Eskom	Strategy	Medupi Power Station

Title: **Medupi Power Station Maintenance Execution Strategy for Fire Detection System Plant**

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1. Introduction

The Manage Maintenance Base process is based on best practices identified from the Equipment Reliability Process (AP-913), CIGRE and EPRI, existing Eskom practices and operational experience, with input from several industry subject matter experts. This is a generic process, providing standard capabilities that are utilised during operating and maintenance engineering phases of the asset lifecycle. The intention is to standardise all Eskom's operations and maintenance engineering activities to ensure an optimal engineering process.

Manage Maintenance Base is the process in, which the Maintenance Execution Strategy as well as the Inspection and Test Strategy are developed, specifying the maintenance and inspection tasks as well as the frequencies ("What" and "When") of an asset for it to be maintained.

Fire Detection System is responsible for early detection of a possible fire incident for the protection of plant and personnel at Medupi Power station.

This document is intended for the Medupi Power Station Maintenance personnel to implement the Inspection, Testing and Maintenance strategy on the installed equipment making up the Fire Detection System.

2. Supporting Clauses

2.1 Scope

The Maintenance Execution Strategy involves among other things, the value engineering and reconciliation of all required maintenance activities, specified in the Maintenance Base, into a consolidated optimised strategy with due consideration for resource availability and other operational constraints. The following components are the minimum requirements within a Maintenance Execution Strategy, which are the implementation of the Maintenance Engineering output requirements:

a) Identification of the individual assets to be maintained
b) Definition of specific component maintenance strategy, (What and When)
c) Development of detailed preventative maintenance strategy,
d) Component failure analysis,
e) Determination of cataloguing items to ensure that materials, tools, and equipment specifications are available to aid maintenance execution,
f) Design Base Standard
g) Asset Remnant Life determination
h) Maintenance data capturing and analysis process

The scope of this FDS Maintenance Strategy covers and is not limited to;

- From the EOD HMI, BOP SSB HMI
- Including the main and local FACP at Control Rooms and Substations
- Including the Field Instrumentation (detectors and modules contained in a Loop)

2.1.1 Purpose

All maintenance plans will align with the Maintenance Execution Strategy.

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Manage Maintenance Base is based upon an asset's operational requirements and parameters, together with the availability / reliability that are expected from the asset over its entire lifecycle. To achieve these objectives, Engineering will develop the inspection and test strategy as well as a maintenance execution strategy and ultimately provide direction on the overall asset maintenance, structure, system and component specific periodicities and requirements together with the overall inspection requirements and criteria. The Maintenance Engineering Strategy and Maintenance Base are inputs to the maintenance strategy.

To achieve this purpose, this document prescribes “What to be done and when it will be done”. Finally, Planned Maintenance and Testing is performed to ensure sustainable, optimal asset performance at the lowest cost.

The defined strategy and plans shall include all testing and inspection requirements to obtain reliable information for accurate assessment of asset condition, which in turn will be used for decisions on the future lifecycle management strategy.

This document provides guideline for optimising the maintenance activities of the Fire Detection System at Medupi Power Station. Reliability and functional design

Its objective is to maximize the reliability of the 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.

2.1.2 Applicability

This document shall apply throughout Medupi Power Station.

2.1.3 Effective date

Indicate the date from which the document is effective if different from the authorisation date. The effective date means that from this date all training, artefacts and supporting systems required for compliance to the document requirements shall have been established and implemented

2.2 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

[1] ISO 9001 Quality Management Systems

[2] 240-54937454 Inspection, Testing and Maintenance of Fire Detection Systems

[3] 240-53114026 Project Engineering Change Procedure

[4] 240-53113685 Design Review Procedure

2.2.2 Informative

[5] SANS 369-1 Code of Practice for the Operation of Fire Protection

[6] SANS 10139 Fire Detection and Alarm Systems for Buildings –

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[7] SANS 50054-2 Fire detection and fire alarm systems Part 2: Control and indicating equipment

[8] SANS 50054-4 Fire detection and fire systems Part 4: Power supply equipment

[9] SANS 50054-5 Fire detection and fire systems Part 5: Heat detectors

[10] SANS 50054-7 Fire detection and fire systems Part 7: Smoke detectors

[11] SANS 50054-11 Fire detection and fire systems Part 11: Manual call points

[12] SANS 60849 Sound Systems for Emergency Purposes

[13] NFPA 72 Fire Alarm Code

2.3 Definitions

Definition	Description
Maintenance	A combination of all technical, administrative, and managerial actions during the lifecycle of an item intended to retain it in, or restore it to, a condition in which it can perform its required function.
Maintenance Philosophy	The principal approach decided upon for performing maintenance, such as pro-active or re-active maintenance.
Maintenance Strategy	The type of maintenance selected for specific asset / plant and equipment, such as time or maintenance, corrective or preventative maintenance.
Maintenance Plan	A plan that details the maintenance that needs to be done on a specific asset / plant item or component and the frequency and quality requirements for that maintenance.
Maintenance Schedule	The timing of the Maintenance Plan information stipulating when in the calendar year, work needs to be done.
Preventive Maintenance	Planned time or maintenance carried out with the explicit objective of preventing functional failures and is directed towards maintaining the physical condition of the asset / plant or equipment. It includes scheduled overhauls and scheduled replacement of worn-out parts or failure prone components.
Corrective Maintenance	The process of restoring asset / plant and equipment which have failed or deteriorated to a state which renders it unable to meet the acceptance criteria required for its particular application.
Condition Based Maintenance	Predictive maintenance carried out because of findings from analysis of parameters measured under a condition-monitoring regime, or from recommendations from reliability analysis.
Reliability Centred Maintenance	RCM represents a disciplined decision logic approach that focuses on the consequences of failure to develop the most cost-effective lifetime maintenance programme. The decision logic question is sequenced to those parts of the asset / plant that are maintenance significant. Significant components failure modes are evaluated to identify appropriate maintenance tasks and their costs.
Condition Monitoring	Non-intrusive monitoring carried out to determine the physical condition of asset / plant and equipment.
Inspection	Activities, which by means of examination, observation, or measurement, determine the conformance of material, parts, components etc., to predetermined specifications and quality requirements.

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Definition	Description
In-service Inspection	All inspection and testing conducted on plant and equipment at regular intervals and prescribed by regulatory and statutory codes or other types of specification throughout its service life.
Testing	All activities required determining the actual performance or condition of an item.
Technical Plan	The technical plan will be the first five years of the Lifecycle Manage Plan (Life of Plant Plan).
Lifecycle Management Plan	This is the plan that details the financial and technical requirements with respect to all planned projects over the life of the plant. This plan covers Capital, R&E, and Routine Maintenance and Planned Maintenance costs.
Manual Call Point	Component of a fire detection and alarm system which is used for the manual initiation of an alarm
Master Station	Control unit located at a central control point which controls the EVC system
Maximum Alarm Load	Load imposed on the power supply of a voice alarm system under emergency conditions
Voice Alarm	Sound distribution system that broadcasts speech messages and/or warning signals in an emergency

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2.4 Abbreviations

Abbreviation	Description
BOM	Bill Of Materials
CBMS	Consolidated Building Management System
CPU	Central Processing Unit
DDC	Direct Digital Control
DDC	Direct Digital Control
EBI	Enterprise Building Integrator
EOD	Electrical Operating Desk
FDS	Fire Detection System
FM	Failure Modes
FMA	Failure Mode Analysis
FNA	Fire Network Adaptor
HMI	Human Machine Interface
ISO	International Standardisation Organisation
ITM	Inspection, Testing and Maintenance
LCD	Liquid Crystal Display
LED	Light Emitting Diode
NFPA	National Fire Protection Association
PM	Preventive Maintenance
QC	Quality Control
QCP	Quality Control Plan
RBO	Reliability Basis Optimisation
RCM	Reliability Centred Maintenance
RTF	Run To Failure
SANS	South African National Standard
SSB	Station Services Building
XLS	Honeywell Communication Protocol

2.5 Roles and Responsibilities

Fire Detection System Engineer

- Responsible for developing optimised maintenance strategies and plans to assure the long-term integrity of the Fire Detection System.
- Also monitor the performance of the Fire Detection System and perform modifications when required.

C&I Maintenance

- Responsible for planning and ensuring of correct execution of all maintenance activities in the Fire Detection System.
- Responsible for spares stock holding for the Fire Detection System.

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Planner

- The Work's Management Resource Planner is responsible for planning and scheduling of the Fire Detection System maintenance.

2.6 Process for Monitoring

The document will be reviewed bi-annually to incorporate any changes that might have resulted from the operating of the plant/system (Operating and Control Philosophy).

Documentation centre keeps the hard and soft copy of the strategy (Hyperwave and Doc Centre).

Changes to the plant components will be documented and kept by engineering

History of the component failures and trends will be drawn from the system and used as the bases for changing or improving the Maintenance Strategy.

2.7 Related/Supporting Documents

N/A

3. Maintenance Execution Strategy

3.1 System Overview

3.1.1 System and Process Description

Enterprise Buildings Integrator (EBI) serves as the integration platform for various systems forming the CBMS. EBI is based on a client/server architecture providing the flexibility of geographically distributing client workstations within the Medupi Power Station facility. The workstations allow the Operator to view, manage, control, and respond to alarms and events of any subsystem integrated to the EBI.

EBI-Fire Detection System consists of 3 levels as follows:

- Supervisory Level – EBI software with Primary & Redundant servers, workstations, FNA (Fire Network Adaptor)
- Peripheral Level – XLS 3000 Panel
- Field Level – Detectors, Monitor Modules, Strobes & Manual Call points.

The Fire Detection network, XLS-Net, consists of a combination of XLS3000, and XLS120 Panels, connected via a fibre optic network. The Fire Network Adapter is used as a communication medium between the fire Detection Network and the CBMS Network. The Communication to the CMBS network will be via TCP/IP.

The main FDCP Central Console is a Honeywell Model XLS3000, and it contains a microprocessor based Central Processing Unit (CPU). The CPU communicates with and control the following types of equipment used to make up the system:

a) Intelligent addressable smoke and thermal (heat) detectors,
b) Addressable modules,
c) Panel modules including initiating circuits,

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d) Control circuits,
e) Notification appliance circuits,
f) Local and remote operator terminals,
g) Printers,
h) Annunciators and other system-controlled devices.

The XLS 3000 (main) FDCP are located at Unit 6-1 Control Rooms, EOD, SSB Control Room, Fire and Medical Building and the Access Control Building. The XLS 120 (local) FDCP are located at all Substations, Office building and Workshops.

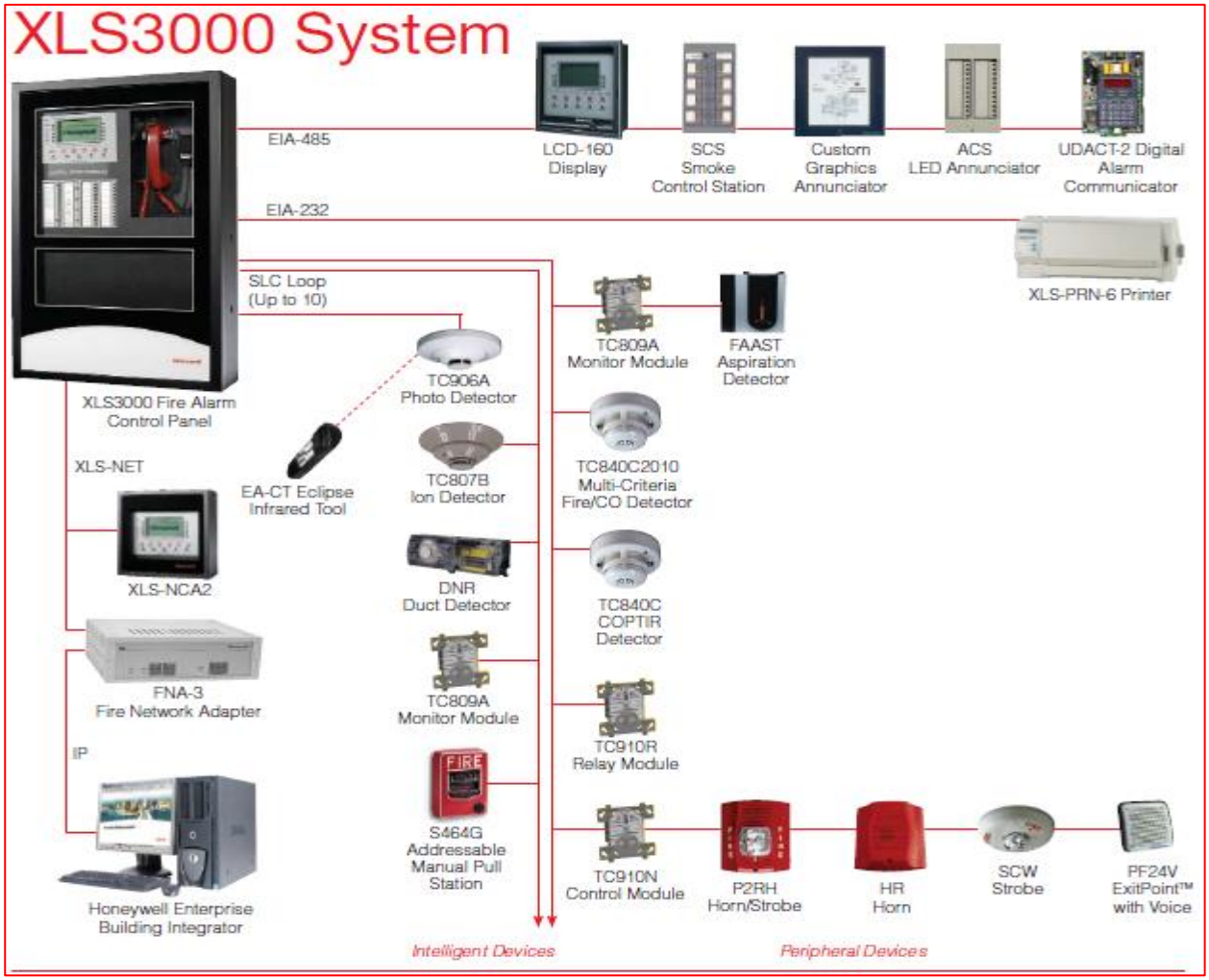

Figure 1: FDS Hardware Architecture

3.1.2 HMI

The HMI of the FDS is accessible on the workstations placed at the EOD, SSB, Fire and Medical Building and the Admin and Access Control Buildings. The software running in these machines is the EBI. It monitors, controls, stores plant information, alarm management, and provides graphic representation of the FDS.

The information used by the HMI/EBI is obtained from the EBI server.

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EBI allows user friendly navigation through the zones and loops.

Software versions management is a function of the Engineering department. Keeping and maintaining of copies and updating the antivirus are part of the strategy.

3.1.3 Fire Alarm Control Panel

The FACP is the cabinet that houses the CPU, loop modules, batteries, LCD, LDSs, and buttons to navigate through the system. The FACP is a DDC system; it gets input signals, processes them, and sends output signals. The alarms generated by the incoming signals are displayed on the LCD and LED, enunciated, and displayed and enunciated on the HMI.

It forms a link between the field instruments and the HMI and does not have a backup. It operates as a standalone in case it is separated from the network. Upon restoration, the stored events are sent to the servers for archiving.

Periodic functional testing is a requirement by the regulation to ensure that the system will operate in case of a fire emergency. Automatic periodic tests can be accessible from the system memory, then relevant system maintenance can be done.

3.1.4 Field Instrumentation

These are the eyes and ears of the system; they monitor sense and send the relevant signals to the FACP. Forming a loop, they are connected by too wires which offers redundancy in a form of dual signal path. Also equipped with self-diagnostics, they will warn the operator of their degrading condition for attention.

Periodic inspections and cleaning will form part of the maintenance strategy. In excessive dust areas, a proper functional HVAC will need to be fully functional to delay the degradation/contamination period of the sensor.

Also, periodic functional testing forms part of the strategy to ensure safety adherence.

3.1.5 Maintenance Philosophy and Limitations

The FDS maintenance can be done while the unit is operational, therefore does not require an outage. A proper risk assessment is to be done if there won't be a temporary solution for detecting fires. The acceptable instrument life is about 15 years. This means that the FDS must be inspected and monitored throughout this period to facilitate proper maintenance of this system. The system includes intelligent field devices having self-diagnostics capabilities. This plus online monitoring gives an added ability to maintain the system at optimum efficiency by responding to faults before they become serious and affect the operation. The rest of the equipment on the FDS will be replaced as and when they fail following the FMECA plan conducted for the purpose of this document and in conjunction with the **Inspection, Testing and Maintenance of Fire Detection Systems Standard** document number **240-56737654.**

The environment plays a critical role too in the effectiveness of the monitoring. Dusty environments pose a risk on the field instrument sensors. Therefore, physical periodic inspection and testing of these field instruments is part of the strategy.

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3.1.6 Plant Performance

Design availability of the system of 99% will be expected since the system is new and responsible for protection of personnel safety and equipment

3.1.7 Operating Philosophy

Refer to the document listed below:

Fire Detection System Operating and Control Philosophy: 240-78755320

3.1.8 Criticality of Asset

Criticality of each component is covered under the FMA spread sheet in appendix A. It is defined as:

Table 1: Criticality Evaluation Criteria

Functional Importance Category	Potential Consequences (Risk)
Critical	Safety, Health or Environmental
	Statutory Impact
	Production Loss (>5% loss of period > 8hrs)
	Hidden (redundancy, protective device)
Non-Critical	Significant Costs
	Secondary Damage
RTF	No significant effects beyond repair of the failure itself. An RTF component is one for which the consequences of failure are acceptable without any preventive maintenance being performed and there is no simple cost effective method to extend the useful life of the component.

3.1.9 Environmental Impact

The Environmental Impacts associated with the FDS are identified during the design phase. This will include the use of instruments that have harmful radiations; in the case of Medupi those were not used.

3.1.10 Safety Impacts

The FDS is mainly installed to ensure safety of plant and personnel. It is therefore its function to ensure that personnel are warned early if there is a fire related safety event and protect the plant and processes by notifying the relevant authorities.

The impact of a non-functional FDS can be very serious and costly too. Care needs to be taken when maintaining this plant. Staff must be properly trained in maintaining this plant and understanding the effects of keeping the plant operational.

Health, safety hazards and risks associated with an installed loop need to be understood and the system left in its original state for it to keep the plant and personnel safe.

3.1.11 Risk Assessment

Risks associated with the system are identified prior to any maintenance work. This including studies done when designing the system to effectively maintain the system.

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3.1.12 Assumptions

All the required testing equipment, the skills needed to analyse the status of the equipment, spares for replacing damaged field instrumentation and relevant task lists will be available to maintain the FDS and keep it operating optimally throughout its life cycle.

3.1.13 Future Plant / Design Modifications and Requirements

The plant design allows for easy extension of additional plants for monitoring. Future work will not require any physical change of the system but only additional software modules. The FDS has been installed and tested on all relevant plant areas, except in Unit 4 where the installation was put on hold because of the generator explosion incident.

3.1.14 Remnant Life

N/A

3.1.15 Lifecycle Management Plan (LCMP) / Life of Plant Plan (LOPP)

The LOPP of the system is as follows:

Description	WBS No.	Total Value	Start date of the project	Completion date of the project
Upgrade Plant Building Management System	P1381801 C.GME0045	R753 788 501	2029/04/01	2059/03/31

3.1.15.1 Technical Plan

No project on the Technical Plan for the FDS as it is still part of New Build strategy.

3.2 Maintenance Strategy Determination Process

The RBO process is a step-by-step approach to develop and optimise the plant Reliability Basis, by incorporating plant specific knowledge, maintenance and failure history and industry best practice, to finally achieve an effective Plant System Strategy.

The optimisation process further includes the understanding of how equipment fails the development of defence mechanisms to counteract these failures and the application of technology to proactively predict potential failures.

A balance has to be found between the amount of maintenance performed and the resulting reliability of the equipment.

The Reliability Basis Optimisation is done by:

1. **Examining** each piece of equipment with a view of how it can be expected to fail,
2. Determining what **maintenance tasks** should be done regularly to prevent such a failure from occurring,
3. Determining the **optimum interval** for each such failure defence task.

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Figure 3.2 shows the RBO process pictorially and below is described a detailed step by step explanation of the process.

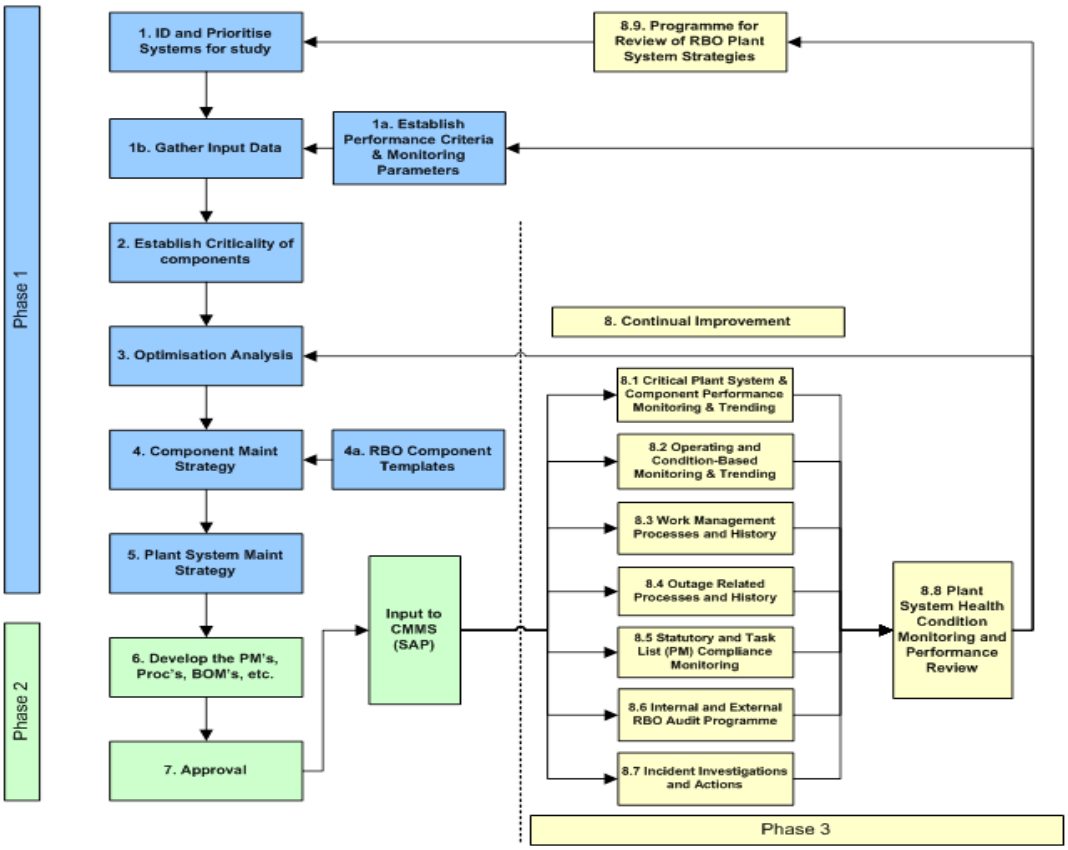

Figure 2: Flow Diagram for Reliability Basis Optimisation

Step 1: Identify Plant Systems Including boundaries to be analysed

The boundaries of the system should be specific (e.g., the system ends at outlet flange of the de-aerator gate valve with functional location 00 XXXXXX). This level of detail is required as it prevents grey areas by making it clear where the next system starts thereby avoiding components being left out of analysis.

Gather Input data, Establish Performance Criteria and Monitoring Parameters

A walk-down of the system to be analysed should be conducted prior to analysis. This should aim to verify that components on the physical plant and components on the plant drawings correspond.

The following data is also collected in preparation for analysis.

1. Plant hardware breakdown structure (functional locations or other)
2. Plant system drawings (flow diagrams, P&IDs, etc.)
3. List of components to be analysed (to be populated in spreadsheet)
4. Current Maintenance Strategies for each component. (PMs from SAP)
5. Maintenance and Operating Procedures
6. Previous analyses e.g., RBO, RCM, FMECA, etc.

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7. RBO analysis from identical plants in other stations (for benchmarking)
8. Capital/Modification Plans in progress or completed
9. OEM documents and/or Contracted Out Plant
10. Maintenance History from CMMS
11. RBO Templates for Best Practice Maintenance Strategies (GGCS)
12. Components desired capabilities (minimum operating parameters or acceptable levels)
13. Component parameters to be monitored (e.g., temperature, pressure, vibration, etc.)

Step 2: Determine and document the Criticality or Functional Importance Evaluation (FIE) of plant system components

Maintenance should be focused on preserving critical System, Structure and Component functions. Thus, to achieve this, it is important to identify which Systems, Structures and Components support critical functions. Some components may not support critical functions but can have serious consequences if they fail in a certain manner (e.g., barring gearbox coupling engages while mill is in service), and this must be considered.

On the spreadsheet populated with all the systems components, all components should be evaluated to determine in what ways they can fail to fulfil their functions. This is termed the **functional failure** evaluation. Once the functional failures have been identified for each component, the component should be assessed for functional importance, in accordance with the set criteria in Table 3.1. The **functional importance** is then recorded in the spreadsheet.

As the success of the resulting Maintenance Strategy relies on accurate component categorisation, it is important to ensure that staff with the appropriate experience review the FIE. A panel of experienced staff from Operating, Maintenance and Engineering should be used to perform this review.

Critical

Critical components are those where the consequences of failure are serious and where the aim must be to defend against all plausible failures.

Non-critical

Non-critical components are still important components but are those where we can tolerate a failure.

Run-to-Failure (RTF)

- Components are Run-to-Failure where there are no effects beyond repair of the actual failure itself.
- For components that are categorised as RTF, the decision must be ratified using the checklist in Appendix B. All components identified as RTF, must be validated and the reasons documented within the spreadsheet.

Step 3: Optimisation Analysis

This analysis entails:

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1. Scrub (search) existing Task Lists and tasks to identify duplication,
2. Search for similar System Models from other Power Stations,
3. Search for relevant Head Office RBO Templates (GGCS)

Step 4: Component Maintenance Strategy

Analysis then commences on the individual components or parts where necessary

RBO Templates (Generation Generic Component Strategies)

For each Critical and Non-critical component, identify the applicable RBO template (GGCS) from the library available from Generation AMD. Consider the following:

1. Basic design (Is the component of similar design in that the component will fail in the same manner as those covered by the RBO template)
2. Functional Importance (Critical, Non-critical)
3. Operating Environment (Harsh or mild).
4. Duty cycle (high or low)

Should there be a technical reason to deviate from the recommendations of the GGCS, this reason should be documented so that the thought logic can be followed by the personnel who will review the document in future.

In the absence of RBO TEMPLATE (GGCS) perform a failure mode analysis.

Component Failure Mode Analysis (FMA)

Where no applicable RBO TEMPLATE (GGCS) is available, perform a FMA on the component. Identify and list against each component, all plausible failure modes (FMs) that will lead to functional failure of the component. For each failure mode, identify and list all possible failure causes. After which a suitable mitigation task and frequency (interval) must be decided upon.

TASK SELECTION

For each failure mode and cause combination, identify the most applicable and effective tasks to defend against the failure. Preventive maintenance tasks should be selected in the following order of priority:

Condition Monitoring Tasks

Task aimed at detecting the onset of failure, to prevent a functional failure.

1. There must be a measurable parameter whose change over time can be correlated to failure onset.
2. The failure development period should be long enough to allow appropriate action to be taken.
3. The task should be non-intrusive.

Time Directed Tasks

Task aimed directly at failure prevention or retardation.

1. The task is carried out at the present interval without any further input and is designed to prevent or retard failure.
2. The task usually entails some form of intrusion into the equipment.

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Failure Finding Tasks

Task aimed at discovering a hidden failure condition before an operational demand.

a) Task is performed to detect whether something has already failed, in order that action can be taken to prevent the multiple failure.

TASK INTERVAL SELECTION

Based on the task type, select a suitable task periodicity.

1. For Condition Monitoring tasks, the periodicity should be based on the failure development period. (Period between the point at which the potential failure condition can be detected and the point at which the functional failure would occur).
2. For Time Directed tasks, the periodicity is based on the age at which the component shows a rapid increase in the conditional probability of failure. This age is estimated based on maintenance history and international experience (EPRI Templates).
3. For Failure Finding tasks, the periodicity should be based on the risk of multiple failures.

The task interval is based on an assessment of the acceptable level of risk associated with the failure. Should there be a lack of available reliability data; specialist opinion and international experience are also used to determine a suitable task interval.

Record Component Maintenance Strategy

1. The RBO Team decides on an appropriate Component Maintenance Strategy (using RBO TEMPLATE (GGCS) or FMA method), and documents it with appropriate task descriptions and frequencies.
2. The RBO Team documents the decision process for future reference.
3. The RBO Team identifies PMs, WPs, SMPs, SOPs, BOMs and other documents for development, review or deletion.

The results of this process are recorded in a spreadsheet with suitable columns as per appendix A of this document.

Step 5: Compile and approve the Plant System Maintenance Strategy

The System Engineer compiles and documents a draft Plant System Maintenance Strategy document which prescribes the “when” to do “what” based on the combination of individual Component Maintenance Strategies. The System engineer is responsible for the contents of this document as well as for keeping it updated.

The Plant System Strategy not only contains maintenance related issues, but also includes the following strategies related to that particular plant system:

1. Operating Strategy (related to the operation, change-over and/or testing of streams, redundant and standby equipment)
2. Outage Strategy (related to unit outages as well as non-unit outages, at what frequency will the equipment be taken out, pre-outage interventions required, etc.)
3. Maintenance Strategy will comprise of the individual Component Maintenance Strategies, which become the essential building blocks of the Reliability Basis. (Component breakdown, failure modes and what to be done when)
4. Spares Strategy (related specifically to capital or strategic spares)

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5. Proposed Modifications (planned and based on the Analysis study)
6. Any other areas for research, modification or investigation to improve the condition monitoring and predictive maintenance efforts.

Once the Plant System Strategy has been drafted by the System Engineer, this document is circulated for review and approval, as follows:

1. Internal team review (by members of the analysis participating members, maintenance functions, etc.)
2. External Power Station review (this is normally only needed if the power station believes that external specialists off-site can add value to the content of the document)
3. Approval by the Engineering Manager.
4. Distribute the Plant System Strategy within the Power Station and to AMD at Head Office.

Step 6: Implementation of the Plant System Strategy (Phase 2)

This phase involves the development of each one of the tasks identified in the Maintenance Strategy. This development will take place in the Works Management/ Maintenance functions and involves the detailed step by step process of doing the inspection or work.

All task lists are to be reviewed by the System Engineer prior to approval by the relevant function, to assure that all related aspects of the Maintenance Strategy have been incorporated.

1. Compilation of PMs and SMPs (inclusive of BOMs and work packages):
   The PM schedule and procedure format of the particular power station is used as a standard.
2. Removal of redundant PM's and re-packaging of tasks:
   During the optimisation process, certain tasks will be made redundant, replaced by condition monitoring tasks and/or have their frequencies changed and therefore groupings of tasks may have to be re-packaged.

Step 7: Approval of PMs and SMPs

These documents are to be reviewed and approved by the relevant Department individuals after a review by the System Engineer, whose role is to assure that all related aspects of the Maintenance Strategy have been incorporated.

1. Uploading into SAP
   All documents developed are to be uploaded into the CMMS (SAP) and all these documents can be viewed by any person from that site or even another site.
2. Switching on the CMMS (SAP) PM's
   When appropriate, all PMs are to be switched on and these then become active from here on. The normal CMMS (SAP) controls of Work Management/ Maintenance execution then apply from hereon.

Step 8: Continual Improvement

a) Strategy Document Reviews

System Engineers are required to update their strategies whenever a change of task list is required in their plants. As a minimum, the strategy document shall be reviewed at least once a year.

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Even if there are changes during the year, the yearly review should still be conducted to ensure that analysis is done in order to identify components that are being over maintained and to ensure that failure history is being analysed.

The documentation system should be such that all previous analysis remains available for reference hence a revision number should apply to all updated documents.

The new revision document should highlight (preferably in the first pages), what changes have been made within that document. It is suggested that is say the yearly review is rev 3, the minor revisions during the course of that year be rev 3,1; rev 3,2 etc. and the revision will only move up to rev 4 during the yearly review of the following year.

For purposes of the annual review, the System Engineer should download history from SAP for the previous years and compare this against the listed strategy to determine if the task is still relevant, is being performed too frequently or too little and/or if a new strategy is required. The annual RBO Review Program will be developed by each site.

The annual review should verify the following aspects:

1. All changes (physical functional location, component manufacturer, operating parameters, feed material, etc.) or modifications done have been included in the Plant System Strategies,
2. Drawing numbers used are referenced in the strategy document,
3. Spares required especially for RTF components should be listed,
4. For each task identified in the Plant System Strategy, a Task List shall exist in SAP,
5. The Plant System Strategy shall reflect the SAP task list number (maintenance item) per component task,
6. Each SAP task list is active and generating work orders at the defined frequencies,
7. The maintenance history specified by the System Engineer in the strategy document is being captured by the maintenance personnel and analyzed by the System Engineer. If additional history is required, this should be updated on the strategy document,
8. Resource requirements (manpower, spares, tools, scaffolding, time, lifting equipment, etc.) have been clearly identified for each Task List,
9. Task List instructions are clearly listed (no one-liners allowed),
10. Plant System Strategy Tasks are optimal in terms of plant system reliability, failure data and cost,
11. Shortcomings and Corrective Actions required are identified.

This review shall be documented to show this review has been carried out and formally communicated to the Engineering Manager for approval.

b) External Audits

In order to assure that all components have been considered, have strategies and that the strategies are in SAP, AMD will initiate an audit process. As it is not possible to audit every single component, these audits will take the form of sample audits and shall be conducted every 3 years.

c) Auditing for Plant System component listing completeness

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The Eskom plant is broken down into 26 systems as per GGG 0806 (Generic Plant Breakdown) for the purposes of RBO. AMD will conduct sample audits by selecting random components and the Station should provide evidence of the component having been analysed in a strategy document. Should this component not be located in a strategy document, the assumption will exist that it was not covered. Drawing numbers used should be referenced in all strategy documents.

d) Auditing to assure all component strategies are in SAP

For each component that is not a run-to-failure, the Station should be able to demonstrate that a task list exists for the component in the CMMS. This may be by way of associating a maintenance task number to a component on the spreadsheet column “documents required”. A random check will also be done in SAP to ensure that strategies that have been made redundant are switched off. Points will be allocated as appropriate.

3.3 Maintenance Strategy (Specific Equipment and Component Maintenance Strategy)

Refer to appendix B.

4. Authorisation

This document has been seen and accepted by:

Name	Designation
Nthabi Mashigo	C&I Engineering Manager
Lerato Sehume	C&I Maintenance Manager
Nicolaas du Toit	Fire Risk Manager
Lesley Baloyi	Risk Group Manager

5. Revisions

Date	Rev.	Compiler	Remarks
July 2022	5	MS Sithole	Periodic Document Review. Minor format changes.
July 2019	4	EF Van Dyk	Periodic Document Review. Minor format changes.
July 2017	3	TL Mzila	Periodic Review of the Document
June 2016	2	TL Mzila	Format change Yearly Review
October 2014	1	TL Mzila	First Issue

6. Development Team

The following people were involved in the development of this document

- Nthabi Mashigo
- Tendani Masesane

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7. Acknowledgements

- Nthabi Mashigo
- Tendani Masesane

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Appendix A – Maintenance Strategy Template

Asset Class:	
Asset Sub Class:	
Asset Sub Class Family:	

Options		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Functional Importance	Critical	X	X	X	X				
	Non Critical					X	X	X	X
Duty Cycle	High	X		X		X		X	
	Low		X		X		X		X
Environment	Harsh	X	X			X	X		
	Mild			X	X			X	X

Key	
1M	One monthly
2M	Once every two months
6M	Once Every six months
1Y	Once Every year
2Y	Once every two years
3Y	Once every three years
4Y	Once every four years
5Y	Once every five years
6Y	Once every six years
10Y	Once every ten years
AR	As required

PM Tasks	**Failure Mode Line No**	**Periodicity**								**Activities**	**Quality Criteria**	**Hold Point**	**Witness Point**
Preventive Maintenance:													
Condition Based Maintenance:													
Corrective Maintenance:													

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Appendix B: Maintenance strategy For Fire Detection System Plant

No.	Eq.	Sub-Equipment /Component Group	Functional Location (KKS/ AKZ Code)	Functional Description	Asset Class	Asset Type	Functional Importance	Functional Failure	Parts that can Fail	Failure Mode	Failure Mode (Specify if Other)	Task	Task Description		Task Type	Frequency	Unit Run or Outage	GGCS/GSS Reference Number	GGCS Classification number	Reason for Deviation from GGCS	Work Centre	SAP Ref	Material or	History to be Captured	History Measurement Parameters
1	FDS	XLS 3000	6 0SGY01 GH001, 6 0SGY02 GH001, 6 0SGY03 GH001, 0 0SGY11 GH001, 0 0SGY12 GH001, 0 0SGY13 GH001, 0 0SGY21 GH001, 0 0SGY22 GH003	CPU	Other	Other	NC	loss of processing	electronic card	Other	electronic failure	function test	Check Panel display, Power LED's and status LED are in normal condition, not indicating any trouble and error message	1	PM	6M	R								
				Power Supply	C_I_Power _Supply	DC	NC	loss of power supply	power supply module	Other	electronic failure	function test	Check stand by battery for full load alarm by simulating normal power supply.	2	PM	6M	R								
				Batteries	Battery	NI-Cad	NC	loss of power back up	batteries	Other	battery failure	function test	test for full charge voltage and load current, and top up acid	3	PM	1M	R								
				Network \Control Card	Other	Other	NC	loss of loop control	loop control card	Other	electronic failure	replace	replace when required	4	RTF	RTF	R								
				Loop Expander card	Other	Other	NC	loss of loop expansion	loop expansion card	Other	electronic failure	replace	replace when required	5	RTF	RTF	R								
				Cabinet	Other	Other	RTF	loss of component housing	door seals, LEDs, LCDs, buttons, seals	Other	cubicle damage	functional inspection	clean cubicle, check loose connections,	6	PM	1Y	R								
2	FDS	Control Module	6 0SGY01 GH305 6 0SGY01 GH309, 6 0SGY01 GH314, 6 0SGY01 GH319 6 0SGY01 GH321, 6 0SGY01 GH322, 6 0SGY01 GH331 6 0SGY01 GH334 6 0SGY01 GH340 6 0SGY01 GH347	electronic control module	Other	Other	RTF	loss of control interface	electronic module	Other	electronic failure	replace	test module, different zones each month, clean, check loose connections	7	RTF	6M	R								

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No.	Eq.	Sub-Equipment /Component Group	Functional Location (KKS/ AKZ Code)	Functional Description	Asset Class	Asset Type	Functional Importance	Functional Failure	Parts that can Fail	Failure Mode	Failure Mode (Specify if Other)	Task	Task Description		Task Type	Frequency	Unit Run or Outage	GGCS/GSS Reference Number	GGCS Classification number	Reason for Deviation from GGCS	Work Centre	SAP Ref	Material or	History to be Captured	History Measurement Parameters
			6 0SGY01 GH348 6 0SGY02 GH302 6 0SGY02 GH306 6 0SGY02 GH307 6 0SGY02 GH316 6 0SGY02 GH317 6 0SGY02 GH320 6 0SGY02 GH32 0 0SGY11 GH303 0 0SGY11 GH307 0 0SGY11 GH311 0 0SGY11 GH313 0 0SGY11 GH317 0 0SGY11 GH319 0 0SGY11 GH322 0 0SGY11 GH325 0 0SGY11 GH326 0 0SGY11 GH327 0 0SGY12 GH301 0 0SGY12 GH302 0 0SGY12 GH303 0 0SGY12 GH304 0 0SGY13 GH316 0 0SGY13 GH320 0 0SGY21 GH306 0 0SGY21 GH307 0 0SGY21 GH310 0 0SGY21 GH311 0 0SGY21 GH314 0 0SGY21 GH315 0 0SGY21 GH318 0 0SGY22 GH302 0 0SGY22 GH305 0 0SGY22 GH310 0 0SGY22 GH313 0 0SGY22 GH316 0 0SGY22 GH319 0 0SGY22 GH324 0 0SGY22 GH325 0 0SGY22 GH326 0 0SGY31 GH301 0 0SGY31 GH304 0 0SGY31 GH307 0 0SGY31 GH313 0 0SGY32 GH302 0 0SGY32 GH307 0 0SGY33 GH303 0 0SGY33 GH306																				

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No.	Eq.	Sub-Equipment /Component Group	Functional Location (KKS/ AKZ Code)	Functional Description	Asset Class	Asset Type	Functional Importance	Functional Failure	Parts that can Fail	Failure Mode	Failure Mode (Specify if Other)	Task	Task Description		Task Type	Frequency	Unit Run or Outage	GGCS/GSS Reference Number	GGCS Classification number	Reason for Deviation from GGCS	Work Centre	SAP Ref	Material or	History to be Captured	History Measurement Parameters
			0 0SGY33 GH309 0 0SGY33 GH312 0 0SGY34 GH301 0 0SGY34 GH306 0 0SGY34 GH310 0 0SGY34 GH311																						
3	FDS	XLS 120	0 0SGY31 GH004 0 0SGY32 GH005 0 0SGY33 GH006 0 0SGY34 GH007 0 0SGY35 GH008 6 0SGY36 GH009 0 0SGY37 GH010 0 0SGY38 GH011	CPU	Other	Other	NC	loss of processing	electronic card	Other	electronic failure	function test	Check Panel display, Power LED's and status LED are in normal condition, not indicating any trouble and error message	8	PM	6M	R								
				Power Supply	C_I_Power_Supply		NC	loss of power supply	power supply module	Other	electronic failure	function test	Check stand by battery for full load alarm by simulating normal power supply.	9	PM	6M	R								
				Batteries	Battery	NI-Cad	NC	loss of power back up	batteries	Other	battery failure	function test	test for full charge voltage and top up acid	10	PM	1M	R								
				Network \Control Card	Other	Other	NC	loss of loop control	loop control card	Other	electronic failure	replace	replace when required	11	RTF	RTF	R								
				Loop Expander card	Other	Other	NC	loss of loop expansion	loop expansion card	Other	electronic failure	replace	replace when required	12	RTF	RTF	R								
				Cabinet	Other	Other	RTF	loss of component housing	door seals, LEDs, LCDs, buttons, seals	Other	cubicle damage	replace	replace when required	13	RTF	1Y	R								

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4	FDS	Fault Isolator	6 0SGY01 GS301 6 0SGY01 GS302 6 0SGY01 GS303 6 0SGY01 GS304 6 0SGY01 GS305 6 0SGY01 GS306 6 0SGY01 GS307 6 0SGY01 GS308 6 0SGY01 GS309 6 0SGY01 GS310 6 0SGY01 GS311 6 0SGY01 GS312 6 0SGY01 GS313 6 0SGY01 GS314 6 0SGY02 GS301 6 0SGY02 GS302 6 0SGY02 GS303 6 0SGY02 GS304 6 0SGY02 GS305 6 0SGY02 GS306 6 0SGY02 GS307 6 0SGY02 GS308 6 0SGY02 GS309 6 0SGY02 GS310 6 0SGY03 GS301 6 0SGY03 GS302 6 0SGY03 GS303 6 0SGY03 GS304 6 0SGY03 GS305 6 0SGY03 GS306 6 0SGY03 GS307 6 0SGY03 GS308 6 0SGY03 GS309 6 0SGY03 GS310 6 0SGY03 GS311 6 0SGY03 GS312 6 0SGY03 GS313 6 0SGY03 GS314 6 0SGY03 GS315 6 0SGY03 GS316 6 0SGY03 GS317 6 0SGY03 GS318 0 0SGY11 GS301 0 0SGY11 GS302 0 0SGY11 GS303 0 0SGY11 GS304 0 0SGY11 GS305 0 0SGY11 GS306	fault isolator module	Other	Other	RTF	loss of control interface	electronic module, cabling	Other	electronic failure	replace	replace when required	14	RTF	6M	R								

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No.	Eq.	Sub-Equipment /Component Group	Functional Location (KKS/ AKZ Code)	Functional Description	Asset Class	Asset Type	Functional Importance	Functional Failure	Parts that can Fail	Failure Mode	Failure Mode (Specify if Other)	Task	Task Description		Task Type	Frequency	Unit Run or Outage	GGCS/GSS Reference Number	GGCS Classification number	Reason for Deviation from GGCS	Work Centre	SAP Ref	Material or	History to be Captured	History Measurement Parameters
			0 0SGY11 GS307 0 0SGY11 GS308 0 0SGY11 GS309 0 0SGY11 GS310 0 0SGY11 GS311 0 0SGY11 GS312 0 0SGY11 GS313 0 0SGY12 GS301 0 0SGY12 GS302 0 0SGY12 GS303 0 0SGY12 GS304 0 0SGY12 GS305 0 0SGY12 GS306 0 0SGY13 GS301 0 0SGY13 GS302 0 0SGY13 GS303 0 0SGY13 GS304 0 0SGY13 GS305 0 0SGY21 GS301 0 0SGY21 GS302 0 0SGY21 GS303 0 0SGY21 GS304 0 0SGY21 GS305 0 0SGY21 GS306 0 0SGY21 GS307 0 0SGY21 GS308 0 0SGY21 GS309 0 0SGY22 GS301 0 0SGY22 GS302 0 0SGY22 GS303 0 0SGY22 GS304 0 0SGY22 GS305 0 0SGY22 GS306 0 0SGY22 GS307 0 0SGY22 GS308 0 0SGY31 GS301 0 0SGY31 GS302 0 0SGY31 GS303 0 0SGY31 GS304 0 0SGY31 GS305 0 0SGY32 GS301 0 0SGY32 GS302 0 0SGY32 GS303 0 0SGY33 GS301 0 0SGY33 GS302 0 0SGY33 GS303 0 0SGY33 GS304 0 0SGY33 GS305																				

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			0 0SGY33 GS306 0 0SGY34 GS301 0 0SGY34 GS302 0 0SGY34 GS303 0 0SGY34 GS304 0 0SGY34 GS305 0 0SGY35 GS301 0 0SGY35 GS302 0 0SGY35 GS303 0 0SGY35 GS304 0 0SGY35 GS305 6 0SGY36 GS301 6 0SGY36 GS302 6 0SGY36 GS303 6 0SGY36 GS304 6 0SGY36 GS305 6 SGY36 GS306 6 0SGY36 GS307 6 0SGY36 GS308 6 0SGY36 GS309 6 0SGY36 GS310 6 0SGY36 GS311 6 0SGY36 GS312 6 0SGY36 GS313																					
5	FDS	Relay Module	6 0SGY01 GH306 6 0SGY01 GH307 6 0SGY01 GH310 6 0SGY01 GH311 6 0SGY01 GH315 6 0SGY01 GH316 6 0SGY01 GH317 6 0SGY01 GH318 6 0SGY01 GH320 6 0SGY01 GH323 6 0SGY01 GH324 6 0SGY01 GH329 6 0SGY01 GH330 6 0SGY01 GH335 6 0SGY01 GH341 6 0SGY01 GH342 6 0SGY01 GH343 6 0SGY01 GH344 6 0SGY01 GH349 6 0SGY02 GH303 6 0SGY02 GH304 6 0SGY02 GH305 6 0SGY02 GH308 6 0SGY02 H309	relay module	Other	Other	RTF	loss of control interface	electronic module, cabling	Other	electronic failure	replace	replace when required	15	RTF	6M	R							

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			6 0SGY02 GH314 6 0SGY02 GH315 6 0SGY02 GH318 6 0SGY02 GH319 6 0SGY02 GH321 6 0SGY02 GH323 6 0SGY02 GH325 6 0SGY02 GH326 6 0SGY02 H331 6 0SGY02 GH332 6 0SGY02 GH333 6 0SGY03 H301 6 0SGY03 GH305 6 0SGY03 GH312 6 0SGY03 GH317 6 0SGY03 GH322 6 0SGY03 GH327 6 0SGY03 H332 6 0SGY03 GH340 6 0SGY03 GH345 6 0SGY03 H349 6 0SGY03 GH361 6 0SGY03 GH374 6 0SGY03 GH378 6 0SGY03 GH384 6 0SGY03 GH387 6 0SGY03 H390 0 0SGY11 GH302 0 0SGY11 GH305 0 0SGY11 GH306 0 0SGY11 GH308 0 0SGY11 GH309 0 0SGY11 GH310 0 0SGY11 GH312 0 0SGY11 GH314 0 0SGY11 GH315 0 0SGY11 GH316 0 0SGY11 GH318 0 0SGY11 GH320 0 0SGY11 GH321 0 0SGY11 GH323 0 0SGY11 GH324 0 0SGY11 GH328 0 0SGY11 GH329 0 0SGY12 GH305 0 0SGY12 GH306 0 0SGY13 GH305 0 0SGY13 GH307																				

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			0 0SGY13 GH308 0 0SGY13 GH314 0 0SGY13 GH318 0 0SGY21 GH301 0 0SGY21 GH305 0 0SGY21 GH308 0 0SGY21 GH309 0 0SGY21 GH312 0 0SGY21 GH313 0 0SGY21 GH316 0 0SGY21 GH317 0 0SGY22 GH301 0 0SGY22 GH303 0 0SGY22 GH306 0 0SGY22 H307 0 0SGY22 GH308 0 0SGY22 GH309 0 0SGY22 H314 0 0SGY22 GH315 0 0SGY22 GH317 0 0SGY22 GH318 0 0SGY22 GH320 0 0SGY22 GH321 0 0SGY22 H327 0 0SGY22 GH328 0 0SGY31 GH302 0 0SGY31 GH303 0 0SGY31 GH305 0 0SGY31 GH306 0 0SGY31 GH308 0 0SGY31 GH309 0 0SGY31 GH311 0 0SGY31 GH312 0 0SGY32 GH303 0 0SGY32 GH304 0 0SGY32 GH305 0 0SGY32 GH306 0 0SGY33 GH301 0 0SGY33 H302 0 0SGY33 GH304 0 0SGY33 GH305 0 0SGY33 H310 0 0SGY33 GH311 0 0SGY33 GH313 0 0SGY33 GH314 0 0SGY34 GH302 0 0SGY34 GH303 0 0SGY34 H304																					

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			0 0SGY34 GH305 0 0SGY34 GH308 0 0SGY34 H309 0 0SGY34 GH312 0 0SGY34 GH313 0 0SGY35 GH302 0 0SGY35 GH303 0 0SGY35 GH306 0 0SGY35 GH307 0 0SGY35 GH310 0 0SGY35 GH311 0 0SGY35 GH312 0 0SGY35 GH313 6 0SGY36 GH302 6 0SGY36 GH303 6 0SGY36 GH307 6 0SGY36 GH308 6 0SGY36 GH311 6 0SGY36 GH312 6 0SGY36 GH314 6 0SGY36 GH315 6 0SGY36 GH317 6 0SGY36 GH318 6 0SGY36 GH320 6 0SGY36 GH321 6 0SGY36 GH323 6 0SGY36 GH324																				

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6	FDS	Smoke Detector	6 0SGY01 CQ301 6 0SGY01 CQ302 6 0SGY01 CQ303 6 0SGY01 CQ304 6 0SGY01 CQ305 6 0SGY01 CQ306 6 0SGY01 CQ307 6 0SGY01 CQ308 6 0SGY01 CQ309 6 0SGY01 CQ310 6 0SGY01 CQ311 6 0SGY01 CQ312 6 0SGY01 CQ313 6 0SGY01 CQ314 6 0SGY01 CQ315 6 0SGY01 CQ316 6 0SGY01 CQ317 6 0SGY01 CQ318 6 0SGY01 CQ319 6 0SGY01 CQ320 6 0SGY01 CQ321 6 0SGY01 CQ322 6 0SGY01 CQ323 6 0SGY01 CQ324 6 0SGY01 CQ325 6 0SGY01 CQ326 6 0SGY01 CQ327 6 0SGY01 CQ328 6 0SGY01 CQ329 6 0SGY01 CQ330 6 0SGY01 CQ331 6 0SGY01 CQ332 6 0SGY01 CQ333 6 0SGY01 CQ334 6 0SGY01 CQ335 6 0SGY01 CQ336 6 0SGY01 CQ337 6 0SGY01 CQ338 6 0SGY01 CQ339 6 0SGY01 CQ340 6 0SGY01 CQ341 6 0SGY01 CQ342 6 0SGY01 CQ343 6 0SGY01 CQ344 6 0SGY01 CQ345 6 0SGY01 CQ346 6 0SGY01 CQ347 6 0SGY01 CQ348	smoke detector module	Other	Other	NC	loss of control interface	electronic module, cabling, sensor	Other	electronic failure	replace	replace when required	16	RTF	6M	R								

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			6 0SGY01 CQ349 6 0SGY01 CQ350 6 0SGY01 CQ351 6 0SGY01 CQ352 6 0SGY01 CQ353 6 0SGY01 CQ354 6 0SGY01 CQ355 6 0SGY01 CQ356 6 0SGY01 CQ357 6 0SGY01 CQ358 6 0SGY01 CQ359 6 0SGY01 CQ360 6 0SGY01 CQ361 6 0SGY01 CQ362 6 0SGY01 CQ363 6 0SGY01 CQ364 6 0SGY01 CQ365 6 0SGY01 CQ366 6 0SGY01 CQ367 6 0SGY01 CQ368 6 0SGY01 CQ369 6 0SGY02 CQ301 6 0SGY02 CQ302 6 0SGY02 CQ303 6 0SGY02 CQ304 6 0SGY02 CQ305 6 0SGY02 CQ306 6 0SGY02 CQ307 6 0SGY02 CQ308 6 0SGY02 CQ309 6 0SGY02 CQ310 6 0SGY02 CQ311 6 0SGY02 CQ312 6 0SGY02 CQ313 6 0SGY02 CQ314 6 0SGY02 CQ315 6 0SGY02 CQ316 6 0SGY02 CQ317 6 0SGY02 CQ318 6 0SGY02 CQ319 6 0SGY02 CQ320 6 0SGY02 CQ321 6 0SGY02 CQ322 6 0SGY02 CQ323 6 0SGY02 CQ324 6 0SGY02 CQ325 6 0SGY02 CQ326 6 0SGY02 CQ327																				

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			6 0SGY02 CQ328 6 0SGY02 CQ329 6 0SGY02 CQ330 6 0SGY02 CQ331 6 0SGY02 CQ332 6 0SGY02 CQ333 6 0SGY02 CQ334 6 0SGY02 CQ335 6 0SGY02 CQ336 6 0SGY02 CQ337 6 0SGY02 CQ338 6 0SGY02 CQ339 6 0SGY02 CQ340 6 0SGY02 CQ341 6 0SGY02 CQ342 6 0SGY02 CQ343 6 0SGY02 CQ344 6 0SGY02 CQ345 6 0SGY02 CQ346 6 0SGY02 CQ347 6 0SGY03 CQ301 6 0SGY03 CQ302 6 0SGY03 CQ303 6 0SGY03 CQ304 0 0SGY11 CQ301 0 0SGY11 CQ302 0 0SGY11 CQ303 0 0SGY11 CQ304 0 0SGY11 CQ305 0 0SGY11 CQ306 0 0SGY11 CQ307 0 0SGY11 CQ308 0 0SGY11 CQ309 0 0SGY11 CQ310 0 0SGY11 CQ311 0 0SGY11 CQ312 0 0SGY11 CQ313 0 0SGY11 CQ314 0 0SGY11 CQ315 0 0SGY11 CQ316 0 0SGY11 CQ317 0 0SGY11 CQ318 0 0SGY11 CQ319 0 0SGY11 CQ320 0 0SGY11 CQ321 0 0SGY11 CQ322 0 0SGY11 CQ323 0 0SGY11 CQ324																				

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No.	Eq.	Sub-Equipment /Component Group	Functional Location (KKS/ AKZ Code)	Functional Description	Asset Class	Asset Type	Functional Importance	Functional Failure	Parts that can Fail	Failure Mode	Failure Mode (Specify if Other)	Task	Task Description		Task Type	Frequency	Unit Run or Outage	GGCS/GSS Reference Number	GGCS Classification number	Reason for Deviation from GGCS	Work Centre	SAP Ref	Material or	History to be Captured	History Measurement Parameters
			0 0SGY11 CQ325 0 0SGY11 CQ326 0 0SGY11 CQ327 0 0SGY11 CQ328 0 0SGY11 CQ329 0 0SGY11 CQ330 0 0SGY11 CQ331 0 0SGY11 CQ332 0 0SGY11 CQ333 0 0SGY11 CQ334 0 0SGY11 CQ335 0 0SGY11 CQ336 0 0SGY11 CQ337 0 0SGY11 CQ338 0 0SGY11 CQ339 0 0SGY11 CQ340 0 0SGY11 CQ341 0 0SGY11 CQ342 0 0SGY11 CQ343 0 0SGY11 CQ344 0 0SGY11 CQ345 0 0SGY11 CQ346 0 0SGY11 CQ347 0 0SGY11 CQ348 0 0SGY11 CQ349 0 0SGY11 CQ350 0 0SGY11 CQ351 0 0SGY11 CQ352 0 0SGY11 CQ353 0 0SGY11 CQ354 0 0SGY11 CQ355 0 0SGY11 CQ356 0 0SGY11 CQ357 0 0SGY11 CQ358 0 0SGY11 CQ359 0 0SGY11 CQ360 0 0SGY11 CQ361 0 0SGY11 CQ362 0 0SGY11 CQ363 0 0SGY11 CQ364 0 0SGY11 CQ365 0 0SGY11 CQ366 0 0SGY11 CQ367 0 0SGY11 CQ368 0 0SGY11 CQ369 0 0SGY11 CQ370 0 0SGY11 CQ371 0 0SGY11 CQ372																					

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			0 0SGY11 CQ373 0 0SGY11 CQ374 0 0SGY11 CQ375 0 0SGY11 CQ376 0 0SGY11 CQ377 0 0SGY11 CQ378 0 0SGY11 CQ379 0 0SGY12 CQ301 0 0SGY12 CQ302 0 0SGY12 CQ303 0 0SGY12 CQ304 0 0SGY12 CQ305 0 0SGY12 CQ306 0 0SGY12 CQ307 0 0SGY12 CQ308 0 0SGY12 CQ309 0 0SGY12 CQ310 0 0SGY12 CQ311 0 0SGY12 CQ312 0 0SGY12 CQ313 0 0SGY12 CQ314 0 0SGY12 CQ315 0 0SGY12 CQ316 0 0SGY12 CQ317 0 0SGY12 CQ318 0 0SGY12 CQ319 0 0SGY12 CQ320 0 0SGY12 CQ321 0 0SGY12 CQ322 0 0SGY12 CQ323 0 0SGY12 CQ324 0 0SGY12 CQ325 0 0SGY12 CQ326 0 0SGY12 CQ327 0 0SGY12 CQ328 0 0SGY12 CQ329 0 0SGY12 CQ330 0 0SGY12 CQ331 0 0SGY12 CQ332 0 0SGY12 CQ333 0 0SGY13 CQ301 0 0SGY13 CQ302 0 0SGY13 CQ303 0 0SGY13 CQ304 0 0SGY13 CQ305 0 0SGY13 CQ306 0 0SGY13 CQ307 0 0SGY13 CQ308																					

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			0 0SGY13 CQ309 0 0SGY13 CQ310 0 0SGY13 CQ311 0 0SGY13 CQ312 0 0SGY21 CQ301 0 0SGY21 CQ302 0 0SGY21 CQ303 0 0SGY21 CQ304 0 0SGY21 CQ305 0 0SGY21 CQ306 0 0SGY21 CQ307 0 0SGY21 CQ308 0 0SGY21 CQ309 0 0SGY21 CQ310 0 0SGY21 CQ311 0 0SGY21 CQ312 0 0SGY21 CT303 0 0SGY21 CQ313 0 0SGY21 CQ314 0 0SGY21 CQ316 0 0SGY21 CQ317 0 0SGY21 CQ318 0 0SGY21 CQ319 0 0SGY21 CQ320 0 0SGY21 CQ321 0 0SGY21 CQ322 0 0SGY21 CQ323 0 0SGY21 CQ324 0 0SGY21 CQ325 0 0SGY21 CQ327 0 0SGY21 CQ328 0 0SGY21 CQ329 0 0SGY21 CQ330 0 0SGY21 CQ331 0 0SGY21 CQ332 0 0SGY21 CQ333 0 0SGY21 CQ334 0 0SGY21 CQ335 0 0SGY21 CQ336 0 0SGY21 CQ337 0 0SGY21 CQ338 0 0SGY21 CQ339 0 0SGY21 CQ340 0 0SGY21 CQ341 0 0SGY21 CQ342 0 0SGY21 CQ343 0 0SGY21 CQ344 0 0SGY21 CQ345																				

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			0 0SGY21 CQ346 0 0SGY21 CQ347 0 0SGY21 CQ348 0 0SGY21 CQ349 0 0SGY21 CQ350 0 0SGY21 CQ351 0 0SGY21 CQ352 0 0SGY22 CQ301 0 0SGY22 CQ302 0 0SGY22 CQ303 0 0SGY22 CQ304 0 0SGY22 CQ305 0 0SGY22 CQ306 0 0SGY22 CQ307 0 0SGY22 CQ308 0 0SGY22 CQ309 0 0SGY22 CQ310 0 0SGY22 CQ311 0 0SGY22 CQ312 0 0SGY22 CQ313 0 0SGY22 CQ314 0 0SGY22 CQ315 0 0SGY22 CQ316 0 0SGY22 CQ317 0 0SGY22 CQ318 0 0SGY22 CQ319 0 0SGY22 CQ320 0 0SGY22 CQ321 0 0SGY22 CQ322 0 0SGY22 CQ323 0 0SGY22 CQ324 0 0SGY22 CQ325 0 0SGY22 CQ326 0 0SGY22 CQ327 0 0SGY22 CQ328 0 0SGY22 CQ329 0 0SGY22 CQ330 0 0SGY22 CQ331 0 0SGY22 CQ332 0 0SGY22 CQ333 0 0SGY22 CQ334 0 0SGY22 CQ335 0 0SGY22 CQ336 0 0SGY22 CQ337 0 0SGY22 CQ338 0 0SGY22 CQ339 0 0SGY31 CQ301 0 0SGY31 CQ302																				

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			0 0SGY31 CQ303 0 0SGY31 CQ304 0 0SGY31 CQ305 0 0SGY31 CQ306 0 0SGY31 CQ307 0 0SGY31 CQ308 0 0SGY31 CQ309 0 0SGY31 CQ310 0 0SGY31 CQ311 0 0SGY31 CQ312 0 0SGY31 CQ313 0 0SGY31 CQ314 0 0SGY31 CQ315 0 0SGY31 CQ316 0 0SGY32 CQ301 0 0SGY32 CQ302 0 0SGY32 CQ303 0 0SGY32 CQ304 0 0SGY32 CQ305 0 0SGY32 CQ306 0 0SGY32 CQ307 0 0SGY32 CQ308 0 0SGY32 CQ309 0 0SGY32 CQ310 0 0SGY32 CQ311 0 0SGY32 CQ312 0 0SGY32 CQ313 0 0SGY32 CQ314 0 0SGY32 CQ315 0 0SGY32 CQ316 0 0SGY32 CQ317 0 0SGY32 CQ318 0 0SGY32 CQ319 0 0SGY32 CQ320 0 0SGY32 CQ321 0 0SGY32 CQ322 0 0SGY32 CQ323 0 0SGY32 CQ324 0 0SGY32 CQ325 0 0SGY32 CQ326 0 0SGY32 CQ327 0 0SGY32 CQ328 0 0SGY33 CQ301 0 0SGY33 CQ302 0 0SGY33 CQ303 0 0SGY33 CQ304 0 0SGY33 CQ305 0 0SGY33 CQ306																					

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			0 0SGY33 CQ307 0 0SGY33 CQ308 0 0SGY34 CQ301 0 0SGY34 CQ302 0 0SGY34 CQ303 0 0SGY34 CQ304 0 0SGY34 CQ305 0 0SGY34 CQ306 0 0SGY34 CQ307 0 0SGY34 CQ308 0 0SGY34 CQ309 0 0SGY34 CQ310 0 0SGY34 CQ311 0 0SGY34 CQ312 0 0SGY34 CQ313 0 0SGY34 CQ314 0 0SGY34 CQ315 0 0SGY34 CQ316 0 0SGY34 CQ317 0 0SGY34 CQ318 0 0SGY34 CQ319 0 0SGY34 CQ320 0 0SGY34 CQ321 0 0SGY34 CQ322 0 0SGY34 CQ323 0 0SGY34 CQ324 0 0SGY35 CQ301 0 0SGY35 CQ302 0 0SGY35 CQ303 0 0SGY35 CQ304 0 0SGY35 CQ305 0 0SGY35 CQ306 0 0SGY35 CQ307 0 0SGY35 CQ308 6 0SGY36 CQ301 6 0SGY36 CQ302 6 0SGY36 CQ303 6 0SGY36 CQ304 6 0SGY36 CQ305 6 0SGY36 CQ306 6 0SGY36 CQ307 6 0SGY36 CQ308 6 0SGY36 CQ309 6 0SGY36 CQ310 6 0SGY36 CQ311 6 0SGY36 CQ312 6 0SGY36 CQ313 6 0SGY36 CQ314																				

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			6 0SGY36 CQ315 6 0SGY36 CQ316 6 0SGY36 CQ317 6 0SGY36 CQ318 6 0SGY36 CQ319 6 0SGY36 CQ320 6 0SGY36 CQ321 6 0SGY36 CQ322 6 0SGY36 CQ323 6 0SGY36 CQ324 6 0SGY36 CQ325 6 0SGY36 CQ326 6 0SGY36 CQ327 6 0SGY36 CQ328 6 0SGY36 CQ329 6 0SGY36 CQ330 6 0SGY36 CQ331 6 0SGY36 CQ332 6 0SGY36 CQ333 6 0SGY36 CQ334 6 0SGY36 CQ335 6 0SGY36 CQ336 0 0SGY37 CQ301 0 0SGY37 CQ302 0 0SGY37 CQ303 0 0SGY37 CQ304 0 0SGY37 CQ305 0 0SGY37 CQ306 0 0SGY37 CQ307 0 0SGY37 CQ308 0 0SGY37 CQ309 0 0SGY37 CQ310 0 0SGY37 CQ311 0 0SGY37 CQ312 0 0SGY37 CQ313 0 0SGY37 CQ314 0 0SGY37 CQ315 0 0SGY37 CQ316 0 0SGY37 CQ317 0 0SGY37 CQ318																					

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7	FDS	Manual Call Point	6 0SGY01 EG301 6 0SGY01 EG302 6 0SGY01 EG303 6 0SGY01 EG304 6 0SGY01 EG305 6 0SGY01 EG306 6 0SGY01 EG307 6 0SGY01 EG308 6 0SGY01 EG309 6 0SGY01 EG310 6 0SGY01 EG311 6 0SGY02 EG301 6 0SGY02 EG302 6 0SGY02 EG303 6 0SGY02 EG304 6 0SGY03 EG301 6 0SGY03 EG302 0 0SGY11 EG301 0 0SGY11 EG302 0 0SGY11 EG303 0 0SGY11 EG304 0 0SGY11 EG305 0 0SGY12 EG301 0 0SGY12 EG302 0 0SGY12 EG303 0 0SGY12 EG304 0 0SGY12 EG305 0 0SGY12 EG306 0 0SGY12 EG307 0 0SGY12 EG308 0 0SGY12 EG309 0 0SGY12 EG310 0 0SGY13 EG304 0 0SGY13 EG305 0 0SGY13 EG306 0 0SGY21 EG301 0 0SGY21 EG302 0 0SGY21 EG303 0 0SGY21 EG304 0 0SGY22 EG301 0 0SGY22 EG302 0 0SGY22 EG303 0 0SGY22 EG304 0 0SGY22 EG305 0 0SGY22 EG306 0 0SGY22 EG307 0 0SGY22 EG308 0 0SGY22 EG309	manual call point	Other	Other	NC	loss of control interface	electronic module, cabling	Other	electronic failure	replace	replace when required	17	RTF	6M	R								

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			0 0SGY22 EG310 0 0SGY22 EG311 0 0SGY22 EG312 0 0SGY22 EG313 0 0SGY22 EG314 0 0SGY22 EG315 0 0SGY22 EG316 0 0SGY22 EG317 0 0SGY31 EG301 0 0SGY31 EG302 0 0SGY31 EG303 0 0SGY31 EG304 0 0SGY31 EG305 0 0SGY32 EG301 0 0SGY32 EG302 0 0SGY32 EG303 0 0SGY32 EG304 0 0SGY32 EG305 0 0SGY33 EG301 0 0SGY33 EG302 0 0SGY33 EG303 0 0SGY33 EG304 0 0SGY33 EG305 0 0SGY33 EG306 0 0SGY34 EG301 0 0SGY34 EG302 0 0SGY34 EG303 0 0SGY34 EG304 0 0SGY34 EG305 0 0SGY34 EG306 0 0SGY34 EG307 0 0SGY34 EG308 0 0SGY35 EG301 0 0SGY35 EG302 0 0SGY35 EG303 0 0SGY35 EG304 0 0SGY35 EG305 0 0SGY35 EG306 0 0SGY35 EG307 0 0SGY35 EG308 6 0SGY36 EG301 6 0SGY36 EG302 6 0SGY36 EG303 6 0SGY36 EG304 6 0SGY36 EG305 6 0SGY36 EG306 6 0SGY36 EG307 6 0SGY36 EG308																				

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			6 0SGY36 EG309 6 0SGY36 EG310 6 0SGY36 EG311 6 0SGY36 EG312																						
8	FDS	Monitor Module	6 0SGY01 GH301 6 0SGY01 GH302 6 0SGY01 GH303 6 0SGY01 GH304 6 0SGY01 GH312 6 0SGY01 GH313 6 0SGY01 GH325 6 0SGY01 GH326 6 0SGY01 GH327 6 0SGY01 GH328 6 0SGY01 GH332 6 0SGY01 GH333 6 0SGY01 GH336 6 0SGY01 GH337 6 0SGY01 GH338 6 0SGY01 GH339 6 0SGY01 GH345 6 0SGY01 GH346 6 0SGY01 GH350 6 0SGY01 GH351 6 0SGY01 GH352 6 0SGY01 GH353 6 0SGY02 GH301 6 0SGY02 GH310 6 0SGY02 GH311 6 0SGY02 GH312 6 0SGY02 GH313 6 0SGY02 GH327 6 0SGY02 GH328 6 0SGY02 GH329 6 0SGY02 GH330 6 0SGY02 GH334 6 0SGY03 GH302 6 0SGY03 GH303 6 0SGY03 GH304 6 0SGY03 GH306	monitor module	Other	Other	RTF	loss of control interface	electronic module, cabling	Other	electronic failure	replace	replace when required	18	RTF	6M	R								

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			6 0SGY03 GH307 6 0SGY03 GH308 6 0SGY03 GH309 6 0SGY03 GH310 6 0SGY03 GH311 6 0SGY03 GH313 6 0SGY03 GH314 6 0SGY03 GH315 6 0SGY03 GH316 6 0SGY03 GH318 6 0SGY03 GH319 6 0SGY03 GH320 6 0SGY03 GH321 6 0SGY03 GH323 6 0SGY03 GH324 6 0SGY03 GH325 6 0SGY03 GH326 6 0SGY03 GH328 6 0SGY03 GH329 6 0SGY03 GH330 6 0SGY03 GH331 6 0SGY03 GH333 6 0SGY03 GH334 6 0SGY03 GH335 6 0SGY03 GH336 6 0SGY03 GH337 6 0SGY03 GH338 6 0SGY03 GH339 6 0SGY03 GH341 6 0SGY03 GH342 6 0SGY03 GH343 6 0SGY03 GH344 6 0SGY03 GH346 6 0SGY03 GH347 6 0SGY03 GH348 6 0SGY03 GH350 6 0SGY03 GH351 6 0SGY03 GH352 6 0SGY03 GH353 6 0SGY03 GH354 6 0SGY03 GH362 6 0SGY03 GH363 6 0SGY03 GH364 6 0SGY03 GH365 6 0SGY03 GH366 6 0SGY03 GH367 6 0SGY03 GH368 6 0SGY03 GH369																					

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			6 0SGY03 GH370 6 0SGY03 GH371 6 0SGY03 GH372 6 0SGY03 GH373 6 0SGY03 GH375 6 0SGY03 GH376 6 0SGY03 GH377 6 0SGY03 GH379 6 0SGY03 GH380 6 0SGY03 GH381 6 0SGY03 GH382 6 0SGY03 GH383 6 0SGY03 GH385 6 0SGY03 GH386 6 0SGY03 GH388 6 0SGY03 GH389 6 0SGY03 GH391 6 0SGY03 GH392 6 0SGY03 GH395 0 0SGY11 GH304 0 0SGY13 GH301 0 0SGY13 GH302 0 0SGY13 GH303 0 0SGY13 GH304 0 0SGY13 GH306 0 0SGY13 GH309 0 0SGY13 GH310 0 0SGY13 GH311 0 0SGY13 GH312 0 0SGY13 GH313 0 0SGY13 GH315 0 0SGY13 GH317 0 0SGY13 GH319 0 0SGY13 GH321 0 0SGY21 GH302 0 0SGY21 GH321 0 0SGY22 GH311 0 0SGY22 GH312 0 0SGY22 GH322 0 0SGY22 GH323 0 0SGY32 GH301 0 0SGY33 GH307 0 0SGY33 GH308 0 0SGY33 GH315 0 0SGY33 GH316 0 0SGY33 GH317 0 0SGY33 GH318 0 0SGY34 GH307																				

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			0 0SGY35 GH304 0 0SGY35 GH305 6 0SGY36 GH304 6 0SGY36 GH305 6 0SGY36 GH309 6 0SGY36 GH310 6 0SGY36 GH329 6 0SGY36 GH330 6 0SGY36 GH334 6 0SGY36 GH335 6 0SGY36 GH336 6 0SGY36 GH337 6 0SGY36 GH338 6 0SGY36 GH339 6 0SGY36 GH340 6 0SGY36 GH341 6 0SGY36 GH342 6 0SGY36 GH343 6 0SGY36 GH344 6 0SGY36 GH345 6 0SGY36 GH346 6 0SGY36 GH347 6 0SGY36 GH348 6 0SGY36 GH349 6 0SGY36 GH350 6 0SGY36 GH351 6 0SGY36 GH352 6 0SGY36 GH353 6 0SGY36 GH354 6 0SGY36 GH355 6 0SGY36 GH356 6 0SGY36 GH357 6 0SGY36 GH358 6 0SGY36 GH359 6 0SGY36 GH360 6 0SGY36 GH361 0 0SGY37 GH316 0 0SGY37 GH317																				

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9	FDS	Chime/Strobe	6 0SGY02 GH316 -H01 6 0SGY02 GH316 -H02 6 0SGY02 GH316 -H03 6 0SGY02 GH316 -H04 6 0SGY02 GH316 -H05 6 0SGY02 GH316 -H06 6 0SGY02 GH316 -H07 6 0SGY02 GH316 -H08 6 0SGY02 GH316 -H09 6 0SGY02 GH316 -H10 6 0SGY02 GH316 -H11 6 0SGY02 GH316 -H12 6 0SGY02 GH316 -H13 6 0SGY02 GH316 -H14 6 0SGY02 GH316 -H15 6 0SGY02 GH316 -H16 6 0SGY02 GH316 -H17 6 0SGY02 GH316 -H18 6 0SGY02 GH316 -H19 6 0SGY02 GH316 -H20 6 0SGY02 GH316 -H21 6 0SGY02 GH324 -H01 6 0SGY02 GH324 -H02 6 0SGY02 GH324 -H03 6 0SGY02 GH324 -H04 6 0SGY02 GH324 -H05 6 0SGY02 GH324 -H06 6 0SGY02 GH324 -H07 6 0SGY02 GH324 -H08 6 0SGY02 GH324 -H09 6 0SGY02 GH324 -H10 6 0SGY02 GH324 -H11 6 0SGY01 GH322 -H01 6 0SGY01 GH322 -H02 6 0SGY01 GH322 -H03 6 0SGY01 GH322 -H04 6 0SGY01 GH322 -H05 6 0SGY01 GH321 -H01 6 0SGY01 GH321 -H02 6 0SGY01 GH321 -H03 6 0SGY01 GH321 -H04 6 0SGY01 GH321 -H05 6 0SGY01 GH321 -H06 6 0SGY01 GH321 -H07 6 0SGY01 GH321 -H08 6 0SGY01 GH321 -H09 6 0SGY02 GH302 -H01 6 0SGY02 GH306 -H01	chime strobe	Other	Other	NC	loss of control interface	electronic module, cabling	Other	electronic failure	replace	replace when required	19	RTF	6M	R								

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			6 0SGY02 GH306 -H02 6 0SGY02 GH306 -H03 6 0SGY02 GH307 -H01 6 0SGY02 GH307 -H02 6 0SGY01 GH347 -H01 6 0SGY01 GH347 -H02 6 0SGY01 GH347 -H03 6 0SGY01 GH331 -H01 6 0SGY01 GH331 -H02 6 0SGY01 GH331 -H03 6 0SGY01 GH331 -H04 6 0SGY01 GH340 -H01 6 0SGY01 GH340 -H02 6 0SGY01 GH340 -H03 6 0SGY01 GH334 -H01 6 0SGY01 GH334 -H02 6 0SGY01 GH334 -H03 6 0SGY02 GH320 -H01 6 0SGY02 GH317 -H01 6 0SGY01 GH309 -H01 6 0SGY01 GH309 -H02 6 0SGY01 GH314 -H01 6 0SGY01 GH314 -H02 6 0SGY01 GH319 -H01 6 0SGY01 GH348 -H01 6 0SGY01 GH348 -H02 6 0SGY01 GH348 -H03 6 0SGY01 GH348 -H04 6 0SGY01 GH348 -H05 6 0SGY01 GH348 -H06 6 0SGY01 GH348 -H07 0 0SGY11 GH326 -H01 0 0SGY11 GH326 -H02 0 0SGY11 GH326 -H03 0 0SGY11 GH326 -H04 0 0SGY11 GH326 -H05 0 0SGY11 GH326 -H06 0 0SGY11 GH326 -H07 0 0SGY11 GH326 -H08 0 0SGY11 GH326 -H09 0 0SGY11 GH326 -H10 0 0SGY11 GH326 -H11 0 0SGY11 GH326 -H12 0 0SGY11 GH327 -H01 0 0SGY11 GH327 -H02 0 0SGY11 GH327 -H03 0 0SGY11 GH327 -H04 0 0SGY11 GH327 -H05																				

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			0 0SGY11 GH327 -H06 0 0SGY11 GH327 -H07 0 0SGY11 GH303 -H01 0 0SGY11 GH317 -H01 0 0SGY11 GH322 -H01 0 0SGY11 GH322 -H02 0 0SGY11 GH322 -H03 0 0SGY11 GH322 -H04 0 0SGY11 GH322 -H05 0 0SGY11 GH322 -H06 0 0SGY11 GH322 -H07 0 0SGY11 GH311 -H01 0 0SGY11 GH311 -H02 0 0SGY11 GH319 -H01 0 0SGY11 GH319 -H02 0 0SGY11 GH307 -H01 0 0SGY11 GH307 -H02 0 0SGY11 GH313 -H01 0 0SGY11 GH325 -H01 0 0SGY11 GH325 -H02 0 0SGY12 GH303 -H01 0 0SGY12 GH303 -H02 0 0SGY12 GH303 -H03 0 0SGY12 GH303 -H04 0 0SGY12 GH303 -H05 0 0SGY12 GH303 -H06 0 0SGY12 GH303 -H07 0 0SGY12 GH302 -H01 0 0SGY12 GH302 -H02 0 0SGY12 GH302 -H03 0 0SGY12 GH302 -H04 0 0SGY12 GH302 -H05 0 0SGY12 GH302 -H06 0 0SGY12 GH304 -H01 0 0SGY12 GH304 -H02 0 0SGY12 GH304 -H03 0 0SGY12 GH304 -H04 0 0SGY12 GH304 -H05 0 0SGY12 GH304 -H06 0 0SGY12 GH304 -H07 0 0SGY12 GH304 -H08 0 0SGY12 GH301 -H01 0 0SGY12 GH301 -H02 0 0SGY12 GH301 -H03 0 0SGY12 GH301 -H04 0 0SGY12 GH301 -H05 0 0SGY12 GH301 -H06 0 0SGY12 GH301 -H07																					

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			0 0SGY12 GH301 -H08 0 0SGY13 GH316 -H01 0 0SGY13 GH316 -H02 0 0SGY13 GH316 -H03 0 0SGY13 GH316 -H04 0 0SGY13 GH316 -H05 0 0SGY13 GH320 -H01 0 0SGY13 GH320 -H02 0 0SGY13 GH320 -H03 0 0SGY13 GH320 -H04 0 0SGY13 GH320 -H05 0 0SGY21 GH310 -H01 0 0SGY21 GH310 -H02 0 0SGY21 GH310 -H03 0 0SGY21 GH310 -H04 0 0SGY21 GH310 -H05 0 0SGY21 GH310 -H06 0 0SGY21 GH310 -H07 0 0SGY21 GH310 -H08 0 0SGY21 GH310 -H09 0 0SGY21 GH310 -H10 0 0SGY21 GH310 -H11 0 0SGY21 GH310 -H12 0 0SGY21 GH310 -H13 0 0SGY21 GH318 -H01 0 0SGY21 GH318 -H02 0 0SGY21 GH318 -H03 0 0SGY21 GH318 -H04 0 0SGY21 GH318 -H05 0 0SGY21 GH318 -H06 0 0SGY21 GH318 -H07 0 0SGY21 GH318 -H08 0 0SGY21 GH318 -H09 0 0SGY21 GH318 -H10 0 0SGY21 GH318 -H11 0 0SGY21 GH318 -H12 0 0SGY21 GH318 -H13 0 0SGY21 GH318 -H14 0 0SGY21 GH318 -H15 0 0SGY21 GH318 -H16 0 0SGY21 GH318 -H17 0 0SGY21 GH306 -H01 0 0SGY21 GH314 -H01 0 0SGY21 GH314 -H02 0 0SGY21 GH314 -H03 0 0SGY21 GH314 -H04 0 0SGY21 GH307 -H01 0 0SGY21 GH315 -H01																					

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			0 0SGY21 GH315 -H02 0 0SGY21 GH311 -H01 0 0SGY21 GH311 -H02 0 0SGY21 GH311 -H03 0 0SGY21 GH311 -H04 0 0SGY21 GH311 -H05 0 0SGY22 GH324 -H01 0 0SGY22 GH324 -H02 0 0SGY22 GH324 -H03 0 0SGY22 GH324 -H04 0 0SGY22 GH324 -H05 0 0SGY22 GH324 -H06 0 0SGY22 GH324 -H07 0 0SGY22 GH324 -H08 0 0SGY22 GH325 -H01 0 0SGY22 GH325 -H02 0 0SGY22 GH325 -H03 0 0SGY22 GH325 -H04 0 0SGY22 GH325 -H05 0 0SGY22 GH325 -H06 0 0SGY22 GH325 -H07 0 0SGY22 GH325 -H08 0 0SGY22 GH325 -H09 0 0SGY22 GH325 -H10 0 0SGY22 GH326 -H01 0 0SGY22 GH326 -H02 0 0SGY22 GH326 -H03 0 0SGY22 GH326 -H04 0 0SGY22 GH326 -H05 0 0SGY22 GH326 -H06 0 0SGY22 GH326 -H07 0 0SGY22 GH326 -H08 0 0SGY22 GH326 -H09 0 0SGY22 GH326 -H10 0 0SGY22 GH302 -H01 0 0SGY22 GH305 -H01 0 0SGY22 GH305 -H02 0 0SGY22 GH310 -H01 0 0SGY22 GH310 -H02 0 0SGY22 GH313 -H01 0 0SGY22 GH313 -H02 0 0SGY22 GH313 -H03 0 0SGY22 GH313 -H04 0 0SGY22 GH313 -H05 0 0SGY22 GH313 -H06 0 0SGY22 GH319 -H01 0 0SGY22 GH319 -H02 0 0SGY22 GH316 -H01																					

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			0 0SGY22 GH316 -H02 0 0SGY22 GH316 -H03 0 0SGY22 GH316 -H04 0 0SGY22 GH316 -H05 0 0SGY22 GH316 -H06 0 0SGY22 GH316 -H07 0 0SGY22 GH316 -H08 0 0SGY22 GH316 -H09 0 0SGY22 GH316 -H10 0 0SGY31 GH304 -H01 0 0SGY31 GH307 -H01 0 0SGY31 GH307 -H02 0 0SGY31 GH307 -H03 0 0SGY31 GH313 -H01 0 0SGY31 GH313 -H02 0 0SGY31 GH313 -H03 0 0SGY31 GH313 -H04 0 0SGY31 GH313 -H05 0 0SGY31 GH313 -H06 0 0SGY31 GH301 -H01 0 0SGY32 GH302 -H01 0 0SGY32 GH302 -H06 0 0SGY32 GH302 -H10 0 0SGY32 GH302 -H11 0 0SGY32 GH302 -H12 0 0SGY32 GH302 -H13 0 0SGY32 GH307 -H02 0 0SGY32 GH307 -H04 0 0SGY32 GH307 -H06 0 0SGY32 GH307 -H09 0 0SGY32 GH307 -H11 0 0SGY32 GH307 -H15 0 0SGY32 GH307 -H16 0 0SGY32 GH307 -H21 0 0SGY33 GH306 -H01 0 0SGY33 GH309 -H01 0 0SGY33 GH303 -H01 0 0SGY33 GH303 -H02 0 0SGY33 GH303 -H03 0 0SGY33 GH303 -H04 0 0SGY33 GH312 -H01 0 0SGY33 GH312 -H02 0 0SGY33 GH312 -H03 0 0SGY34 GH301 -H01 0 0SGY34 GH306 -H01 0 0SGY34 GH310 -H01 0 0SGY34 GH310 -H02 0 0SGY34 GH310 -H03																				

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			0 0SGY34 GH310 -H04 0 0SGY34 GH311 -H01 0 0SGY34 GH311 -H02 0 0SGY34 GH311 -H03 0 0SGY34 GH311 -H04 0 0SGY34 GH311 -H05 0 0SGY34 GH311 -H06 0 0SGY35 GH301 -H01 0 0SGY35 GH308 -H01 0 0SGY35 GH309 -H01 0 0SGY35 GH309 -H02 0 0SGY35 GH314 -H01 0 0SGY35 GH314 -H02 0 0SGY35 GH314 -H03 0 0SGY35 GH314 -H04 0 0SGY35 GH314 -H05 6 0SGY36 GH301 -H01 6 0SGY36 GH306 -H01 6 0SGY36 GH316 -H01 6 0SGY36 GH313 -H01 6 0SGY36 GH319 -H01 6 0SGY36 GH319 -H02 6 0SGY36 GH319 -H03 6 0SGY36 GH319 -H05 6 0SGY36 GH319 -H06 6 0SGY36 GH322 -H01 6 0SGY36 GH325 -H01 6 0SGY36 GH325 -H02 6 0SGY36 GH325 -H03 6 0SGY36 GH326 -H01 6 0SGY36 GH333 -H01 6 0SGY36 GH333 -H02 0 0SGY37 GH315 -H03 0 0SGY37 GH303 -H01 0 0SGY37 GH303 -H02 0 0SGY37 GH303 -H03 0 0SGY37 GH303 -H04																			

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10	FDS	Heat Detector	6 0SGY01 CT301 6 0SGY01 CT302 6 0SGY01 CT303 6 0SGY01 CT304 6 0SGY01 CT305 6 0SGY01 CT306 6 0SGY01 CT307 6 0SGY01 CT308 6 0SGY01 CT309 6 0SGY01 CT310 6 0SGY01 CT311 6 0SGY01 CT312 6 0SGY01 CT313 6 0SGY01 CT314 6 0SGY01 CT315 6 0SGY01 CT316 6 0SGY01 CT317 6 0SGY01 CT318 6 0SGY01 CT319 6 0SGY01 CT320 6 0SGY01 CT321 6 0SGY01 CT322 6 0SGY01 CT323 6 0SGY01 CT324 6 0SGY01 CT325 6 0SGY01 CT326 6 0SGY01 CT327 6 0SGY01 CT328 6 0SGY01 CT329 6 0SGY01 CT330 6 0SGY01 CT331 6 0SGY01 CT332 6 0SGY01 CT333 6 0SGY01 CT334 6 0SGY01 CT335 6 0SGY01 CT336 6 0SGY01 CT337 6 0SGY01 CT338 6 0SGY01 CT339 6 0SGY01 CT340 6 0SGY01 CT341 6 0SGY01 CT342 6 0SGY01 CT343 6 0SGY01 CT344 6 0SGY01 CT345 6 0SGY01 CT346 6 0SGY01 CT347 6 0SGY01 CT348	heat detector module		Other	NC	loss of control interface	electronic module, cabling, sensor	Other	electronic failure	replace	replace when required	20	RTF	6M	R								

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			6 0SGY01 CT349 6 0SGY01 CT350 6 0SGY01 CT351 6 0SGY01 CT352 6 0SGY02 CT301 6 0SGY02 CT302 6 0SGY02 CT303 6 0SGY02 CT304 6 0SGY02 CT305 6 0SGY02 CT306 6 0SGY02 CT307 6 0SGY02 CT308 6 0SGY02 CT309 6 0SGY02 CT310 6 0SGY02 CT311 6 0SGY02 CT312 6 0SGY02 CT313 6 0SGY02 CT314 6 0SGY02 CT315 6 0SGY03 CT301 6 0SGY03 CT302 6 0SGY03 CT303 6 0SGY03 CT304 0 0SGY11 CT301 0 0SGY11 CT302 0 0SGY12 CT301 0 0SGY12 CT302 0 0SGY12 CT303 0 0SGY12 CT304 0 0SGY12 CT305 0 0SGY12 CT306 0 0SGY12 CT307 0 0SGY12 CT308 0 0SGY12 CT309 0 0SGY12 CT310 0 0SGY12 CT311 0 0SGY12 CT312 0 0SGY12 CT313 0 0SGY12 CT314 0 0SGY12 CT315 0 0SGY12 CT316 0 0SGY12 CT317 0 0SGY12 CT318 0 0SGY12 CT319 0 0SGY12 CT320 0 0SGY12 CT321 0 0SGY12 CT322 0 0SGY12 CT323																				

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			0 0SGY12 CT324 0 0SGY12 CT325 0 0SGY12 CT326 0 0SGY12 CT327 0 0SGY12 CT328 0 0SGY12 CT329 0 0SGY12 CT330 0 0SGY12 CT331 0 0SGY12 CT332 0 0SGY12 CT333 0 0SGY12 CT334 0 0SGY13 CT301 0 0SGY13 CT302 0 0SGY13 CT303 0 0SGY13 CT304 0 0SGY21 CT301 0 0SGY21 CT302 0 0SGY21 CT304 0 0SGY21 CT305 0 0SGY21 CQ315																					
11	FDS	Interface Module	6 0SGY01 GH308 6 0SGY02 GH322 0 0SGY11 GH301 0 0SGY22 GH304	interface module	Other	Other	RTF	loss of control interface	electronic module, cabling	Other	electronic failure	replace	replace when required	21	RTF	6M	R								
12	FDS	Power Supply Module	0 0SGY11 GW301 0 0SGY11 GW302 0 0SGY11 GW303 0 0SGY11 GW304 0 0SGY21 GW301 0 0SGY21 GW302 0 0SGY21 GW303	power supply module	Other	Other	NC	loss of control interface	electronic module, cabling	Other	electronic failure	function test	heat test, power level test	22	PM	6M	R								
13	FDS	XNX transmitter		CO gas monitor	C_I_Sensor_and_Transmitter	Electronic	C - SFTY	loss of CO signal monitoring	electronic, sensor, cabling	Other	electronic failure	inspect		23	RTF	1M	R								

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