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|  | Scope Of Work | Hendrina Power Station |
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1. INTRODUCTION

The purpose of this document is to provide a clear statement of the scope of work for the **Maintenance of the Fire Detection & Protection System and supply and delivery of C&I non or stock item spares** at Hendrina Power Station for a Period of 5 Years. This document defines the maintenance requirements, which shall be met by the supplier.

2. SUPPORTING CLAUSES

2.1 SCOPE.

This document describes the maintenance requirements of the Fire Detection and Protection system as installed at Hendrina Power Station.

2.1.1 Purpose

The objective of this document is to ensure the reliability of fire detection systems and equipment such that the systems and equipment meet the functional design intent and is likely to continue to do so until the next scheduled maintenance activity.

2.2 NORMATIVE/INFORMATIVE REFERENCES

2.2.1 Normative

- [1] 240-56737654 ITM of FD System Standard
- [2] 240-56737448 FD & Life Safety Design Standard

2.2.1 Informative

- [3] SANS 10139 Fire Detection and Alarm Systems for Buildings – System Design, Installation and Servicing

2.3 DEFINITIONS

| | |
|---------------------------|--|
| Deluge System | <p>A fixed fire protection system in which the pipe system is empty until the deluge valve operates to distribute pressurized water from open water-spray or foam-water nozzles. The deluge valve is activated by operation of a fire detection system installed in the same area as the nozzles. Various types of detection systems may be used, including smoke, heat or flame.</p> <p>The deluge valve is activated by a hydraulic, pneumatic, electric or manual release system or any combination of these. When the detection device is activated (hydraulic, pneumatic, electric or manual) the deluge valve is tripped and water flows into the piping system, discharging through all nozzles simultaneously.</p> |
| Electric Release System | <p>An electrical system employing smoke, heat or flame detectors to detect a fire and to release a deluge valve. The operation of a detector causes an electrical signal to be sent to the tripping device of the deluge valve, thereby causing the valve to open</p> |
| Suppressant | <p>A medium or agent that is used to control the spread of fire or to suppress a fire, either by direct application to the fire or by application to a space with a fixed volume. The suppression medium can be water, a gas, an aerosol or a powder.</p> |
| Suppressant Release Panel | <p>An electrical panel that is used to control the release of a fire suppressant upon the activation of relevant automatic fire detection devices, and to control all functions associated with resetting, disabling or manually activating the system.</p> |
| Fire Detection Panel | <p>A permanent panel used for the termination, controlling, powering, operating, monitoring, indicating, testing, programming, etc. of different fire detectors, alarms and other input / output units.</p> |
| Functional Testing | <p>Testing of a fixed fire protection system, fire detection system and FDS interfaces (only as part of a multi-disciplinary test plan) to confirm that it operates as designed.</p> |

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| Inspection | <p>A visual examination of a component, sub-system and system or portion thereof to verify that it is in the right location, correctly labelled, appears to be in operating condition, is free from physical damage and or environmental conditions that can impair its operation. The visual inspections further contribute to the assurance of the operational reliability of the FDS, and through the optimised ITM schedules and procedures, the out of service probabilities of the components, sub-systems or systems can be reduced.</p> <p>Where defects are captured following the inspections, the corrective actions are confirmed and captured in similar (hardcopy and softcopy) formats, and the part of the systems, sub-systems and or components affected are re-inspected, tested, the successful resolution achieved, and the outcomes are then recorded.</p> |
| Maintenance | Work (which is not limited to the repair, replacement and services) performed to keep the FDS equipment operable and within the design specifications, which can be undertaken through preventative activities, and or corrective activities. |
| Manual Operated Release System | A manually operated system used to release a deluge valve. The system may be used in conjunction with one of the other deluge valve release systems. The manual release device is arranged to operate as a stand-alone system to ensure operation, regardless of the potential failure of any associated automatic detection and activation system. |
| Evaluate | To assess something |
| Service | To perform routine maintenance or repair work on something. |
| Ensure | To make certain that something will occur or be the case. |
| Preventative Maintenance | The periodic servicing, checking and adjustment of components on a predetermined basis to ensure the performance of the system as near as possible to the original operational and technical specifications, as well as the modification of the system or components where necessary to ensure these specifications are met. |
| Corrective Maintenance: | Locating and correcting faults within the system or its components to restore the system to full operational capability within a reasonable amount of time. |

2.3.1 Disclosure Classification

Controlled Disclosure: controlled disclosure to external parties (either enforced by law or discretionary)

2.4 ABBREVIATIONS

| Abbreviation | Description |
|--------------|--|
| C&I | Control & Instrumentation |
| CPU | Central Processing Unit |
| EOD | Electrical Operating Desk |
| FDS | Fire Detection System |
| HMI | Human Machine Interface |
| ITM | Inspection, Testing and Preventative Maintenance |
| O&M | Operating and Maintenance |
| SOW | Scope of Work |

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| Abbreviation | Description |
|--------------|------------------------------|
| UPS | Uninterruptable Power Supply |

2.5 ROLES AND RESPONSIBILITIES

- Inspection, testing and maintenance measures detailed in this standard are to be performed by competent persons only. The FDS competent persons are to ensure that they fully comply with the following requirements as per the different classifications of activities undertaken on the Fire Detection Systems:
- The power station O&M Engineers are responsible for the overall maintenance regime at their respective power stations and as such are responsible to ensure that site specific preventative maintenance schedules are drawn up based on this document.
- In addition, the O&M Engineers need to confirm that the quality of the inspection procedures, preventative maintenance procedures and indeed the recorded history are acceptable and contribute to a sustained high level of workmanship.
- Lastly the maintenance and system administration personnel and O&M Engineers need to ensure that the quality of the information recorded is of a high standard such that it forms the basis which can be used for investigations, analysis and towards the continuous improvement on all the aspects of the FDS.

2.6 PROCESS FOR MONITORING

N/A

2.7 RELATED/SUPPORTING DOCUMENTS

N/A

3. SYSTEM REQUIREMENTS

3.1 DESCRIPTION OF SERVICE

Background.

At Hendrina, we have installed the following Fire Detection systems:

- 46 Ziton ZP3 Fire panels that are installed on the office buildings, selected workshops and selected switchgear rooms. On the fire panels, we are monitoring smoke & heat detectors, break-glass units and Interface units.
- a Desktop computer with a Maestro Fire Panel monitoring software for monitoring all the above named Ziton ZP3 fire panels,
- a Fire detection & Protection system at 10 C&I Equipment rooms. Five C&I Equipment rooms on Units 1-5 are using Pyro-shield as an extinguishing gas and five C&I Equipment rooms (on Unit 6-10) use CO₂ gas,
- Standalone Fire Protection system for the IT server room that also uses CO₂ gas as an extinguishant.

3.1.1 Fire Detection and Suppression at Units 6-10 Equipment Rooms

The fire panels on Units 6-10 Equipment Rooms are Ziton ZC3 panel (Precept fire control panel on Units 8-10 that were manufactured by UPC) and Technoswitch Fire alarm panels on Units 6 & 7.

All Units 6-10 Equipment Rooms have 6 smoke sensors, of which 2 are under a raised floor. The fire protection system uses CO₂ gas as a fire suppressing agent.

Adjacent to these C&I Equipment rooms, are the battery rooms. On each Equipment room, there are 12 CO₂ gas cylinders for quenching fire at the Equipment room and 6 gas cylinders for quenching fire at the battery room. Each of these rooms has a pilot cylinder that activates the release of the CO₂ gas.

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A) Smoke Detectors and Fire Panel (3 Monthly)

- a) The *Contractor* to test in-situ the operation of all smoke detectors using a test medium whose testing particulate material does not contaminate the sensing chamber or entry screen and which contains particles in the size range appropriate for the detector.
- b) The test will confirm if the fire panel is working or not. If the fire panel is not responding correctly to function testing, the *Contractor* shall inform the *Employer's Agent* of a way forward. That can either be to get the replacement parts or getting a suitable replacement fire panel.
- c) The *Contractor* checks if the fire indicator panel (FIP) is clearly visible readily accessible and free from dust and contaminants.
- d) The *Contractor* inspects the zone block plans to ensure that they are still securely mounted and legible.
- e) The *Contractor* tests the occupant warning system and check that the signals are distinctly audible in all areas of the building.
- f) The contaminated fire detectors shall be replaced.

B) Extinguishant Gas Release Panel (ERP) (3 Monthly)

Pre-caution:

The Contractor to take the pre-caution to prevent the discharge of the system during these tests.

- a) The *Contractor* tests the operation of each Auto/Manual switch and confirms that it prevents the automatic discharge of the gas.
- b) The *Contractor* confirms that it stops and resets the normal system discharge sequence.
- c) If the Auto/Manual station is not responding correctly to function testing, the *Contractor* to inform the *Employers Agent* of a way forward. That can either be to repair it or getting a suitable replacement Extinguishant Gas Release Panel.

C) Extinguishant Gas Cylinders (6 Monthly)

- a) The *Contractor* checks if the CO₂ gas cylinders still have enough gas in them by weighing each cylinder.
- b) For the tanks with a low weight, those CO₂ tanks shall be refilled by the *Contractor*.
- c) On the units where there are missing gas cylinders, the *Contractor* to supply the cylinders and install.

D) Pilot Cylinders (6 Monthly)

- a) The *Contractor* checks if the pilot cylinders on all Units have gas or not.
- b) Those ones without gas shall be refilled by the *Contractor*.
- c) On the Units where there are missing gas cylinders, the *Contractor* to supply the pilot cylinder and install.

E) Extinguishant Gas Release Manual-Initiate Switch (3 Monthly)

- a) The *Contractor* tests the operation of the manual initiate switch and confirm normal system discharge sequence including fire and evacuation alarm, time delays, equipment shutdown and that it overrides the ERP discharge inhibit switch.

F) System Inoperative Visual Warning Device (VWD) (3 Monthly)

- a) The *Contractor* confirms that the system inoperative VWD operates for:
 - Operation of a service switch (discharge initiating circuit electrical isolation)
 - Fault in discharge actuator circuit
 - Operation of the manual inhibit switch, if fitted
 - Isolation or fault in any part of the fire detection system that prevents the discharge of the suppression system.

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G) Extinguishant Release Actuator (3 Monthly)

Precaution:

The Contractor ensures that each actuator has been mechanically isolated or temporarily removed the CO₂ gas supply to prevent unintended discharge.

- a) The *Contractor* tests every function of the actuator and ensures that it operates correctly.
- b) For non-resettable actuators, the *Contractor* substitutes the actuator with a load of equivalent value and confirms that the operating current is in accordance with the baseline data.

H) Extinguishant Release Indication (3 Monthly)

- a) The *Contractor* tests the extinguishant release detection device (e.g. pressure switch) and confirms the operation of the extinguishant.

I) Battery Life (6 Monthly)

- a) If the existing Fire panel has standby batteries, the *Contractor* checks the installation date of the batteries against the battery life as recommended by the battery supplier and replaces the batteries, if appropriate.
- b) When the batteries have not been replaced in the previous two years, the *Contractor* verifies the batteries condition by carrying out a battery discharge test.
- c) Primary Power Supply
The *Contractor* disconnects the standby power supply and check that the system continues to operate correctly, when powered from the primary power supply, under full load conditions.
- d) Standby Power Supply
The *Contractor* disconnects the primary supply and check that the system continues to operate correctly, when powered from the standby supply under full alarm load conditions

3.1.2 Fire Detection and Suppression at Units 1-5 Equipment Rooms

The fire detection and suppression system is slightly different from the one at Units 6-10. The fire panel in use is an Technoswitch fire alarm panel (on Unit 4) and Aritech fire panel (on Units 1, 2, 3 and 5). The equipment rooms have two smoke sensors, of which both must be activated to release the gas. The fire protection system uses Pyroshield gas as a fire suppressing agent.

There are 3 Pyro-shield gas cylinders per unit for quenching fire at each Equipment room. The Pyro-shield gas is activated by the activation of a pilot cylinder via a solenoid valve.

A) Smoke Detectors and Fire Panels (3 Monthly)

- a) The *Contractor* tests in-situ the operation of all smoke detectors using a test medium whose testing particulate material does not contaminate the sensing chamber or entry screen and which contains particles in the size range appropriate for the detector.
- b) The following tests will confirm if the fire panel is working or not.
 - The *Contractor* checks if the Fire indicator panel display is clearly visible readily accessible and free from dust and contaminants.
 - The *Contractor* inspects the zone block plans to ensure that they are still securely mounted and legible
 - The *Contractor* tests the occupant warning system and check the signals are distinctly audible in all areas of the building.
 - If the Fire panel is not responding correctly to function testing, the *Contractor* shall inform the *Employers Agent* of a way forward. That can either be to get the replacement parts or getting a suitable replacement Fire panel.

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B) Extinguishant Gas Release Panel (ERP) (3 Monthly)

Pre-caution:

The Contractor to take the pre-caution to prevent the discharge of the system during these tests.

- a) The *Contractor* tests the operation of each inhibit or Auto/Manual switch and confirms that it prevents the automatic discharge of the gas.
- b) The *Contractor* confirms that it stops and resets the normal system discharge sequence.
- c) If the Auto/Manual station is not responding correctly to function testing, the *Contractor* to inform the *Employers Agent* of a way forward. That can either to repair it or getting a suitable replacement Extinguishant Release Panel.

C) Extinguishant Gas Cylinders (3 Monthly)

- a) The *Contractor* checks if the Pyro-shield gas cylinders still have enough gas in them.
- b) For the tanks which are not full, the gas tanks shall be refilled by the *Contractor*.
- c) The faulty Pyro-shield gas gauges must be replaced by the *Contractor*.

D) Pilot Cylinders (3 Monthly)

- a) The *Contractor* checks if the pilot cylinders on all Units have gas or not.
- b) Those ones without the gas shall be refilled by the *Contractor*.
- c) On the Units where there are missing gas cylinders the *Contractor* to supply the pilot cylinders and install.

E) Extinguishant Release Manual Initiate Switch (3 Monthly)

- a) The *Contractor* tests the operation of the manual initiate switch and confirms normal system discharge sequence including fire and evacuation alarm, time delays equipment shutdown and that it overrides the ERP discharge inhibits switch.

F) System Inoperative Visual Warning Device (VWD) (3 Monthly)

- a) The *Contractor* confirms the system inoperative VWD operates for the:
 - Operation of a service switch (discharge initiating circuit electrical isolation)
 - Fault in discharge actuator circuit
 - Operation of a lock-off valve, if fitted
 - Operation of the manual inhibit switch, if fitted
 - Isolation of fault in any part of the fire detection system that prevents the discharge of the suppression system.

G) Extinguishant Release Actuator (3 Monthly)

Pre-caution:

The Contractor to ensure that each actuator has been mechanically isolated or temporarily removed the extinguishant gas supply to prevent unintended discharge.

- a) The *Contractor* tests every function of the actuator and ensures that it operates correctly.
- b) For non-resettable actuators, the *Contractor* substitutes the actuator with a load of equivalent value and confirm that the operating current is in accordance with the baseline data.

H) Extinguishant Release Indication (3 Monthly)

- a) The *Contractor* tests the Extinguishant release detection device (e.g. pressure switch) and confirms the operation of the extinguishant release.

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I) Battery Life (6 Monthly)

- a) If the existing Fire panel has standby batteries, the *Contractor* checks the date of installation of the batteries against the battery life as recommended by the battery manufacturer and replace the batteries, if appropriate.
- b) When the batteries have not been replaced in the previous two years, the *Contractor* verifies the battery condition by carrying out a battery discharge test.
- c) Primary Power Supply
 - The *Contractor* disconnects the standby power supply and check that the system continues to operate correctly, when powered from the primary power supply, under full load conditions.
- d) Standby Power Supply
 - The *Contractor* disconnects the primary supply and check that the system continues to operate correctly, when powered from the standby supply under full alarm load conditions.

3.1.3 Fire Detection and Suppression at the IT Servo Room at GigaWatt Park building

The Fire detection and suppression system comprises the following: The fire panel is a Ziton ZC4 fire alarm panel capable of sensing 6 zones. The IT room has 4 smoke sensors. The system uses CO₂ gas as a suppressing agent.

There is one CO₂ gas cylinder for quenching fire. The CO₂ gas is directly activated by the solenoid that is connected to the Technoswitch TEC 057A Extinguishant Test & Interface unit.

A) Smoke Detectors and Fire Panel (3 Monthly)

- a) The *Contractor* tests in-situ the operation of all smoke detectors using a test medium whose testing particulate material does not contaminate the sensing chamber or entry screen and which contains particles in the size range appropriate for the detector.
- b) This test will confirm if the fire panel is working or not.
- c) The *Contractor* checks if the fire indicator panel display is clearly visible, readily accessible and free from dust and contaminants.
- d) The *Contractor* inspects the zone block plans to ensure that they are still securely mounted and legible.
- e) The *Contractor* tests the alarm system and check that the signals are distinctly audible in all area of the building.
- f) If the fire panel is not responding correctly to function testing, the *Contractor* informs the *Employer's Agent* of a way forward. That can either be to get the replacement parts or getting a suitable replacement fire panel.

B) Extinguishant Gas Release Panel (ERP) (3 Monthly)

Pre-caution:

The Contractor to take the pre-cautions to prevent the discharge of the gas during these tests.

- a) The *Contractor* tests the operation of each inhibit or Auto/Manual switch and confirm that it prevents the automatic discharge of the gas.
- b) The *Contractor* confirms that ERP stops and resets the normal system discharge sequence.
- c) The gas release unit in use is a ZC4-GCU1 Auto / Manual Gas Release Unit
- d) If the Auto/Manual station is not responding correctly to function testing, the *Contractor* informs the *Employer's Agent* of a way forward. That can be either to repair it or getting a suitable replacement Extinguishant Release Panel.

C) Extinguishant Gas Cylinders (6 Monthly)

- a) The *Contractor* checks if the extinguishant gas cylinder still has enough gas inside by weighing it.
- b) If the gas tank is not full, the CO₂ gas shall be refilled by the *Contractor*.
- c) Any missing gas cylinder shall be supplied and installed by the *Contractor*.

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D) Extinguishant Release Actuator (3 Monthly)

Precaution:

The Contractor to ensure that each actuator has been mechanically isolated or temporarily removed the extinguishant gas supply to prevent unintended discharge.

- a) The *Contractor* tests every function of the actuator and ensures that it operates correctly.
- b) For non-resettable actuators, the *Contractor* substitutes the actuator with a load of equivalent value and confirms that the operating current is in accordance with the baseline data.
- c) The gas release valve actuator in use is a DAB2/2 Control Valve.

E) Extinguishant Release Indicator (3 Monthly)

- a) The *Contractor* tests the extinguishant release detection device (e.g. pressure switch) and confirm the operation of the extinguishant release as indicated in the FIP.

3.1.4 Fire Detection System around the Station

Hendrina has installed a Ziton ZP3 addressable fire detection system. It comprises of 46 fire panels that are linked by fibre to form a ring. On this ring there is a Maestro monitoring PC that is capable of monitoring the status of each fire panel and is able to detect the fire panel condition on each building.

The network comprises of the following:

- Smoke & Heat detectors, Sounders, Break glass units in offices, switchgear rooms and workshops.
- There are 46 Ziton ZP3 fire panels.
- There are also Ziton A45E-2 interface units that are connected to some of the fire panels to monitor the fire spray water activation on the:
 - Transformers and South & North Fuel Oil System
 - Boiler feed pumps and Lube Oil tanks
 - Coal conveyors at the Coal Staithes
- Maestro Fire Panel status monitoring at the Control Room.

A) Quarterly Service

The *Contractor* shall service these fire panels quarterly and annually to check that the system is functioning to its installation specifications, and this must be carried out by the *Contractor*.

The details of the checks are mentioned below:

Ziton ZP3 Fire Control Panel Quarterly Maintenance Checks

| No | Quarterly Checks | Description |
|----|-------------------------------|---|
| 1 | Log book analysis | Prepare for testing by reading through the log book. Any corrective action that has not yet been taken should be noted and carried out during the service |
| 2 | Service and pre-service check | Use the panel menu to take a print out of all the sensors that are in a "service" or "pre-service" condition, which indicates that they are contaminated. Exchange these points with replacement units, set to the same address. Dirty sensors can be sent to Ziton for cleaning. |

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| 3 | Analogue value check | Use the panel menu to generate printer reports of device analogue values. Compare these values to permitted values for each point. Replace faulty devices or repair wiring. |
| 4 | Configuration check | Connect "Planner" to the panel and print out a complete system configuration from the panel software. Compare this to the system specification and verify that the system zoning, input-output mapping, and other settings have not been changed. |
| 5 | Disabled device check | Check if the common Disabled-LED on the front of the panel is illuminated. If so, use the menu to identify the disabled devices and investigate the reason. Any faults should be rectified, and any disabled devices should then be enabled. |
| 6 | Test the alarms | Test one sensor or call point in each zone. Activate each point in turn, checking that the sounders operate and that the panel reacts correctly. Check that the signals to auxiliary systems such as the Fire Station, air conditioning, building management systems, graphic displays or remote indicators, all function correctly. |
| 7 | Fault test | Remove one sensor in the system and check that the panel correctly reports the event. Accept the fault, replace the sensor and reset the panel. |
| 8 | Panel control test | Check that all control functions, the ACCEPT and RESET keys are operating correctly. |
| 9 | Monitor earth leakage | If the earth leakage monitoring feature on the ZP3 system is enabled, test the earth leakage by applying a short between the positive leg of the Z loop and earth. Make sure that the panel indicates an earth leakage fault. Repeat test using the negative leg of the Z loop. |
| 10 | Connection checks | Make sure that all terminal screws are tight and cables inside the panel are secure. Check that all printed circuit boards (PCB's) appear to be in good condition, are free of dust and securely mounted in the panel. |
| 11 | Battery replacement check | Make sure that the back-up batteries installed are sufficient to meet the system specification. If not then replace them with suitable ones as described under "removing and replacing the back-up batteries" on page 129 of the Ziton ZP3 Manual. Check if the battery replacement date will still be valid before next service. If not, then replace the batteries. The age of the battery should be marked on with a label, or refer to the log book. SLA batteries should be replaced at least every four years, or more frequently in high temperature environments (refer to manufacturer's documentation if necessary) |
| 12 | Battery operation check | Check that the battery is healthy. One method is to conduct an "all sounders on" operational test with the mains off and the system running on batteries. This will test the batteries under a full load. The battery voltage should be monitored during this test and should not fall below 24 volts. Remove one battery terminal and verify that the system reports a battery fault. Replace terminal, ensure that it is tight, and reset the panel. Clean the battery with a damp cloth and lightly lubricate any exposed terminals with petroleum jelly if necessary. |
| 13 | Time and date set | Set the correct time and date on panel, if necessary. |

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| 14 | Completion of service | Restore the system to normal condition, re-enable any disabled devices, re-connect any disconnected devices, re-connect all external systems that were disconnected for testing, and make sure that the system is left in 100% working condition. Advise all staff and the remote manned centre that testing is complete, and that any alarm received must be treated as real. |
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B) Ziton ZP3 Fire Control Panel Annual Maintenance Checks

| No | Annual Checks | Description |
|----|-----------------------------------|---|
| 1 | Quarterly Checks | Make sure the quarterly checks have been performed (see above) |
| 2 | Input-Output configuration test | Using a fairly large representative sample, verify by testing that the input-output mapping operates as programmed. Activate an input, such as a sensor, call point, or interface unit, and verify that the correct outputs operate. Also check that the outputs function correctly, for example that they pulse, or operate continuously that any delays operate correctly etc. |
| 3 | Building changes check | Visually inspect that the internal structural layout of the building, including interoffice partitioning, has not changed from the system specification to such an extent that it may affect the efficient operation of the fire alarm system. |
| 4 | Lithium time/date batteries check | Check if the lithium time/date batteries will still be valid before the next service. If not then replace the batteries. The age of the battery should be marked on it with a label. SLA batteries should be replaced at least every four years, or more frequently in high temperature environments (refer to manufactures documentation if necessary) |
| 5 | Completion of Service | Restore the system to normal condition, re-enable any disabled devices, re-connect any disconnected devices, re-connect all external systems that were disconnected for the testing, and ensure that the system is left in 100% working condition. Advise all staff and the remote manned centre that testing is complete, and that any alarm now received must be treated as real. |

C) Maestro Fire Alarm Monitoring computer (6 Monthly)

- Sensor changing / removal: Check if there has been changes in sensor positions, sensor types, call point locations and the general renaming of specific site areas. Update Maestro's maps to ensure that the additional devices added or removed are updated on Maestro.
- Name changes. Establish if there has been a name change or renaming of parts of the protected areas. Any name change, especially where the name of the building area forms the location point of the fire alarm device, must be updated within the MAESTRO system immediately any site change takes place.
- Check that the Maestro computer can still communicate with all the fire panels. If not, check and correct.
- Check that it is still able to remotely control all devices on the Fire Panels.

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3.1.5 General

- a) Critical system failures are responded to within 8 working hours of notification.
- b) If any equipment is faulty and requires repairs or replacement, the *Contractor* shall inform the *Employer's agent* with the proposal. The *Employer* shall inform the contractor the way forward.
- c) Non - critical failures are responded to within 16 working hours of notification.
- d) A formal report on call outs / breakdowns is provided to the *Employer's Agent* after each incident.
- e) The formal report contains the following information:
 - Time and date of call out / breakdown,
 - Condition of system at time of call out / breakdown,
 - Components / equipment that failed,
 - Probable cause of failure and action taken to rectify,
 - Hours spent.
- f) The *Contractor* must produce own safety file as per Eskom standard.
- g) The *Contractor* must notify at least one month in advance, his intention to withdraw and replace his technician.
- h) The *Employer* requires onsite maintenance during normal working hours. Standby and call outs services for abnormal events.
- i) The normal working hours is from 07H00 to 16H15, Mondays to Thursdays excluding Public Holidays. Lunch is from 12H00 to 12H35. On Fridays the working hours are from 07H00 to 12H00.
- j) The *Contractor* always keeps a record of his personnel who are on site and record all activities for personnel in the form of a time sheet. The *Employer's Agent* must also sign the time sheet for verification.
- k) Contingency amount to be used for call outs and spares that is not stock.
- l) Appendix A : Spares that needs to be available from *Contractor*.

4. AUTHORISATION

This document has been seen and accepted by:

| Name & Surname | Designation |
|----------------|-------------|
| | |
| | |

5. REVISIONS

| Date | Rev. | Compiler | Remarks |
|------|------|----------|---------|
| | | | |

6. DEVELOPMENT TEAM

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

7. ACKNOWLEDGEMENTS

N/A

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8. APPENDIX A

9. SPARES FOR FIRE PANELS AND EQUIPMENT ROOMS

| <u>DESCRIPTION</u> | <u>QUANTITY</u> | <u>PRICE</u> |
|---|-----------------|--------------|
| SUPPLY NEW 45KG CO2 CYLINDER WITH DAB VALVE | 2 | |
| SUPPLY NEW PILOT CYLINDER COMPLETE | 2 | |
| HPT & REFILL PYROSHIELD CYLINDERS | 9 | |
| HPT & REFILL CO2 CYLINDERS | 9 | |
| HPT & REFILL PILOT CYLINDERS | 9 | |
| PANEL BATTERIES 12V 7.2AH | 40 | |
| PANEL BATTERIES 12V 18AH | 40 | |
| KEYBOARD FOR ZP3 PANEL | 1 | |
| ZP3 2 LOOP PANEL | 1 | |
| ZP3 4 LOOP MOTHERBOARD | 1 | |
| ZITON NETWORK CARDS | 2 | |
| KENTECH 3 ZONE EXT PANEL | 1 | |
| KENTECH 4 ZONE GAS EXT PANEL | 1 | |
| ROLL OF 200M PH30 CABLE 1.5 | 1 | |
| DISPLAY BOARD | 1 | |
| FIBRE CABLE 400M ROLL 1MM | 1 | |
| ZITON ZP755HAV – 2R LOOP SOUNDER | 10 | |
| HEAT SENSORS & BASES | 15 | |
| IP66 SOUNDER BEACON | 15 | |
| IP66 MCP | 2 | |
| SOUNDER BEACON – LOOP DRIVER | 5 | |
| WESTERMO (FIBRE TO RS485 CONVERTER) | 1 | |

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**Scope of Work for the Maintenance and Supply of Spares
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| | | |
|--|----|--|
| EDWARDS UNIVERSAL GLASS PACK (10PACKS) | 6 | |
| MAESTRO SYSTEM SOFTWARE (ATS 8691) | 1 | |
| MOTHERBOARD 2 LOOP | 2 | |
| MOTHERBOARD 4 LOOP | 2 | |
| ZP3 SMOKE SENSOR AND BASE | 20 | |

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