Standard Operating Procedure for Electrical Engineering System

FEMS SOP(E)-001	Electrical System Operations and Maintenance
FEMS SOP(E)-002	High Voltage (HV) and Low Voltage (LV) System
FEMS SOP(E)-003	Uninterruptible Power Supply (UPS)
FEMS SOP(E)-004	Standby Generator Set
FEMS SOP(E)-005	Earthing System
FEMS SOP(E)-006	Private Automated Branch Exchange (PABX)
FEMS SOP(E)-007	Protection Relay Calibration
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FEMS SOP(E)-010	Lightning Protection System & Surge Protection System

FEMS SOP (E)-001 ELECTRICAL SYSTEM OPERATIONS AND MAINTENANCE

1.0 INTENTION

1.1 To establish procedures of Electrical System Operations and Maintenance.

1.2 To deliver service of required operations and standards.

2.0 SCOPE

Electrical system includes :-

2.1 High Voltage (HV)

2.2 Low Voltage (LV)

2.3 Uninterruptible Power Supply (UPS)

2.4 Standby Generator Set

2.5 Earthing System

2.6 Private Automated Branch Exchange (PABX) System

2.7 Protection Relay

2.8 Extra Low Voltage (ELV) System

2.9 Isolated Power Supply (IPS)

2.10 Lightning Protection System & Surge Protection System

3.0 DEFINITION

3.1 The Electrical System Operations procedures is aimed at providing an efficient and effective operations and maintenance services that can render the Hospital a conducive environment where patient care services can be provided with minimum disruptions and discomfort to the patients, hospital staff, visitors and other users.

4.0 REFERENCES

4.1 Akta Bekalan Elektrik 1990

4.2 Peraturan - Peraturan Bekalan Elektrik 1994

4.3 Hospital Specific Implementation Plan (HSIP)

4.4 Hospital Engineering Planned Preventive Maintenance (HEPPM)

4.5 Technical Requirement Key Performance Indicator (TRKPI) & Master Agreed Procedures (MAP).

4.6 Health Technical Memorandum (HTM)

4.7 Malaysian Standard (MS IEC/IEC)

4.8 British Standard (BS)

4.9 American Hospitalization Association (AHA)

4.10 Institute of Electrical & Electronics Engineer (IEEE)

4.11 Others related regulation, standard, guideline or technical document

5.0 RESPONSIBILITIES

5.1 Government

5.1.1 To agree and approve for approval on the procedures of electrical systems operations and maintenance.

5.1.2 To ensure all existing operating and maintenance manual, drawing, including setting up of technical library, and computerised site plan, architectural and services drawing provided by Company.

5.1.3 To request from the Company for professional technical advice on maintenance and operations of electrical equipment, plant and installations. MOH to review and assess the professional technical advice submitted by Company.

5.1.4 To inform Company for any new project, installation or equipment.

5.1.5 To ensure the Company to carry out the comprehensive maintenance and operation according to the requirement

5.1.6 To ensure the Company comply with the manpower norm.

5.1.7 To ensure the Company appoint competent person on the related system as required by statutory bodies.

5.1.8 To ensure the Company provide tools, instruments, spare parts, materials, transportations, workshop, facilities and anything else necessary to carry out maintenance and operation of the system.

5.1.9 To hand over the technical report and test result and related document to the Company for the new project.

5.2 **Company**

5.2.1 To prepare and submit for approval on the procedures of electrical systems operation and maintenance.

5.2.2 To take over and maintain all existing operating and maintenance manual, drawing, including setting up of technical library, and computerised site plan, architectural and services drawing. In cases where existing drawing are not available or updated, Company need to procure or produce technical drawing to carry out operational service.

5.2.3 To provide professional technical advice on maintenance and operation of electrical equipment, plant and installation.

5.2.4 To carry out the comprehensive maintenance and operation of system according to schedule.

5.2.5 To comply with the manpower norm as stated in Concession Agreement.

5.2.6 To appoint competent person on the related system as required by statutory bodies.

5.2.7 To provide tools, instruments, spare parts, materials, transportations, workshop, facilities, Personnel Protective Equipment (PPE) and anything else necessary to carry out maintenance and operation of the system.

6.0 PROCEDURES

6.1 Company to prepare and submit for approval on the procedures of electrical systems operation and maintenance.

6.2 MOH to agree and approve for approval on the procedures of electrical systems operation and maintenance

6.3 Maintaining and operating all electrical system, equipment, plant and installation.

7.0 RECORDS

7.1 Hospital Specific Implementation Plan (HSIP).

7.2 Log sheet

7.3 Logbook

7.4 HEPPM Check list

7.5 Professional Technical Advice

FEMS SOP(E)-002 HIGH VOLTAGE AND LOW VOLTAGE SYSTEM

1.0 INTENTION

1.2 To establish procedures for the operation and maintenance of high voltage and low voltage system.

1.3 To deliver service of required operations and standards.

2.0 SCOPE

2.1 Switchgear

2.2 Ring Main Unit (RMU)

2.3 Transformer

2.4 Main Switchboard (MSB)

2.5 Sub-Switchboard (SSB)

2.6 Distribution Board (DB)

2.7 Feeder Pillar

2.8 Tap Off Unit

3.0 DEFINITION

3.1 HIGH VOLTAGE

3.1.1 The electrical voltage supply is 11kV and above.

3.1.2 The operation of the switchgear, ring main unit, transformer and others related devices and apparatuses.

3.2 LOW VOLTAGE

3.2.1 The electrical voltage supply is 230V - 400V.

3.2.2 The operation of the MSB, SSB, DB, Feeder Pillar, Tap Off Unit and others related devices and apparatuses.

4.0 REFERENCES

4.1 Akta Bekalan Elektrik 1990

4.2 Peraturan - Peraturan Bekalan Elektrik 1994

4.3 Hospital Specific Implementation Plan (HSIP)

4.4 Hospital Engineering Planned Preventive Maintenance (HEPPM)

4.5 Technical Requirement Key Performance Indicator (TRKPI) & Master Agreed

Procedures (MAP)

4.6 Health Technical Memorandum (HTM)

4.7 Malaysian Standard (MS IEC/IEC)

4.8 British Standard (BS)

4.9 American Hospitalization Association (AHA)

4.10 Institute of Electrical & Electronics Engineer (IEEE)

4.11 Others related regulation, standard, guideline or technical document

5.0 RESPONSIBILITIES

5.1 Government

5.1.1 To agree and approve procedures for the operation and maintenance of high voltage and low voltage system.

5.1.2 To ensure the Company to carry out the comprehensive maintenance and operation according to the requirement.

5.1.3 To handover the operational drawing and document to the Company for the new project.

5.1.4 To ensure the availability of the essential electrical power supply to the hospital in the event of breakdown from the electrical service provider.

5.1.5 To acknowledge the electrical work including for switchgear servicing done by Company once in every two years for HV and LV system for an electrical shutdown work

5.1.6 To maintain and calibrate the protection device according to the requirement.

5.1.7 To advise MOH related to new project or new installation which requires for additional load.

5.1.8 To request and acknowledge the Company for professional technical advice on maintenance and operation of electrical equipment, plant and installation – SOP Technical Advice.

5.1.9 To prepare permit to work.

5.1.10 To ensure the cleanliness of plant rooms and log book is updated daily.

5.1.11 To ensure all electrical room are safely lock at all time.

5.1.12 To analyse power quality for Low Voltage site by yearly. (Voltage, current, frequency and harmonics)

5.1.13 To ensure the power factor is not less than 0.85.

5.1.14 Visiting Engineer require to follow statutory requirement and need to submit the report to MOH.

5.1.15 To ensure all operational parameter are recorded and uploaded to ASIS

5.1.16 To inform the Company for any upgrading project or new electrical installation / equipment related to the additional equipment & electrical load.

5.2 Company

5.2.1 To prepare and submit procedures for the operation and maintenance of high voltage and low voltage system.

5.2.2 To carry out the comprehensive maintenance and operation accordingly to the requirement.

5.2.3 To ensure the availability of the essential electrical power supply to the hospital in the event of breakdown from the electrical service provider.

5.2.4 To maintain and calibrate the protection device accordingly to the requirement.

5.2.5 To keep the operational drawing and document.

5.2.6 To advise MOH related to new project or new installation which requires for additional load.

5.2.7 To carry out the switchgear servicing once every two years for HV and LV. (propose to review the HEPPM).

5.2.8 To prepare permit to work.

5.2.9 To ensure the cleanliness of plant rooms and log book is updated daily.

5.2.10 To analyse power quality for Low Voltage site by yearly. (Voltage, current, frequency and harmonics)

5.2.11 To ensure the power factor is not less than 0.85.

5.2.12 Visiting Engineer require to follow statutory requirement and need to submit the report to MOH monthly.

5.2.13 To ensure all electrical room are safely lock at all time.

5.2.14 To ensure all operational parameter are recorded and uploaded to ASIS

6.0 PROCEDURES

6.1 Company to prepare and submit for approval on the procedures of electrical systems operation and maintenance.

6.2 MOH to agree and approve for approval on the procedures of electrical systems operation and maintenance

6.3 Maintaining and operating all High Voltage & Low Voltage electrical system, equipment, plant and installation.

7.0 RECORDS

7.1 Hospital Specific Implementation Plan (HSIP).

7.2 Log sheet

7.3 HEPPM Check list

7.4 Professional Technical Advice

7.5 Log Book

7.6 Visiting Engineer's Report

FEMS SOP(E)-003 UNINTERRUPTIBLE POWER SUPPLY

1.0 INTENTION

1.1 To establish procedures for the operation and maintenance of Uninterruptible Power Supply.

1.2 To deliver service of required operations and standards.

2.0 SCOPE

2.1 Rectifier

2.2 Charger

2.3 Inverter,

2.4 Control and instrumentation

2.5 Switch gears,

2.6 Battery bank,

2.7 Electronic bypass switches and maintenance bypass switch (internal and external).

3.0 DEFINITION

3.1 UNINTERRUPTIBLE POWER SUPPLY (UPS)

3.1.1 Uninterruptible Power Supply (UPS) is required to provide no-break supply to specific equipment during the period of blackout, from the loss of normal supply to the start-up and subsequent electrical power generation of the emergency generator.

3.1.2 The electrical voltage supply input and output is 230V - 400V.

4.0 REFERENCES

4.1 Akta Bekalan Elektrik 1990

4.2 Peraturan - Peraturan Bekalan Elektrik 1994

4.3 General Requirement On Installation And Maintenance For Centralized Three Phase Uninterruptible Power Supply (Ups) In Healthcare Facilities

4.4 Hospital Specific Implementation Plan (HSIP)

4.5 Hospital Engineering Planned Preventive Maintenance (HEPPM)

4.6 Technical Requirement Key Performance Indicator (TRKPI) & Master Agreed Procedures (MAP)

4.7 Health Technical Memorandum (HTM)

4.8 Malaysian Standard (MS IEC/IEC)

4.9 British Standard (BS)

4.10 American Hospitalization Association (AHA)

4.11 Institute of Electrical & Electronics Engineer (IEEE)

4.12 Others related regulation, standard, guideline or technical document

5.0 RESPONSIBILITIES

5.1 Government

5.1.1 To agree and verify the electrical system documents.

5.1.2 To ensure the UPS is functional.

5.1.3 To ensure the Company to carry out the maintenance accordingly.

5.1.4 To handover the operational drawing and document to the Company for the new project.

5.1.5 To inform and seek advice from the Company related to the project or new installation which requires for additional load.

5.1.6 To provide accessibility to Company to carry out maintenance.

5.2 Company

5.2.1 To prepare and submit procedures for the operation and maintenance of UPS system.

5.2.2 To ensure the functionality of UPS at all time.

5.2.3 To carry out the maintenance as per require in HEPPM and performed by competent personnel.

5.2.4 To keep the operational drawing and document.

5.2.5 To advise MOH related to new project or new installation which requires for additional load.

5.2.6 To ensure the cleanliness, ventilation of plant rooms are in good condition and log book is updated daily.

5.2.7 To provide Permit-To–Work

5.2.8 To ensure all electrical room are safely lock at all time.

5.2.9 To ensure all operational parameter are recorded and uploaded to ASIS

6.0 PROCEDURES

6.1 Company to prepare and submit the UPS systems operations document.

6.2 MOH to agree and approve the electrical systems operations document.

6.3 Maintaining and operating all installed UPS system.

7.0 RECORDS

7.1 Hospital Specific Implementation Plan (HSIP).

7.2 Log sheet

7.3 HEPPM Check list

7.4 Professional Technical Advice

7.5 Log Book

FEMS SOP(E)-004 STANDBY GENERATOR SET

1.0 INTENTION

1.1 To establish procedures for the operation and maintenance of Generator Set.

1.2 To deliver service of required operations and standards.

2.0 SCOPE

2.1 Auto Main Failure (AMF) Board

2.2 Synchronization system

2.3 Battery

2.4 Standby generator set

2.5 Diesel Tank

2.6 Changeover / Auto Transfer System (ATS)

2.7 Acoustic Treatment

2.8 DOE requirement

3.0 DEFINITION

3.1 STANDBY GENERATOR SET

3.1.1 A system that provide backup supply during electrical power failure.

3.1.2 The machine output voltage is 400V.

4.0 REFERENCES

5.1 Akta Bekalan Elektrik 1990.

5.2 Peraturan - Peraturan Bekalan Elektrik 1994.

5.3 Hospital Specific Implementation Plan (HSIP)

5.4 Hospital Engineering Planned Preventive Maintenance (HEPPM)

5.5 Technical Requirement Key Performance Indicator (TRKPI) & Master Agreed Procedures (MAP)

5.6 Health Technical Memorandum (HTM)

5.7 Malaysian Standard (MS IEC/IEC)

5.8 British Standard (BS)

5.9 American Hospitalization Association (AHA)

5.10 Institute of Electrical & Electronics Engineer (IEEE)

5.11 Others related regulation, standard, guideline or technical document

5.0 RESPONSIBILITIES

5.1 Government

5.1.1 To agree and verify the electrical system documents.

5.1.2 To ensure the Company to carry out the maintenance accordingly.

5.1.3 To handover the operational drawing and document to the Company for the new project.

5.1.4 To inform and seek advice from the Company related to new project or new installation which requires for additional load.

5.1.5 To ensure the On Load Test is done once a month.

5.2 Company

5.2.1 To ensure the functionality of genset is in good condition.

5.2.2 To prepare permit to work.

5.2.3 To carry out the maintenance as per require in HEPPM.

5.2.4 To keep the operational drawing and document.

5.2.5 To advise MOH related to new project or new installation which requires for additional load.

5.2.6 To carry out the On Load Test once a month.

5.2.7 To carry out the Off Load Test once a week

5.2.8 To ensure the cleanliness, ventilation of plant rooms and fire protection are in good condition, and log book is updated daily.

5.2.9 To carry out the on load test and off load test during warranty period according to the manufacturer recommendation. (if it is not stated in the installation contract).

6.0 PROCEDURES

6.1 Company to prepare and submit the Standby generator set operations document.

6.2 MOH to agree and approve the electrical systems operations document.

6.3 Maintaining and operating all installed standby generator set system equipment

7.0 RECORDS

7.1 Hospital Specific Implementation Plan (HSIP).

7.2 Log sheet

7.3 HEPPM Check list

7.4 Professional Technical Advice

7.5 Log Book

FEMS SOP (E)-005 EARTHING SYSTEM

1.0 INTENTION

1.1 To establish procedures for the operation and maintenance of earthing systems

1.2 To deliver service of required operations and standards.

2.0 SCOPE

2.1 Lightning Earthing

2.2 Electrical Power Earthing

2.3 Communication Earthing

3.0 DEFINITION

3.1 EARTHING SYSTEM

Earthing system is an installation of a protective conductor into the surface of the earth to limit the chances of an electrical shock, facilities and equipment damages.

4.0 REFERENCES

4.1 Akta Bekalan Elektrik 1990.Peraturan - Peraturan Bekalan Elektrik 1994.

4.2 Hospital Specific Implementation Plan (HSIP)

4.3 Hospital Engineering Planned Preventive Maintenance (HEPPM)

4.4 Technical Requirement Key Performance Indicator (TRKPI) & Master Agreed Procedures (MAP)

4.5 Health Technical Memorandum (HTM)

4.6 Malaysian Standard (MS IEC/IEC)

4.7 British Standard (BS)

4.8 American Hospitalization Association (AHA)

4.9 Institute of Electrical & Electronics Engineer (IEEE)

4.10 Others related regulation, standard, guideline or technical document

5.0 RESPONSIBILITIES

5.1 Government

5.1.1 To agree and verify the earthing system documents.

5.1.2 To ensure the Company to carry out the maintenance and test accordingly.

5.1.3 to hand over the operational drawing, earthing test results and document to the Company for the new project.

5.2 Company

5.2.1 To ensure the earthing system consist of earthing chamber, main earthing terminal, conductor and etc is in good condition and functional.

5.2.2 To prepare permit to work.

5.2.3 To carry out the maintenance and test as per requirement.

5.2.4 To keep the operational drawing, earthing test result and document to the Company.

6.0 PROCEDURES

6.1 Company to prepare and submit the earthing systems operations document.

6.2 MOH to agree and approve the electrical systems operations document.

6.3 Maintaining and operating all installed earthing system.

7.0 RECORDS

7.1 Hospital Specific Implementation Plan (HSIP).

7.2 Log sheet

7.3 HEPPM Check list

7.4 Professional Technical Advice

7.5 Log Book

FEMS SOP(E)-006 PRIVATE AUTOMATED BRANCH EXCHANGE (PABX)

1.0 INTENTION

1.1 To establish procedures for the operation and maintenance of PABX System Operations

1.2 To deliver service of required operations and standards.

2.0 SCOPE

2.1 Power supply /CPU card/ extension card/ line card/others related apparatus

2.2 Trunk line

2.3 Operator console

2.4 Distribution point (DP)

2.5 Operating Software Password

3.0 DEFINITION

3.1 PRIVATE AUTOMATED BRANCH EXCHANGE (PABX)

3.1.1 PABX is single access number to offer multiple lines to outside caller while providing a range of external lines to internal caller.

4.0 REFERENCES

4.1 Akta Bekalan Elektrik 1990.Peraturan - Peraturan Bekalan Elektrik 1994.

4.2 Hospital Specific Implementation Plan (HSIP)

4.3 Hospital Engineering Planned Preventive Maintenance (HEPPM)

4.4 Technical Requirement Key Performance Indicator (TRKPI) & Master Agreed Procedures (MAP)

4.5 Health Technical Memorandum (HTM)

4.6 Malaysian Standard (MS IEC/IEC)

4.7 British Standard (BS)

4.8 American Hospitalization Association (AHA)

4.9 Institute of Electrical & Electronics Engineer (IEEE)

4.10 Others related regulation, standard, guideline or technical document

5.0 RESPONSIBILITIES

5.1 Government

5.1.1 To agree and verify the PABX system documents.

5.1.2 To ensure the availability of the phone line to the hospital.

5.1.3 To ensure the PABX is functional.

5.1.4 To ensure the Company to carry out the maintenance accordingly.

5.1.5 To handover the operational drawing and document to the Company for the new project.

5.1.6 To inform and seek advice from the Company related to new project or new installation which requires for additional extension line.

5.2 Company

5.2.1 To ensure the functionality of PABX is in good condition.

5.2.2 To carry out the maintenance as per require in HEPPM.

5.2.3 To keep the operational drawing and document.

5.2.4 To advise MOH related to new project or new installation which requires for extension line.

5.2.5 To ensure the cleanliness and ventilation of pabx room is in good condition.

5.2.6 To update and record the extension numbers.

6.0 PROCEDURES

6.1 Company to prepare and submit the PABX systems operations document.

6.2 MOH to agree and approve the electrical systems operations document.

6.3 Maintaining and operating all installed PABX system.

7.0 RECORDS

7.1 Hospital Specific Implementation Plan (HSIP).

7.2 Log sheet

7.3 HEPPM Check list

7.4 Professional Technical Advice

7.5 Log Book

FEMS SOP(E)-007 PROTECTION RELAY CALIBRATION

1.0 INTENTION

1.1 To establish procedures for the operation and maintenance of Protection Relay Calibration.

1.2 To deliver service of required operations and standards.

2.0 SCOPE

2.1 Earth leakage relay

2.2 Earth fault overcurrent relay

2.3 Over current relay

2.4 Earth fault relay

3.0 DEFINITION

3.1 CALIBRATION

3.1.1 Calibration is a setting or correcting of measurement device usually by adjusting it to match a dependently measurement device according to as per design or competent personnel advice.

4.0 REFERENCES

4.1 Akta Bekalan Elektrik 1990.Peraturan - Peraturan Bekalan Elektrik 1994.

4.2 Hospital Specific Implementation Plan (HSIP)

4.3 Hospital Engineering Planned Preventive Maintenance (HEPPM)

4.4 Technical Requirement Key Performance Indicator (TRKPI) & Master Agreed Procedures (MAP)

4.5 Health Technical Memorandum (HTM)

4.6 Malaysian Standard (MS IEC/IEC)

4.7 British Standard (BS)

4.8 American Hospitalization Association (AHA)

4.9 Institute of Electrical & Electronics Engineer (IEEE)

4.10 Others related regulation, standard, guideline or technical document

5.0 RESPONSIBILITIES

5.1 MOH

5.1.1 To acknowledge the protection relay's test result.

5.1.2 To ensure the Concession Company to carry out the calibration and maintenance every two years..

5.1.3 To hand over the protection relay's test result and related document to the concession company for the new project.

5.2 Concession Company

5.2.1 To ensure the protection relay is in good condition and functional.

5.2.2 To calibrate the protection relays every two years and carry out maintenance as per require in HEPPM.

5.2.3 To keep the protection relay's test result and related document.

5.2.4 To advise MOH related to new project or new installation if required.

6.0 PROCEDURES

6.1 Concession Company to prepare and submit the Protection Relay Calibration operations document.

6.2 MOH to acknowledge the test result of protection relay.

6.3 Maintaining and operating all installed Protection Relay Calibration.

7.0 RECORDS

7.1 Hospital Specific Implementation Plan (HSIP).

7.2 Log sheet

7.3 HEPPM Check list

7.4 Log Book

7.5 Protection Relay Test Result

FEMS SOP(E)-008 EXTRA LOW VOLTAGE (ELV)

1.0 INTENTION

1.1 To establish procedures for the operation and maintenance of Extra Low Voltage system (ELV)

1.2 To deliver service of required operations and standards.

2.0 DEFINITION

2.1 EXTRA LOW VOLTAGE (ELV)

2.1.1 ELV circuit as one in which the electrical potential of any conductors against earth is not more than either 50 Volt AC or 120 Volt DC (IEC Voltage Range)

3.0 SCOPE

3.1 Nurse Call System

3.2 MATV System

3.3 Digital Call System/QMS

3.4 PA system

3.5 Security and Surveillance System

3.6 CCTV System

3.7 Door Access System

3.8 Any other system that use 50 Volt AC or 120 Volt DC

4.0 REFERENCES

4.1 Akta Bekalan Elektrik 1990.Peraturan - Peraturan Bekalan Elektrik 1994.

4.2 Hospital Specific Implementation Plan (HSIP)

4.3 Hospital Engineering Planned Preventive Maintenance (HEPPM)

4.4 Technical Requirement Key Performance Indicator (TRKPI) & Master Agreed Procedures (MAP)

4.5 Health Technical Memorandum (HTM)

4.6 Malaysian Standard (MS IEC/IEC)

4.7 British Standard (BS)

4.8 American Hospitalization Association (AHA)

4.9 Institute of Electrical & Electronics Engineer (IEEE)

4.10 Others related regulation, standard, guideline or technical document

5.0 RESPONSIBILITIES

5.1 Government

5.1.1. To ensure the Company to carry maintenance as per requirement.

5.2 Company

5.2.1 To ensure the equipment is in good condition and functional.

5.2.2 To carry out maintenance as per require in HEPPM.

6.0 PROCEDURES

6.1 Company to prepare and submit the ELV systems operations document.

6.2 MOH to agree and approve the electrical systems operations document.

6.3 Maintaining and operating all installed ELV system.

7.0 RECORDS

7.1 Hospital Specific Implementation Plan (HSIP).

7.2 Log sheet

7.3 HEPPM Check list

7.4 Professional Technical Advice

7.5 Log Book

FEMS SOP(E)-009 ISOLATED POWER SUPPLY (IPS)

1.0 INTENTION

1.1 To establish procedures for the operation and maintenance of isolated power supply (IPS)

1.2 To deliver service of required operations and standards.

2.0 DEFINITION

2.1 ISOLATED POWER SUPPLY (IPS)

2.1.1 An ungrounded system with insulation monitoring device to ensure safety of patients from possible electrical hazards and to ensure the continuity of power supply in medical location Group 2 where discontinuity of the supply can cause danger to life.

3.0 REFERENCES

4.1 Akta Bekalan Elektrik 1990.Peraturan - Peraturan Bekalan Elektrik 1994.

4.2 Hospital Specific Implementation Plan (HSIP)

4.3 Hospital Engineering Planned Preventive Maintenance (HEPPM)

4.4 Technical Requirement Key Performance Indicator (TRKPI) & Master Agreed Procedures (MAP)

4.5 Health Technical Memorandum (HTM)

4.6 Malaysian Standard (MS IEC/IEC)

4.7 British Standard (BS)

4.8 American Hospitalization Association (AHA)

4.9 Institute of Electrical & Electronics Engineer (IEEE)

4.10 Others related regulation, standard, guideline or technical document

4.0 SCOPE

4.1 Isolated Transformer

4.2 IPS Distribution Board

4.3 Insulation Monitoring Device

4.4 Remote IPS Indication and Alarm Panel

4.5 Equipotential Bonding / Earthing Network

5.0 RESPONSIBILITIES

5.1 Government

5.1.1 To ensure the Company to carry out the maintenance for the system.

5.1.2 To handover the IPS test result and related document to the Company.

5.2 Company

5.2.1 To ensure the IPS is in good condition and functional.

5.2.2 To carry out maintenance as per require in HEPPM.

6.0 PROCEDURES

6.1 Company to prepare and submit the IPS operations document.

6.2 MOH to agree and approve the electrical systems operations document.

6.3 Maintaining and operating all installed IPS system.

7.0 RECORDS

7.1 Hospital Specific Implementation Plan (HSIP).

7.2 Log sheet

7.3 HEPPM Check list

7.4 Professional Technical Advice

7.5 Log Book

FEMS SOP (E)-010 LIGHTNING PROTECTION SYSTEM (LPS) AND SURGE PROTECTION SYSTEM

1.0 INTENTION

1.1 To establish procedures for the operation and maintenance of Lightning Protection System and Surge Protection System

1.2 To deliver service of required operations and standards.

2.0 SCOPE

2.1 Air Terminal

2.2 Down Conductor

2.3 Test Joint

2.4 Earthing Chamber

3.0 DEFINITION

3.1 LIGHTNING PROTECTION SYSTEM (LPS)

A Lightning Protection System (LPS) is designed to protect a structure or building and contents from damage caused by the intensely high voltage currents of a lightning strike.

3.2 SURGE PROTECTION SYSTEM

A surge protector (or surge suppressor) is an appliance designed to protect electrical devices from voltage spikes. A surge protector attempts to limit the voltage supplied to an electric device by either blocking or by shorting to ground any unwanted voltages above a safe threshold.

The terms surge protection device (SPD), or transient voltage surge suppressor (TVSS), are used to describe electrical devices typically installed in power distribution panels, process control systems, communications systems, and other heavy-duty industrial systems, for the purpose of protecting against electrical surges and spikes, including those caused by lightning.

4.0 REFERENCES

4.1 Akta Bekalan Elektrik 1990Peraturan - Peraturan Bekalan Elektrik 1994

4.2 Hospital Specific Implementation Plan (HSIP)

4.3 Hospital Engineering Planned Preventive Maintenance (HEPPM)

4.4 Technical Requirement Key Performance Indicator (TRKPI) & Master Agreed
Procedures (MAP)

4.5 Health Technical Memorandum (HTM06)

4.6 Malaysian Standard (MS IEC/IEC)

4.7 British Standard (BS)

4.8 American Hospitalization Association (AHA)

4.9 Institute of Electrical & Electronics Engineer (IEEE)

4.10 Others related regulation, standard, guideline or technical document

5.0 RESPONSIBILITIES

5.1 Government

5.1.1 To agree and verify the earthing system documents.

5.1.2 To ensure the Concession Company to carry out the maintenance and test accordingly.

5.1.3 to hand over the operational drawing, earthing test results and document to the Company for the new project.

5.2 Company

5.2.1 To ensure the A Lightning Protection System (LPS) and Surge Protection Device (SPD) is in good condition and functional.

5.2.1 To check availability of LPS conductors and all other accessories. If any component found missing, Company shall report to MOH.

5.2.2 To carry out the maintenance and test as per requirement.

5.2.3 To keep the operational drawing, earthing test result and document to the Company.

6.0 PROCEDURES

6.1 Company to prepare and submit the earthing systems operations document.

6.2 MOH to agree and approve the electrical systems operations document.

6.3 Maintaining and operating all installed earthing system.

7.0 RECORDS

7.1 Hospital Specific Implementation Plan (HSIP).

7.2 Log sheet

7.3 HEPPM Check list

7.4 Professional Technical Advice

7.5 Log Book