV)
- 2,5mm sq. x 19 Core (BVX19DCV)

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- 4mm sq. x 2 Core (BVX02ECV)
- 4mm sq. x 3 Core (BVX03ECV)
- 4mm sq. x 4 Core (BVX04ECV)
- 4mm sq. x 7 Core (BVX07ECV)
- 4mm sq. x 19 Core (BVX19ECV)
- 4mm sq. x 37 Core (BVX37ECV)
- 6mm sq. x 4 Core (BVX04FCV)
- 16mm sq. x 4 Core (BVX04HCV)
- 25mm sq. x 4 Core (BVX04KCV)
- 35mm sq. x 4 Core (BVX04LCV)
- 50mm sq. x 4 Core (BVX04MCV)
- 70mm sq. x 4 Core (BVX04NCV)
- 95mm sq. x 3 Core (BVX02PCV)
- 120mm sq. x 3 Core (BVX03QCV)
- 120mm sq. x 4 Core (BVX03QCV)
- 150mm sq. x 3 Core (BVX03RCV)
- 150mm sq. x 4 Core (BVX04RCV)
- 185mm sq. x 4 Core (BVX04SCV)
- 240mm sq. x 3 Core (BVX03TCV)
- 240mm sq. x 4 Core (BVX04TCV)

Termination complete, for 600/1000V grade installation only  
PVC/PVC/SWA/PVC insulated stranded copper conductor cable.

- 1,5mm sq. x 3 Core (BVX03CCV)
- 1,5mm sq. x 4 Core (BVX04CCV)
- 1,5mm sq. x 12 Core (BVX12CCV)
- 1,5mm sq. x 48 Core (BVX48CCV)
- 2,5mm sq. x 2 Core (BVX02DCV)
- 2,5mm sq. x 3 Core (BVX03DCV)
- 2,5mm sq. x 4 Core (BVX04DCV)
- 2,5mm sq. x 7 Core (BVX07DCV)
- 2,5mm sq. x 12 Core (BVX12DCV)
- 2,5mm sq. x 19 Core (BVX19DCV)
- 2,5mm sq. x 37 Core (BVX37DCV)
- 4mm sq. x 2 Core (BVX02ECV)
- 4mm sq. x 3 Core (BVX03ECV)
- 4mm sq. x 4 Core (BVX04ECV)
- 4mm sq. x 7 Core (BVX07ECV)
- 2,5mm sq. x 19 Core (BVX19ECV)
- 2,5mm sq. x 37 Core (BVX37ECV)

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- 6mm sq. x 4 Core (BVX04FCV)
- 16mm sq. x 3 Core (BVX03HCV)
- 16mm sq. x 4 Core (BVX04HCV)
- 25mm sq. x 4 Core (BVX04KCV)
- 35mm sq. x 3 Core (BVX03LCV)
- 35mm sq. x 4 Core (BVX04LCV)
- 50mm sq. x 4 Core (BVX04MCV)
- 70mm sq. x 4 Core (BVX04NCV)
- 95mm sq. x 2 Core (BVX02PCV)
- 120mm sq. x 3 Core (BVX03QCV)
- 150mm sq. x 3 Core (BVX03RCV)
- 150mm sq. x 4 Core (BVX04RCV)
- 185mm sq. x 3 Core (BVX03SCV)
- 240mm sq. x 3 Core (BVX03TCV)
- 240mm sq. x 4 Core (BVX04TCV)

#### 1.7.1.3 Cable Glands

Supply and install

Unarmoured, for DC and AC systems

Compression steel cable gland complete to fit all cable sizes and types

Armoured, for DC and AC systems.

BW captive cone steel cable gland complete to fit cable sizes and types

Glands, shrouds, lugs included

- Size 0
- Size 1
- Size 2
- Size 3
- Size 4
- Size 5
- Size 6

Through-joints, complete for 600/1000V grade

PVC/PVC/SWA/PVC stranded copper conductor cable

Scotch's Cast or similar type

- Size A0
- Size A1
- Size A2
- Size A3

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- Size A4
- Size A5
- Size A6

#### 1.7.1.4 Process Control And Instrumentation Cables

600/1000V grade PVC/PVC/CT/PVC insulated stranded copper conductor cable fixed/laid in all positions, etc., to all heights above floor level, etc., and to all areas.

- 0,5mm sq. x 2 Core (UVG02ACV)
- 0,5mm sq. x 4 Core (UVG04ACV)
- 0,5mm sq. x 20 Core (UVG20ACV)
- 

Terminations complete, with gland, for 600/1000V grade PVC/PVC/CT/PVC insulated stranded copper conductor cable.

- 0,5mm sq. x 2 Core (UVG02ACV)
- 0,5mm sq. x 4 Core (UVG04ACV)
- 0,5mm sq. x 20 Core (UVG20ACV)

#### 1.7.1.5 Telephone Cables Steel Wire Armoured/Unarmoured

600/1000V grade TELEPHONE cable fixed/laid in all positions, etc., to all heights above floor level, etc., and to all areas.

0,6mm sq. x 10 Pair (TVH10BR)

Installation

0,6mm sq. x 10 Pair (TVH10BV)

#### 1.7.1.6 Cable Removal, Disconnecting, and Reconnecting

Removal of cabling shall be done in such manner, as to account for the lengths removed, and booked into safe storage area as identified by the Employer. Removal of cabling shall be done only on Employers' instruction, and for the cause of financial return to the Employer. All cabling installed in the premises is the property of the Employer with no "Rights of transfer" or use to the Supplier.

- Upon Instruction, terminations may be disconnected for purposes of testing, and will be reconnected after the purpose of disconnection.
- Terminations may, upon instruction, be cut back, and re-terminated after failure. Testing shall be conducted to proof successful terminating. Such terminations shall be reconnected, and connections tested against approved sheets for tithing of connecting bolts and nuts.

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- This instruction is applicable for all Voltage ranges, Including telecoms, control, LV, and MV cabling.
- All accessories, such as glands, shrouds, bolts, nuts, and washers in connection with the removal and reconnecting of cables shall be kept safe for re-use. Only upon inspection where it is found unsafe for intended use shall such accessories be replaced with approved accessories for use.

### **Removal Of Existing Redundant Cable**

The Services shall include for removal of cable previously fixed/laid in all positions, and to all heights above floor level, and in all areas including trefoil clamps, saddles, and ties.

For the drumming of cable and transporting thereof to Eskom Stores or any other place of safe keeping as may require/requested by the Employer as in Camden Power Station.

#### **1.7.1.7 Labelling Of Cables**

Cable number tags to identify cable as per requirements and colour coding in works information for "PERMANENT" applications only.

External Graphoplast number tags

#### **1.7.1.8 Welding Socket Outlets**

Supply and Install of welding socket outlets

63Amp 380v 5pin Welding Socket Outlet

#### **1.7.1.9 Other Miscellaneous Materials**

Supply and Install of CCG Boxes and reducers complete with terminals where applicable, and compliant to installations in explosive atmospheres. (zone applications)

- No 0 CCG box with 2.5mm sq. terminals 5off
- No 1 CCG box with 4.00mm sq. terminals 5off
- No 2 CCG box with 16.00mm sq. terminals 5off
- No 3 CCG box

### **Reducers**

Supply and installation of reducers.

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- Reducer 25 to 20mm
- Reducer 29 to 20mm
- Reducer 29 to 25mm
- Reducer 32 to 20mm
- Reducer 32 to 25mm

### Heat shrinks

Supply and Install of heat shrinks, of various colours

- 4.8mm to 2.4mm sq.
- 12.7 to 6.6mm sq.
- 25mm to 120mm sq.
- 38mm to 19mm sq.
- 50mm to 25mm sq.
- 95mm to 48mm sq.
- 76mm sq.

### PVC Cabtyre

Supply and installation complete inclusive of terminations , dressing, etc.

- 1.5mm sq. x 3core
- 2.5mm sq. x 4core
- 4mm sq. x 4core
- Cable rubber Grommet diameter 25-100mm sq.

### 1.7.10 Racking

#### Supply and install

**Note:** The rates for all galvanized materials use for erecting, the required new racking , must include for the cost of designing such racking.

#### 1.7.10.1 Cable tray and accessories

Cold drawn high tensile galvanized wire mesh cable tray (O-L GRIDSPAN GS 50x50) fixed in all positions, etc., to all heights above floor level, etc and to all areas. Complete with splice clamp sets, hold down brackets, bolts, nuts and washers, etc.

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- 150mm x 75mm x 3m
- 300mm x 75mm x 3m
- 500mm x 75mm x 3m
- 600mm x 75mm x 3m

Cold drawn high tensile galvanized wire mesh cable tray fittings / accessories  
normal bending radius

- 150mm Wide x 75mm 90 degree horizontal bend
- 150mm Wide x 75mm 90 degree external/internal bend
- 150mm Wide x 75mm tee
- 300mm Wide x 75mm 90 degree horizontal bend
- 300mm Wide x 75mm 90 degree external/internal bend
- 300mm Wide x 75mm tee
- 300mm Wide x 75mm to 150mm wide x 75mm reducer

#### 1.7.10.2 Cable support system

Galvanized steel fixing brackets, fixed complete with bolts, spring nuts, nuts and washers, etc.

- 89mm x 105mm Ninety degree angle bracket (O-L 1331)

#### 1.7.10.3 Galvanized steel single arm cantilever with tongue

bracket complete with bolts, spring nuts, nuts and washers, etc

- 200mm Long x 89mm high (O-L 251-200)
- 350mm Long x 89mm high (O-L 251-350)
- 450mm Long x 89mm high (O-L 251-450)
- 650mm Long x 89mm high (O-L 251-650)

#### 1.7.10.4 Galvanized steel channel forming frame support

Complete with bolts, spring nuts, nuts and washers, fixed in all positions, etc., to all heights above floor level, etc., and to all areas.

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- 41.3mm x 41.3mm x 2.5mm Thick (O-L 1000)
- 82.6mm x 41.3mm x 2.5mm Thick (O-L 1001)

#### 1.7.10.5 Galvanized conduit

Surface mounted and fixed in all positions, etc., to all heights above floor level, and to all areas.

- 20mm Diameter
- 25mm Diameter
- 32mm Diameter
- 40mm Diameter
- 50mm Diameter

#### 1.7.10.6 Wiring channels

Galvanized steel channel complete with galvanized cover surface mounted and fixed in all positions, etc., to all heights above floor level, etc and to all areas.

- 41.3 x 41.3 x 1.6mm Thick (O-L 2000)
- 50.8 x 50.8 x 1.6mm Thick (O-L 2200)
- 76.2 x 50.8 x 1.7mm Thick (O-L 8200)
- 76.2 x 76.2 x 2.1mm Thick (O-L 8000)
- 127 x 76.2 x 2.6mm Thick (O-L 9000)

#### 1.7.10.7 Trefoil cable clamps

Supply and installation of trefoil cable clamps complete with bolts, for single core cables

- 95mm sq. up to 150mm sq. x1core
- 185mm sq. up to 630mm sq. x1core

#### 1.7.11 Miscellaneous Steelwork

Steel for support of racking, including all necessary fixing, bolts, nuts, washers, welding, etc and holes, notches, etc fixed in all positions, etc., to all heights above floor level, etc and to all areas.

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- 25mm x 25mm x 5mm Angle section
- 35mm x 35mm x 5mm Angle section
- 50mm x 50mm x 6mm Angle section
- 76mm x 38mm x 6mm Channel iron

All removed steelwork or racking will be kept for re-use

#### 1.7.11.1 Steel Channel Racking

Up to 1m wide

Up to 2m wide

#### 1.7.12 Earthing

Braided bare stranded copper earth, or kwenas conductor for inter-connecting main earthing on racks, etc., and equipment (motors.) installed complete with termination lugs

- 15mm x 3mm Flat copper braided
- 70mm Green with yellow line PVC insulated stranded copper earth conductor
- (complete with crimping lugs, bolts, etc) laid/fixed in trench/rack or equipment,

Hard drawn copper earth strap or rod laid in trench

- 25 x 3mm
- 50 x 3mm

Termination, tee joint, cross over , etc. complete with exothermic welding, lugs, etc. for hard drawn copper earth strap or rod

- 10mm Diameter copper (lug termination)
- 10mm Dia. to 10mm dia. copper
- 10mm Dia. tee joint
- Copper clamps (saddles) for 10mm dia annealed
- Copper rods fixed in all positions etc. To all levels

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- Double rod x 10 mm diameter.

### 1.7.13 Builder's Work

#### 1.7.13.1 Earthworks

Excavation in all classes of material not exceeding 2000mm deep for cable trench, sleeve pipe, etc including risk of collapse, keeping free of water, river sand bed backfilling, compacting and disposal of surplus material, all to the Engineer's specification.

Excavation by hand in all classes of material not exceeding 2000mm deep for cable trench, sleeve pipe, etc including risk of collapse, keeping free of water, river sand bed backfilling, compacting and disposal of surplus material, all to the Engineer's specification

Re-excavation over existing cables, pipes and sleeves, etc. in soft material not exceeding 2000mm deep for cable trench, sleeve pipe, etc including risk of collapse, keeping free of water, river sand bed, backfilling, compacting and disposal of surplus material, all to the Engineer's specification

#### 1.7.13.2 Cable Marker, Slabs And Marker Tape

Laid in ground

Cable marker tape

Concrete cable marker

Off terrace concrete cable marker planted in ground

Remove and replace concrete cable duct cover slabs

Slabs not exceeding 125kg

Slabs not exceeding 250kg

Slabs not exceeding 500kg

PVC sleeve pipe including short lengths and joining fixed in all positions, etc., to all heights above floor level, and to all areas. etc.

100mm Diameter (sewage type)

100mm Diameter (class 5)

150mm Diameter (sewage type)

150mm Diameter (class 5)

PVC sleeve pipe fittings and accessories

100mm Diameter 90 degree long radius bend (sewage type)

100mm Diameter 90 degree long radius bend (class 5)

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150mm Diameter 90 degree long radius bend (sewage type)

150mm Diameter 90 degree long radius bend (class 5)

### 1.7.13.3 Cable Slot Covers

“Vastrap” cable slot covers complete with 32mm x 32mm angle iron stiffeners welded to underside for slots, drilled fixing hole, 32mm x size 10 fixing screw, plug, drilling of floor and fixing down on each corner, covers not exceeding 500mm wide

Vastrap cable slot covers complete with 32mm x 32mm angle iron stiffeners welded to underside for slots, drilled fixing hole, 32mm x size 10 fixing screw, plug, drilling of floor and fixing down on each corner, covers not exceeding 1000mm wide

### 1.7.14 Core Drill Holes

Where the drilling of holes for cable access is required, the following hole sizes will be required;

- 0 to 150mm -diameter up to 300mm slab thickness
- Greater than 150mm up to 300mm slab thickness

### Cable Scanning

Contractor to provide cable and underground services scanning and issue a report of identified services with recommendations of an approved installation route from point of supply to point of consumption.

### Partial Discharge Tests

Contractor must provide services for testing cabling to determine expected life span through Partial Discharge testing.

### 1.7.15 Cable information to be supplied to the *Employer*

The *Contractor* supplies the following cable information to the *Employer* for every cable task performed before invoicing:

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(Information)	1. (Example)
Cable number	01BFA1012
Cable origin Function Location Code	01BFA06AA001
Cable origin Description	380V COMMON FUEL OIL PLANT BOARD A CIRCUIT 05
Cable destination Function Location Code	00EGD11AH001
Cable destination Description	TANK 1 OUTFLOW HEATER BANK 1
Termination Date	20/09/03
Cable type	BVX3PCV
Joint terminal information	20m from origin.....
Gland type	yes
Cable Length utilised (Pull Slip)	55m
Cable route	Yes printed page
Tagged as per Eskom standard	Yes

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### 1.1.16 Contact Persons

The Project Manager, his delegates (other departments using the Contract), and, if outside the Employer's working hours, the most senior person on shift or standby manager are identified as those authorised to call out the Contractor as required to perform the works.

The Contractor ensures that the Contractor, his site manager or his delegate is on site during office hours. The Contractor's site manager or his delegate has full signing authority and is authorised to make binding decisions. The Contractor, his site manager or his delegate is reachable per telephone, after hours for any emergencies.

### 1.1.17 Data Item Descriptions

#### A. Working hours

##### Normal hours:

- Normal working hours is from 07H15 to 16h30 Monday to Thursday. Friday is from 07H15 to 12h15

##### Emergency hours:

- Is from 16H30 on weekdays to 07H15 on the following day.
- All hours are calculated at 1.5hr rate. No 2.0 hr rates are applicable as per Eskom conditions of Service.

## 1.9 Corrective, Routine and Preventative maintenance requirements

### 1.9.1 Cable numbering and Labelling

The contractor adheres to the requirements stipulated in document 240-64550692, called Label Specification and Plant Codification. Hereto the Supplier plan inspects and maintains on continuous basis all labelling of electrical equipment and plant under his control to ensure the following:

- All electrical cables shall be correctly labelled as per document 240-64550692.
- All non-labelled or defective labelling shall be reported to the Employer.
- The Service provider will provide new labelling which shall then be affixed to the equipment identified.

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### 1.9.2 Small Power and Distribution Cubicles 380V and 220V AC and DC

All Power Distribution Boards on Camden Site will be the responsibility of the Service provider to maintain the cubicle, and the electrical equipment installed in the cubicles.

These cubicles are in Buildings and the Plant and are:

Lighting supply kiosks on the premises

Small power distribution cubicles on the premises

All temporary Distribution boards and connection points

DB boards on the premises

Welding socket outlets on the premises

Electrical Junction boxes on the premises

In this regard, The contractor manages, inspects and maintains on a monthly basis all Camden distribution boards installed to ensure that:

- Ensuring all installations conform to requirements of the type of installation,
- Ensuring that all safety covers and locking devices are affixed;
- All cabling, trunkings, cable racks and support systems are securely installed, earthed, bonded and supported to the required standards;
- The Distribution boards are maintained professionally, paint work maintained.
- Cleaning of dust inside the Distribution Boards is maintained
- Electrical connections is sound, neat and tight
- Faulty circuits are repaired, and faulty circuit breakers or connectors are replaced.
- All defects noted on the electrical and civil infrastructures are reported, and notifications created on SAP, scheduled and work executed to ensure compliance.

### 1.9.3 Statutory Testing of Assets, Plant, and Equipment

**Wherever applicable to Cables and new Installations:**

Refer to latest revision of Document 229/12263, "Statutory Plant and Equipment"

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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.

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, or Equipment of the Employer to ensure that:

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

#### 1.9.4 Electrical Drawings

The Contractor manages and maintains all System drawings under his control.

- This will include updating of Wiring diagrams, Single line, Cable block diagrams and schedules, Schematic diagrams and the like, whenever any changes or replacements were affected, 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 ensures that drawings are available when fault finding and repairs are carried out.

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## 2. Description of the *Services for Electrical Fence*

### 2.1 Employer's objectives and purpose of the Service

The contract is for the provision of maintenance and repair services at Camden Power Station for the Electrical non-lethal fence.

This report discusses the overall repair and maintenance scope of work for Camden Power Station Electrical Fence.

- Repairs- electrical, mechanical, and civil structures of electrical fence
- Refurbishment
- Installation, interchanging, and Removal of equipment related to the Security fence
- Electrical Testing of Energizers
- Computer system and communication
- Spares holding

It is the Service provider's responsibility to ensure that the Electrical fence stays in a 100% functionality. The services are applicable to Camden Power Station electrical fence in its totality

### 2.2 References

- The *Contractor* will inform and adhere to all relevant Eskom and SABS/SANS standards and procedures which are relevant to the works. If there is any ambiguity between Eskom and the other regulations or standards this will have to be discussed with the *Employer*.

### 2.3 Standards & Regulations for Fences

- 240-78980848 Specification for non-lethal energized perimeter detection system (NLEPDS) for protection of ESKOM installations and its subsidiaries
- ISO 9001 Quality Management Systems
- ISO 14001 Safety Management Systems
- 240-56227443 Requirements for Control and Power Cables for Power Station Standard
- 240-56355815 Field Instrument Installation Standard: Junction Boxes and Cable Termination
- 85-A-001 Functional Location KKS Coding and Labelling Standard
- SANS 1091 National Colours Standard

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- SANS 10142-1: The wiring of premises, Part 1: Low-voltage installations
- 240-86973501 Engineering drawing Standard
- 240-60725641 Eskom Specification of Standard for Equipment Cabinets
- 36-681 Generation Plant Safety Regulations
- ISO 10007 Guidelines for Configuration Management
- Occupational Health and Safety Act, 1993
- Environmental Regulations for Workplaces, 1987
- 240-64636794 Standard for Wiring and Cable Marking in Substations
- 240-56356396 Earthing and Lightning Protection Standard
- SANS 10222-3:201 Electrical security installations. Part 3: Electric fences (non-lethal)

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

- The Supplier will be required to be trained and authorised in terms of the Regulations stipulated, to enable him/her to take Permit to Work (PTW), on the Fence system to execute the Works.
- The contractor supervises and manages the health and safety of his/her own employees.
- A High Voltage Permit To Work is necessary in terms of ORHVS when work on high voltage parts of the fence energiser (apparatus) is being performed, or when working on HV fence conductors themselves.
- Testing requiring the fence to be energised must to be carried out under regulation 5.09 of ORHVS with the necessary safe to work procedure.
- low voltage PSR Permit is required when work is to be carried out on the low voltage side of the fence installation, for example on the 380V/220V supply or equipment control and circuitry, or if work is to be carried out on the electronics of the energiser.
- Within three months from the contract start date the *contractor* will be required to have his own employees who are authorized to take permits on HV an LV plants.
- The *Employer* shall, on request from the *Contractor*, isolate required plant from all sources of danger as described in the Plant Safety Regulations or HV regulations.
- The *Employer* shall, on request, make available a copy of the latest revision of the Plant Safety Regulations or HV regulations to the *Contractor*.
- The *Contractor* shall conform to all rules and regulations applicable to Plant Safety and HV Regulations and shall complete the Worker's Register prior to working on the plant.
- The *Contractor* shall provide at least two people at all times for the execution of this task as per the eleven point plan.

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## 2.5 Plant Equipment and Overview

At Camden Power Station, the electric fence is installed between the inner perimeter and the outer perimeter fence. Camden Electrical security fence is approximately 5, 7 km long. Five energizers energize the fence. The energizers are situated at the security control room building.

These energizers are supplying energy to the electric fence aluminium conductors. The number of aluminium conductors installed is 30 and the spacing between the conductors is 50 mm.

The string conductors is Aluminium and the thickness of conductors is 2.0mm

## 2.6 System Components

The NLEPDS has a twofold function, which is firstly to deter any unauthorized intruders from entering, and secondly to detect and alarm any unauthorized attempt to enter by cutting the fence wires.

The maintenance of the NLEPDS shall include but is not limited to the following components / sub-systems:

- Electric fence structure
- Energizers
- Mimic and PC with configurations/front end software
- Power supplies
- Communications and cabling
- HT wire and aluminum wire
- Insulators and strainers
- Batteries
- Earthing
- Isolating boxes
- 
- Communication PC and screen

## 2.7 Energizer Input / Output Requirements

The specification of the energizer will be in accordance with IEC 60335-2-76 and Eskom document 240-78980848

- Peak value of voltage must be above 7.5kV, but not exceeding 10kV with the energizer not connected to the load (fence).
- Maximum energy delivered to a load of 500ohm must not be less than 7, 5 J but not exceeding 8 J with the energizer not connected to the load (fence).
- The required energy on each live conductor wire on the structure must not be less than 5 J, with a minimum Difference Potential of 7 kV.
- Minimum interval between pulses should not be less than 1, 0 Hz.

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- Impulse duration shall not exceed 10ms.

These values will be used to assess the performance of the fence and to determine the effectiveness of the maintenance being conducted by the *contractor*.

## 2.8 Types of Faults On The Electric Fence

### **Short Circuit – The system has detected that a live wire is touching a ground wire**

- This can also be due to any other object touching a live wire.
- Intruder tries to gain access and two consecutive conductors touch.
- Conductor is broken and touches another
- Spider, snake or lizard climbing onto electric fence insulator
- Weeds growing into fence to such an extent that a short circuit alarm occurs.
- Electric fence bobbin or insulator is cracked and leaking to the steel bracket.

**Note:** The system will indicate in what specific zone the fault is occurring.

### **Open Circuit – The system has detected that a live wire has been cut, resulting in an open circuit.**

- An intruder trying to gain access to the premises has cut the conductors.
- Conductor breaks due to high tensioning or sudden drop in temperature.
- Looping break loose due to heavy winds.

### **No Communication – The system has detected that there is no communication between the Fence control PC and the energizers.**

- This can be as a result of an energizer being switched off or out of order as well as a damaged communication cable.
- Mains Failure – This indicates that the energizers are running from the battery backup for a limited period of time.
- Battery Low – The battery voltage is down to a critically low level, the system will switch off in the next few hours.
- HT Voltage Low Alarm – This indicates that one or more of the energizers are faulty as the HT voltage is low.

## 2.9 Compliance of the Electrical fence

This scope covers the required repairs to restore the electric fence back to full working condition and ensure compliance to Eskom standards 240–78980848 Specification for non-lethal energized perimeter detection system (NLEPDS) for protection of ESKOM installations and its subsidiaries. To achieve this requirement, the following key areas shall be met:

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- The NLEPDS shall comprise of sectors and zones
- The electric fence conductors shall be in an overlapping format to ensure effective functionality in the case one or more energizers fail
- Maximum distance between electric fence conductors shall be 100mm in compliance to SANS 10222-3 (2016)
- All NLEPDS electronic components shall be housed in the security equipment room and within associated cabinets of the protected sites
- The minimum life of the energizer shall be 15 years
- Only Eskom approved cabinets shall be used to house NLEPDS equipment and shall to comply with 240-60725641 Eskom Specification of Standard for Equipment Cabinets

## 2.10 Maintenance

In order to successfully maintain the fence in a satisfactory condition, the following tasks shall be completed on the fence:

### Visual Inspections

It is the Service provider responsibility to ensure that the electrical fence is in 100% working order. The service provider must plan and schedule the inspections well and execute around adverse weather conditions, such as heavy rain.

Visual inspection to be carried out on all structural components of the system every week and a report must be produced in which the following is reflected;

- Walk along the length of the electric fence and inspect all components of the fence for faults. (i.e. a clicking sound is audible where arcing occurs).
- Fix all faults reported prior to inspection, tighten all loose wires, replace and repair all faulty fence components.
- Inspect the electric fence energizer installation and ensure compliance.
- Inspect the energizer and electric fence earthing system. Tighten loose connection wires, replace worn-out clamps and corroded components.
- Inspect fence insulators and ensure that they are in satisfactory condition. Broken and deformed fence insulators shall be replaced.
- Look for electric fence wires touching any other component not forming part of the electric fence installation and rectify to ensure compliance herewith.
- Check the fence for tightness and tighten faulty wires
- Inspect all joints and replace broken or rusted clamps (or both).

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- Ensure that joints are still electrically sound.
- Perform visual inspections and routine inspections and identify obvious faults / defects and risks.
- Signs of corrosion on all metal structures and conductors, particularly on ground level
- Faulty or cracked insulators
- Check if fence conductors are covered by wind-blown sand
- Check for broken conductors
- Check for weeds and plastic bags and remove where necessary.
- All crimp connection on the fence looping must be checked for corrosion and tightness, especially where HT terminals joins to the electric fence structure
- All strain and intermediate posts must be checked for corrosion at ground level
- Grass growing towards the electric fence must be removed.
- Check if the electric fence warning and zones signs are in place and not damaged.
- Check for washed out wires & cablings and report.
- Check for and clean water and mud build up.
- Repairs carried out according to the contract.

## 2.11 Routine Maintenance

### The monthly routine maintenance will entail:

- All faults found during maintenance is corrected immediately.
- Conducting fault finding utilizing test equipment, drawings / diagrams and manufacturer's specifications. Identify problematic / faulty components / equipment.
- Verifying the correct operation and display of all alarms.

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- Repairing/ replacing faulty equipment as per task order.
- Reporting to supervisor any recurring defects.
- Checking battery operation by switching off the AC supply to the energizers and monitoring responses of the system.
- Initiating appropriate actions to rectify any unsafe activities / or plant conditions.
- Maintenance on the computer software program.
- Recording full details, technical and cost related history of work carried out on notifications / defects and scheduled work / planned maintenance documents prior to submission to the supervisor with special reference to material used, repairs carried out and equipment used.
- Conducting job observations and peer checks according to procedure.
- Verifying correct operating voltages of electrical fence wires at beginning, middle and end of the fence.
- Checking the fence structure and report any abnormalities.
- Verification of correct operation and maintenance on the energizers
- Tensioning of electric wires.
- Conducting on job training for trainees/artisans.
- Inspecting the electric fence installation for faults at gates
- Conducting risk assessments on live plant and mitigate risks.
- Attend Ad hoc meetings.
- The *contractor* will provide a 24h standby on the above mentioned scope (response must be within two hours to be at Camden)
- Any other defects found to be non-compliant is addressed as part of this contract.

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## 2.12 Tests and Measurements

Calibration of each zone for correct fault indication shall be done quarterly. The tests and measurements shall be done and shall be in accordance with the IEC 60335-2-76 specification, documented and made available to the Head of Security and the System Engineer.

## 2.13 Tests

- Two monthly measurements of the integrity of the electric fence system is essential and must be recorded in a log sheet or book to allow the recognition of changes and for counter measures if values deteriorate.
- Measurements must be taken on the electric fence and compared to previous measurements to see if the fence integrity is still intact.
- The output of the energizers is tested off-line and on-line every second month and the results recorded.
- Fence energy and voltage readings will give an indication what the integrity of the fence is.
- It is important that the original level is maintained and should not deviate more than 10 % of the original readings after installation.
- High levels of energy and voltage should be maintained on the electric fence as this provides the deterrence effect of the perimeter security fence system.
- Energy readings should be taken by using the BS017 Energy/HT meter. This instrument will measure the energy reading in Joules and the voltage level in kV across a load of 500  $\Omega$ .
- A minimum of seven joules and 7,5 kV must be maintained on the electric fence.
- The type of conductors used on the perimeter electric fence is aluminum with 2,0 mm in diameter. This type of conductor may contract and expand during different seasons. The tension on the electric fence conductors is checked and maintained properly to ensure proper working of the system.
- The perimeter electric fence zones must be tested regularly to ensure accuracy which will assist in fault finding and proper response from security personnel. This is an essential test and needs to be documented properly.
- The fence zones must be checked at least every month.

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- Stinger power supply batteries must be replaced every six months.

## 2.14 Fence

- Perform spot checks twice monthly by applying a short to the fence (functional zoning checks) to confirm system zoning and fault identification.
- Using an energy/HT meter to test the performance of the fence at various points.

## 2.15 Energisers and Equipment Room

- Take measurements once a month on the electrifier battery terminals with the charging circuit on ( $\pm 13V$  should be measured).
- Disconnect batteries from the charging circuit and measure the voltage on the battery. This reading should not be less than 11.5V, should it be the battery has to be changed.
- Switch off the power supply once every 6 months and confirm that the system does operate with battery power for 1 hour (Actual backup time is 5 hours).
- Do tightness checks on all electrical connections on the electrifier boxes and line taps on the fence.
- All measurements taken shall be documented and compared to previous measurements to see if the fence integrity is still intact

## 2.16 Frequencies

- Above mentioned inspections and tests shall be conducted in the following frequencies:
- Inspections is conducted every second week.
- Tests and measurements is conducted once every 4weeks.
- All call-outs

## 2.17 Spares

The recommended spares will be kept with the Employer. A quotation will be handed to the Contract Supervisor, he will issue a task order for the spares to be purchased by the contractor to keep the Fence in a running condition. The required spares should include but is not limited to the following:

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- BS120 Stinger Energizer
- BS 120 Energizer board
- BS 120 CT units
- BS 120 40W charger units
- BS 120 HT transformers
- BS 120 Monitor board
- BS 120 synchronizing units
- Intermediate isolators
- Strain isolators and studs
- Stinger tensioners and studs
- BS120 Battery Charger
- Stinger BS017 energy/joule meter
- Battery 12V 7.5A/H
- 2.0 mm Aluminium Wire
- Combi Tensioners Heavy Duty
- Intermediate Insulators
- Safety and warning Signs
- 4mm / 6mm Aluminium Ferrules
- Stinger Rs485 to Rs232 converter modules

The *contractor* will inform the *Employer* of any critical spares that have long lead times or are not available off the shelf that needs to be purchased by the *contractor* upfront when they receive a task order. These spares should be kept at the *Employer's* facility. This eliminates any down time caused by unavailability of spares.

#### 2.18 Experience of staff

- All staff shall be adequately qualified and competent of performing all work within safe and correct technical specifications.
- Qualifications will be deemed necessary for an 'Installer and maintainer" of Electrical fences

#### 2.19 Civil and Structural

- Concrete works is to SANS 2001-CC1 and SANS 10100-2 unless otherwise stated
- All broken and damaged concrete underneath the electrical fence is to be replaced, in accordance with applicable SANS

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## 2.20 Safety Signs / Labelling

- Safety /danger signs is mounted on the inner and outer fence, 50 meters apart, signs face outwards.
- Signs are durable, rigid, and UV protected material
- Danger/Safety signs are installed at a height of 1,5 meter, and is secured on Electrical fence, 50 meters apart.
- Signage complies with the requirements of SANS 10222-3
- Labels are affix in such a way that removing of labels are done in a forcibly manner
- Labels are legible and not obstructed by components
- Labels are in accordance with NWS 1582, and Camden Specification 7.1/PR/03

### 2.20.1.1

## 2.21 Documentation

- A full service report will be compiled and provided to Camden Power Station.
- The report will contain a high level description of the work done.
- It will contain the approved PQP of work on site and all related check sheets and reports.
- All technical notifications will be shown as well. It will contain a section on spares used report.

## 2.22 Included In Contract

- *Contractor* shall be on standby at all times, in case of a failure on the fence the *contractor* will be called out to come to site within two hours and rectify the issue within 24hours.
- The repair of the fence: The contractor shall execute the repair of the fence scope as soon as possible to get the fence in a working condition.

## 2.23 Definitions/abbreviations

### Meaning given to the abbreviation

#### Abbreviation

CDSS

Contractor Document Submission  
Schedule (CDSS)

COMS

Communication

ENG

Engineering

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EMS	Environmental Management System
GEN	Generation
GSR	General Safety Regulations
HT	High Tension
IEC	International Electro technical Commission
LV	Low Voltage
OHRVS	Operating Regulations for High Voltage Systems
ISO	International Standard Organisation
KPIs	Key Performance Indicators
KV	Kilo-Volts
MS	Microsoft
MV	Medium Voltage
NLEPDS	Non-Lethal Energised Perimeter Detection System
NEC	New Engineering Contract
NKP	National Key Point
OHS	Occupational Health And Safety
O&M	Operating and Maintenance
OEM	Original Equipment Manufacturer

**Alarm response:** Delineates the response or actions to be taken in response to an alarm received in the unit control room.

**Functional location:** Numbering according to function performed by equipment and KKS numbering system.

## 2.24 Excluded From Contract

- **Horticulture:** The *contractor* shall not be responsible for Vegetation removal in and around the fence, and the control of soil erosion shall also be excluded from this contract.
- **Force majeure:** Any natural disasters like flooding, falling of trees over the fence or any other accidents which is not maintenance related like vehicles driving through the fence etc.
- **Barrier/Perimeter fences:** Any maintenance works on the inner- and outer barrier fences.
- **Vandalism:** the contractor is not responsible if the fence is vandalized, damaged by intruders. The contractor needs to submit a quotation for the repairs if the fence was vandalized

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### 3. Section C general requirements of Contract.

#### 3.1 Works Management and Control

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

- The contractor adheres to the Works Management procedures;
- 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 services;
- 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.

#### 3.2 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 services 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 service to be executed;
- The contractor drafts an (ITP) Inspection and Test Plan for each Critical activity to be executed on the lifts
- 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 Service;
- The contractor executes all services as detailed in the Engineering Scope of Work;
- The contractor provides all means to execute the service;

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- 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, included into the Planned Maintenance works package, the requirements of Section 1 above - **Corrective, Routine and Preventative maintenance requirements**, whichever part is applicable, is executed with the Detailed Scope of Work requirements, set out under Planned Maintenance.

### 3.3 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 submits the plan, and in concurrence with the Employer, drafts a detailed Scope of Work for the service to be executed;
- The contractor drafts an (ITP) Inspection and Test Plan for each Critical Activity, Plant and Level 1 Plant to be maintained;
- 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 services;;
- The contractor provides all means to execute the service;
- 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;
- Any missing or stripped fixture or fitting will be replaced;
- All equipment, parts, or spares that is removed or stripped down from the service shall be counted, listed, bagged, tagged, stored, and signed into, and signed out of, a

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predetermined outage storage area. It will be the responsibility of the contractor to account for each item of the services;

- The contractor shall have check sheets, and registers updated at all times 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);
- Keep Certificates available;
- 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 Section 1 above - **Corrective, Routine and Preventative maintenance requirements**, whichever part is applicable, is executed with the Detailed Scope of Work requirements, set out under Outage Services.

### 3.4 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 stating clearly 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

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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;

- The contractor must ensure that the employer and others required 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 these 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 services, incorporating all reports, data, acceptance criteria, and quality assurance records.

### 3.5 Test Certificates

- Provide a data pack with complete tests and Certificates after completion of any major services;
- Have records of all certificates for tools and test equipment;

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- Ensure that test equipment is at least, yearly calibrated and certificates available, to be executed by an approved test facility.

### 3.6 House keeping

- All work places must be kept clean at all times, 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.

### 3.7 Training

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

- All relevant courses must be attended as required on contractor's account;
- The Employer shall only be responsible for Plant Safety Regulation;
- Compile a required Training matrix for employees and his control;
- Attends required courses as stipulated by the Employer.

### 3.8 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.

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#### 4. 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 Internalegrated 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 execute Safety management in terms of NOSA 5 STAR requirements;
- The contractor execute all inspections as per appendices of document 6.4/MA/01;
- The contractor adhere to the requirements of Document 004/4830;

#### 5. Completion Communication

- Completed task must be communicated to the supervisor;
- Contractor informs and gives feedback on progress;

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- 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.
- All work done must be accompanied by signed of ITP's by the relevant people at the hold and witness points.

## 6. 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 other meetings as required and directed by the Contract Manager;
- Interfaces with the Employer's internal organization;
- Interfaces with other contractors that may perform work for the Employer;
- Attends Monthly scheduled contract meeting.

## 7. Specialized Tools and Test Equipment

- Contractor must provide all required tools to execute the requirements;
- All tools that need certificates must have valid certificate to comply with safety requirements;

## 8. Integration with the Employer's organization

The Contractor Provides the Works 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 on SAP;
- Maintains all required SAP and other maintenance procedures;

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- Attends to plant breakdowns, until completed, unless otherwise agreed with the Contract 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;
- Provides personnel that will be authorised, by the Employer, in Plant Safety Regulations (PSR);
- Spares requisition from the Employer's main store, in liaison with the Contract Manager;
- Supply of goods that are not available in the Employer's main store, as directed by the Contract Manager when an emergency situation arises;
- Assist in the processes to identify goods/equipment/spares needed to effectively maintain the electrical plant as to minimize downtimes.

## 9. Quality assurance requirements

Refer to Camden Document no. 004/5602 (Business Excellence Quality Management Standard.

The Contractor conforms to the following Quality management requirements:

- The quality requirements are as per ISO 9001 and the Employer's Standard 004/5602;
- The requirements of ISO14001, Environmental management;
- The requirements of ISO18001, Documentation control;
- The Contractor utilizes the Employer's quality documentation forms;
- Apart from any statutory data packages required, the Contractor also compiles a data package of the relevant drawings, and test certificates for the services which must be reviewed and signed off by the Supervisor;
- 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 Contract Manager for acceptance;

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- The Contractor submits the following, as directed by the Contract Manager: QA plan/manual, (I&TP's) Inspection and Test Plan;
- The Contractor conforms to the Quality Management requirements as stipulated in the User Requirement specification;
- 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, and test certificates for each section of work which must be reviewed and signed off by the *Employer*.

## 10. Providing access to and interface with others

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 Contract Manager to maintain harmonious working conditions on Site.

During the progress of the services, 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).

## 11. Internal interpretation and terminology

CoE	Centre of Excellence
DOL	Department of Labour
ECSA	Engineering Council of South Africa
EOD	Electrical Operating Desk

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CoE	Centre of Excellence
DOL	Department of Labour
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 Manager
PSR	Plant Safety Regulations
QCP	Quality Control Plan
SANS	South African National Standards
SAP	Systems Application Processes

## 12. Management meetings

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

Meetings of a specialist nature may be convened as specified elsewhere in this Works 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 Contract *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.

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### 13. 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.

### 14. Safety Management

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

#### 14.1 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;
- 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;
- The Contractor must appoint a Safety Representative to assist but not limited to the following:
  - Identify possible hazards, dangers and risks;

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- Eliminate potentially dangerous conditions and actions;
- Ensure a safe working environment;
- Inspect and record findings of his workplace and submit a copy on a monthly basis to The Contract Manager.

## 14.2 Eskom Lifesaving 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;
- Wear the correct PPE

The Contract 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 Contract Manager must be informed 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 job observations on critical tasks as identified, as well as Near Miss reporting and provide proof to the Contract Manager.

## 14.3 Minimum SHE Documentation Required from the Contractor

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.

- 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;

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- 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.

#### 14.4 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;

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

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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.

## 15. Programming constraints

N/A

## 16. Invoicing and payment

Within one week of receiving a payment certificate from the Contract 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 Contract Manager's payment certificate.

The Contractor shall address the tax invoice to:

[invoiceseskomlocal@eskom.co.za](mailto:invoiceseskomlocal@eskom.co.za)

and include on each invoice the following information:

- Name and address of the Contractor and the Contract 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.

## 17. People

Minimum Requirements	OEM / Service provider	Eskom
First Aid Training - level one	x	

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Minimum Requirements	OEM / Service provider	Eskom
Confined space training	x	
Working at heights	x	
Risk assessment training	x	
Medical fitness certificate	x	
<b>Power Station Training provided (required)</b>		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 Supervisor Course		x
Basic firefighting course	x	
Eskom Arc flash training		x

### 17.1 Minimum requirements of people employed on the Site

- The training and certification requirements shall be valid for the duration of the contract;
- Safety and administrative support personnel shall be comprised as follows:
  - 1x Site Manager with N6/National Diploma in Power engineering
  - 1x SHEQ officer with plant related experience must be SACPMCP accredited.
  - 1x Supervisor with minimum N5/National Diploma in Power engineering
  - 1x Electrical wireman with valid trade test certificates in the electrical field
  - 1 x Electrician with accredited as fence installer, with capability of issuing CoC for Electrical fencing

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- 2x cable terminators with valid trade test certificate electrical Power engineering field plus cable joining and termination course.
- 6x general Assistants with a minimum of ABET 3 or std 8 certificate( trenchers / cable pullers)
- 1x boiler maker with valid trade test certificates.
- All personnel should have a Minimum of 2 years' experience in the Industrial field or Power Station Environment;

## 18. Subcontracting

### 18.1 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 Contract Manager prior to such contracts being entered into by the contractor.

TSC does not make use of nominated subcontracting, but the Employer may list which subcontractors or suppliers the Contractor is required to enter into 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.

### 18.2 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 Contract 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.

### 18.3 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.

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## 19. Plant and Materials

### 19.1 Plant & Materials provided “free issue” by the Employer

- Material that are stock item will be made available to the contractor;
  - Contract in this regard shall be liable for the replacement of materials/equipment in the event that negligence in handling/use of the equipment is evident through investigation.

### 19.2 Contractor’s procurement of Plant and Materials

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

### 19.3 Spares and Consumables

Contract 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.

## 20. 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 in possession of an access permit at all times.

In order 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 intends using on site, at

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least 72 hours 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.

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 conform at all times 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 *Contract 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.

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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*.

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.

## 20.1 Restrictions to access on Site, roads, walkways and barricades

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

## 20.2 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 Contract Manager or Supervisor have access to at any time. These records may be needed when assessing compensation events.

Lunch time is between 12:00 until 12:30. Work starts at 07:15 daily, knock off time is 16:30 from Monday to Thursday and 12:15 on Friday.

The contractor should keep daily attendance register for each employee.

## 20.3 Publicity and progress photographs

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

## 21. 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:

### 21.1 Test Equipment MV/Cabling- meters

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- High Voltage VLF sine wave – 34KV cable tester
- Underground services detection equipment scanner (RD 8000 CAT) or alike.
- Surface cable detector or tracer with signal generator and receiver
- Surge generator (thumper tester) with energy level of up to 1800 joules
- Analogue listening set for underground cable fault Pin pointer
- Portable electrical generator, single phase
- Time domain reflectometer / cable length meter with a range of at least 3 km.
- Energy/Joule meter for Fence

## 21.2 Power Tools

- 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
- Heavy duty hydraulic cable crimper complete with any source of pump plus dice from 300 to 630 mm sq
- Industrial Electrical Vacuum Cleaners x 1

## 21.3 Hand Tools

- Fully furnished Tool boxes for each technical employee;
- Brother handheld labelling machine 9 to 38 mm cartridge.
- Cable core cutters x 2
- Measuring wheel
- Distance meter x 2

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- Various crimpers and hydraulic crimpers for power cables, all sizes listed

## 22. Equipment provided by the Employer

The Employer provides Critical Spares as predetermined.

Consumables which are stock items shall be provided by the Employer.

### 22.1 Potable Water

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

### 22.2 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.

### 22.3 Sanitary Facilities

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

### 22.4 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:

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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.

## 22.5 Telecommunication

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

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

## 23. Facilities provided by the Contractor

- The Contractor is to provide accommodation, 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.

## 24. Excavations and associated water control

In areas up to 1 m and greater is required to be excavated, an excavation permit will be required. Existing electrical cables and fibre optic cables are exposed prior to commencement of excavation work in this area. Ensure the correct routing of cables is identified prior to starting excavation.

## 25. 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.

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**26. Start-up procedures required to put the services into operation**

N/A

**27. Take over procedures**

N/A

**2 Access given by the *Employer* for correction of Defects**

Defects shall be attended to as per works management guidelines

**28. 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 remain accessible at all times.

In case of a fire, report the location and extent of the fire to the Electrical Operating Desk at extension 3471.

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

**29. 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-OCCURRENCE of the same incidents. The Contractor is expected to fully co-operate to achieve this objective. The Contract Manager must be informed immediately of any incidents and any damage to property or equipment must be reported within the same shift.

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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.

### **30. Accommodation and catering**

The Contractor will be responsible for the provision of accommodation to his personnel – 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 take away meals from the fast foods outlet on Site. Lunch time is from 12:00 to 12:30.

### **31. Provided by the Contractor**

The contractor shall provide accommodation, 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.

### **32. Control of noise**

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

### **33. Hook ups to existing works**

- Eskom Cardinal Rules shall apply;
- Contractor shall provide safety harnesses;
- Tests and inspections;
- Description of tests and inspections;

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- 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.

### 34. Materials facilities and samples for tests and inspections

N/A

### 35. Performance indicators

Shall not be interpreted in this Scope of Work as per NEC terminology Clause X20.

Performance indicators KPI will be drafted as per the Station Maintenance KPI Contract and be adhered to. Performance shall be measured, and a Non-Conformance Report issued where deemed necessary.

KEY PERFORMANCE INDICATORS (KPI's) sheet

	Monthly Assessments	Weight	Base	Target	Ceiling
	<b>Gate keepers</b>				
1	Call backs rework (Days)	20%	80	90	100
2	Waiting time for spares (Days)	10%	3	2	1
3	MTTR Repair time (Hours)	10%	16	8	4
4	Plant availability per month (measured in%)	25%	80	90	100
5	Cost saving on repairs (Budget quotation / actual cost) %	10%	10	0	-10
6	Contractor Safety performance (Safety statistics report)	25%	1	0	0

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