Eskom Generation	**Grootvlei Power Station** **Scope of work for Maintenance intervention**	**SAP notification №**	
		Date	29/03/2023
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Unit	N/A	**Plant area**	Ash Plant, Weighbridge, Fuel Oil Offloading Bay, perimeter fence, procurement building and access control.
Responsible department	C&I Engineering		

Background

Integrated Perimeter System

The Integrated Perimeter System (IPS) is designed to deter,detect and delay any attacks on the specific sites.

The system is installed on Grootvlei Power Station and Vaal dam sites including Vaal Marina High Mast site.
Gootvlei site surveillance system consists of 33 cameras distributed among 8 field equipment kiosks, and Vaal dam site including Vaal Marina High Mast site surveillance system consists of 11 cameras distributed among 3 field equipment kiosks.

Both sites contain the same equipment and the same systems and the entire system is viewed at the central point situated at Grootvlei Power Station Protective Services Control Room. Communication is facilitated via the wireless network due to the distance between Vaal dam and the central control room.

The system consists of a physical structure (Betafence 358 welded mesh) with electronic detection sensors mounted on the structure on the outside (thread side) and welded mesh fence on the inside, with a no man's land in between. Vaal dam has only got the Betafence 358 welded mesh barrier with electronic detection sensors. Cameras are mounted on poles located between the two fences.

The sensors are connected to each field kiosk via a LinkBus device network, and the field kiosks are connected to the control room via fibre-based IP network backbone where a redundant ring topology is used. The Integrated Perimeter Security Management System (IPSMS) located in the Control Room, monitors the equipment statuses in the field and notifies the operator on critical equipment failures and threats. Equipment status and alarm reports can be drawn from the system. The HMI runs on a Bosch VMS (Video Management system), and the servers are Dell machines.

On attempted breach of the perimeter the sensors will pick up the kinetic energy generated by the attempt and send the alarm via the field network to the field kiosk which then sends the alarm over the IP-network to the IPSMS in the control room.

The field equipment kiosks consist of various hardware devices ranging from power supplies, Moduteq controllers, converters and communication (network) equipment. The IPSMS uses a dedicated network to connect the kiosks to the IPSMS in the Control Room. The Control Room and the kiosks on each site are connected via a fibre backbone connected in a ring topology. The two sites are interconnected via a wireless link. The IPSMS then generates an audio-visual alarm in the control room (on the site's allocated HMI screens/workstations) and switches the closest Pan-Tilt-Zoom (PTZ) camera to the spot monitor that is dedicated for that site once the operator acknowledges the alarm. The alarm details and the operator acknowledgement will then be stored on a database and can later be reported on the Integrated Perimeter Security Management System provides the equipment status monitoring, supervisory control, operator interface and historical data storage.

Integrated Access System

The main access control system in Grootvlei Power station is used to control access of personnel and vehicles in and out of the station. The system has included access control in terms of entry and exit and DVM (Digital Video Management) system. Both these systems are managed and controlled by EBI server. The servers support redundancy and are Dell products with SQL database.

The access control system consists of Temaline card readers and HDD cards. These card readers are connected directly to the Temaline Server. The server then sends information to the EBI server via an Ethernet switch. The EBI server then does the control and stores data for record purposes. It also has digital video management (DVM) made up of cameras in certain areas and these cameras are connected to encoders that convert them to be compatible with IP since they are still analogue. From encoders the data moves to the DVM for monitoring and storing via an IP switch. The system hardware consists of turnstiles, Booms and Boom Barriers, Card Readers, Door Position Sensors, Magnalock/Door strike, Exit Push Button, Power supply for Magnalock, Panels, Tema Server, RTU, break glasses, Cameras, Power supplies for cameras, etc.

Fuel Oil, Weighbridge, procurement building and Ash Plant CCTV Camera Surveillance System and alarm system

The fuel oil offloading bay, weighbridge, procurement building, and ash plant surveillance systems were installed to monitor the following activities:

- Activities inside and around the procurement building.
- Trucks entering and/or leaving the fuel oil offloading bay and the weighbridge.
- The amount of oil that is being offloaded.
- Whether trucks do bring in coal/oil into the station and that they do not illegally leave with coal/oil.
- To monitor the ash sumps for flooding.

The fuel oil offloading bay system consists of 7 cameras, 1 POE switch, 1 uninterruptible power supply and 1 NVR situated at the fuel oil plant while the weighbridge system consists of 19 cameras, 3 POE switches, 1 NVR, 3 uninterruptible power supplies (UPS) and 3 antennas situated at the weighbridge. At the procurement building there are 7 cameras, 2 POE switches, 5 face access control scanners, 1 NVR, 1 UPS and an alarm system while for the ash plant, the system consists of 1 DVR and 4 analogue cameras situated at the ash sump pits.

Objective

Preventative and corrective maintenance of the fence security system, procurement building CCTV camera surveillance and alarm system, fuel oil offloading bay CCTV camera surveillance system, weigh bridge CCTV camera surveillance system, ash plant CCTV camera surveillance system and the integrated access gate control systems for the power station including the High site at Vaal Marina and Vaal dam pump station.

Scope	
The Contractor shall render both preventative and corrective maintenance in regards to the fence security, fuel oil offloading bay CCTV camera surveillance system, weigh bridge CCTV camera surveillance system, ash plant CCTV camera surveillance system and the Integrated access gate control systems for the Power Station including the High Site at Vaal Marina and Vaal Dam pump station over three (3) years as per detailed maintenance schedule requirements stated under (1.4 Employer's requirements for the service).The contractor shall also ensure that their technicians are technically competent to work on the mentioned systems.	**Procedure/Specification/ QCP/ Hold or Witness Points**

As part of corrective maintenance: The Contractor shall respond to faults that severely impact the Client's security within 12 hours of notification. The Contractor shall also respond to faults that do not directly impact the day-to-day operation of Client's security within 48 – 72 hours.	
The scope of Works and Supply includes –	
Maintenance of the mentioned systems.	
The Scope of Work (SOW) **Work information and description of works** <u>Physical Security Barrier</u> • Immediate repair of any damages to structure • Daily testing of all gates • Cleaning of gate tracks • Replacement off Gate Motor batteries • Immediate assistance in case of breakdown <u>Field kiosks</u> • Weekly cleaning of air filters • Yearly replacement of air filters • Monthly cleaning of the inside of kiosks • Yearly UPS battery replacement • Immediate repair to any faults that may occur	

- Assistance in any electrical inspection required
- Bi-Weekly UPS Tests

Fence Detection and procurement building alarm system

- Continuous setting checks
- Immediate sensor replacement on failure
- Weekly random tests to system
- Monthly full system test
- Monthly log submittal
- Monthly configuration and Moduteq LC on-board log back-ups

CCTV Cameras

- Cleaning of camera lenses, 2 weekly in problem areas, monthly in other areas
- Cleaning of camera enclosures (Control Boxes)
- Immediate repairs to any breakdown
- Network maintenance when required
- Back-ups if required
- Regular testing of PTZ presets
- Monthly end to end test on complete CCTV system

Perimeter Lights

- Replacement of dead lamps
- Cleaning of power enclosures
- Monthly checking of light alignment, rectify where necessary

- Daytime test to test functionality of day/night switches

Wireless Link (Remote site and weighbridge)

- Weekly alignment checks on all radio devices
- Monthly cleaning of all control enclosures (Grootvlei & High Site)
- Yearly replacement of UPS batteries
- Bi-Weekly UPS tests

Control Room

- Cleaning of equipment cabinet and monitors
- Monthly backups if required (client to supply storage)
- Replacement of UPS batteries (yearly)

Software

- Daily operational checks
- Weekly Database back-ups
- Monthly network tests
- Device diagnostics when required
- Input / Output status verification
- Upgrades on device firmware if and when required
- Alarm tests and reporting

Camera Focus

- Ensure Camera Image Clarity with help of Lens adjustment
- Check Monitor resolution

- Check Camera Description as per location
- Check recent Recording of Each Camera with help of playback utility
- Capacity of HDD for required Backup Space
- Check PTZ functionality
- Inspect each camera image is viewing the correct location in accordance with the Employer's requirements

Test the logic

- Access Event Based Recording
- Pre & Post Event Recording for each camera
- Motion Based Recording, Frame rate & other settings configured

Cleaning of cameras

- Clean each camera lense and housing lense

Camera power supplies and fuses

- Inspect each power supply and check the heat output. Test the output voltage to ensure compliance with specification
- Inspect each power supply fuse to ensure the installed unit's rating is to the manufacture's specification

Repair and maintain access control administration office equipment

- The maintenance refers to the maintenance of peripherals equipment including the printer and webcams at the take-on stations.

Software patch installation

The Service Provider to distribute approved Microsoft patches to Eskom IT prior to patches being loaded

Contract requirements

- The ***Contractor*** shall provide themselves with their PPE
- The ***Contractor*** shall be a CERTIFIED PC and software installer.
- The ***Contractor*** shall provide adequate skilled personnel for job execution.

The following is a list of spares the contractor must provide:

SECURITY SYSTEM SPARES LIST			
Item No.	Description	Unit/per year	Quantity
1	• **NVR** Hikvision DS-7732NXI-I4-S Pro Series 4K 32-Channel 256Mbps 1U 4 SATA NVR	Each	10
2	• **43"MONITOR** Dell 45 inch QDULED 4K	Each	10
3	• **HARD-DRIVE** 4TB PURPLE PRO 256MB 3.5IN SATA 6GB/S 7200RPM	Each	10
4	• **POE** Hikvision DS-3E1105P-EI Smart Managed Series 4-Port 100 Mbps PoE Ethernet Switch	Each	10
5	• **IP Turret Camera** Hikvision DS-2CD2346G2-IU Pro Series AcuSense IP67 4MP IR 30M IP Turret Camera, 2.8mm Fixed Lens, White	Each	10
6	• **IP Dome Camera** Hikvision DS-2CD2146G2-I Pro Series, 4 MP AcuSense 2.8mm Fixed Lens, IP Dome Camera, IP67, White	Each	17
7	• Varifocal Lens, IP Bullet Camera Hikvision DS-2CD2646G2-IZS Pro Series, AcuSense 4MP 2.8-12mm Varifocal Lens, IP Bullet Camera,IP66, White	Each	12
8	• CAT6 UTP C64PB: CAT6 UTP,4Pair Cable - 500M	Each drum (500m)	4
9	• RJ45 BOOTS Boots RJ45	Each	50

10	RJ45 CAT6	Each drum (500m)	4
11	• LCD Touch Screen Face Recognition Hikvision DS-K1T341AMF Value Series 4.3" LCD Touch Screen Face Recognition Terminal, Surface Mount, Black	Each	10
12	• **emergency door re** CDVI Resettable emergency door re	Each	8
13	• **Magnetic Lock** Hikvision DS-K4H258S Value Series Magnetic Lock	Each	8
14	• **Door Closer** Union 7770--A Door Closer 7770, Silver	Each	8
15	• **LZ Value Series, Magnetic Lock Bracket** Hikvision DS-K4H258-LZ Value Series, Magnetic Lock Bracket	Each	10
16	• **POWER SUPPLY** Securi-Prod Backup Power Supply (13.6VDC 3Amp with Securi Prod 7.2Amp Battery)	Each	15
17	• **6U Cabinet** RCT 6U Cabinet Wallmount 600W x 450D Glass Door 50kg Load 6U-AP46U.GLA.B.PC	Each	10
18	• **Rackmount UPS** Mecer Winner Pro 10kVA 8000W 6U Pf 0.8 On-Line Sine Wave Rackmount UPS ME-10000-WPRU	Each	15
19	• **NVR 16CH** Hikvision DS-7716NI-I4/16P(B) Pro Series, 12MP 16-Channel 160 Mbps 1.5U 16-PoE 4 SATA 4K NVR	Each	20

20	• NVR 8CH Hikvision 7600 Pro Series 8-ch NVR 4K	Each	7
21	• **EXIT BUTTON** Push Button Exit Door	Each	10
22	• **GREEN EMERGENCY** GREEN EMERGENCY DOOR RELEASE CALL POINT (BREAK GLASS)	Each	11
23	• **6 Pair Cable** 6 Pair Cable	Each	10
24	• **PVC Enclosure** PVC Enclosure - 120X100X70	Each	10
25	• **Steel Enclosure** Steel Enclosure 400X300X200	Each	10
26	• **CCTV Warning Sign** Warning Security Cameras In Use Sign	Each	7
27	Electromagnetic Maglock Sp 300kg with LED LK118	Each	10
28	RTU Q01 TemaPower PSU	Each	10
29	RTU-A08 Dual Wiegand Interface Module with IO	Each	10
30	MHTM A20365009 Tension spring, strong (yellow dot)	Each	10
31	D211 sensor	Each	10
32	D221 sensor	Each	10
33	Linkbus PSU Interface module LPI	Each	10
34	Moduteq - Linkbus ↔ Multimode Fiber Bridge. module LOM	Each	10
35	Moduteq Controller module LCX	Each	10
36	Moduteq Fiber Optic TransmitterReceiver pair module D230	Each	10
37	Moduteq Linkbus Device Link Bridge module	Each	10

38	Moduteq Linkbus Ethernet Bridge module	Each	10
39	Moduteq Linkbus Power Supply Unit	Each	10
40	Boom gate logic circuit	Each	10
41	Moduteq Linkbus module LC	Each	10
42	Moduteq Linkbus module L2W	Each	10
43	• **TUBE STEEL** Round tube Steel 4Mx20mm	Each	12

	Compiled by	**Approved by**	**Accepted by**
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