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NHS England

Health Technical Memorandum 06-03: Electrical safety guidance for high voltage systems

Preface

About Health Technical Memoranda

Health Technical Memoranda (HTMs) give comprehensive advice and guidance on the design, installation and operation of specialised building and engineering technology used in the delivery of healthcare.

The focus of Health Technical Memorandum guidance remains on healthcare-specific elements of standards, policies and up-todate established best practice. They are applicable to new and existing sites, and are for use at various stages during the whole building lifecycle.

Language usage in technical guidance

In HTMs and HBNs, modal verbs such as "must", "should" and "may" are used to convey notions of obligation, recommendation or permission. The choice of modal verb will reflect the level of obligation needed to be compliant.

The following describes the implications and use of these modal verbs in HTMs/HBNs (readers should note that these meanings may differ from those of industry standards and legal documents):

- "Must" is used when indicating compliance with the law.
- "Should" is used to indicate a recommendation (not mandatory/ obligatory), i.e. among several possibilities or methods, one is recommended as being particularly suitable – without excluding other possibilities or methods.
- "May" is used for permission, i.e. to indicate a course of action permissible within the limits of the HBN or HTM.

Typical usage examples

- "All publicly-funded organisations must ensure that all contracts established to collect and treat waste conform to the Public Contracts Regulations." [obligation]
- "All low voltage (LV) distributions should be configured as TN systems." [recommendation]
- "Alcohol hand gels that do not contain siloxanes may be rinsed out and the packaging recycled or placed into the municipal waste stream." [permission]

"Shall", in the obligatory sense of the word, is never used in current HTMs/HBNs.

Project derogations from the Technical Guidance

Healthcare facilities built for the NHS are expected to support the provision of high-quality healthcare and ensure the NHS Constitution right to a clean, safe and secure environment. It is therefore critical that they

are designed and constructed to the highest and most appropriate technical standards and guidance. This applies when organisations, providers or commissioners invest in healthcare accommodation (irrespective of status, e.g. Foundation and non-Foundation trusts).

Statutory standards plus technical standards and guidance specific to NHS facilities:

- Health Building Notes
- Health Technical Memoranda
- Complete list of NHS estates related guidance

The need to demonstrate a robust process for agreeing any derogation from Technical Guidance is a core component of the business case assurance process.

The starting point for all NHS healthcare projects at Project Initiation Document (PID) and/or Strategic Outline Case (SOC) stage is one of full compliance.

Derogations to standards will potentially jeopardise business case approval and will only be considered in exceptional circumstances. A schedule of derogations will be required for any project requiring external business case approval and may be requested for those that have gone through an internal approvals process.

While it is recognised that derogation is required in some cases, this must be risk-assessed and documented in order that it may be considered within the appraisal and approval process.

Derogations must be properly authorised by the project's senior responsible owner and informed and supported by appropriate technical advice (irrespective of a project's internal or external approval processes).

Sustainability and "Net Zero Carbon" targets

The UK is leading the way on tackling climate change and improving sustainability, and the NHS is leading the way in England.

In 2019, the UK became the first major economy to commit to net zero emission by 2050. In 2020, the NHS set out its intent to support this ambition through its 'Delivering a "Net Zero" National Health Service' report. The report sets a clear target for achieving a net zero health service for direct emissions by 2040 and indirect emissions by 2045.

In 2021, NHS England published supporting guidance for the NHS Estate in its 'Estates Net Zero Carbon Delivery Plan', available to NHS staff via the Estates and Facilities Hub on the FutureNHS website, and further guidance is planned over the coming years.

The NHS estate has a critical role to play in achieving net zero carbon emissions. It is vital that every opportunity is seized across the NHS to do so, and the NHS estate is an area where direct and cost-effective action can be taken with a high degree of confidence.

This guidance is not mandatory (unless specifically stated). However, any departures/ derogations from this HTM – including the measures implemented – should provide a degree of safety not less than that achieved by following the guidance set out in this HTM.

Executive summary

Status

This 2023 version of Health Technical Memorandum (HTM) 06-03 supersedes all previous versions of HTM 06-03 'Electrical safety guidance for high voltage systems'.

General

Guidance in this HTM applies to all healthcare facilities containing a high voltage electrical system.

Aim of this guidance

Guidance is intended to assist duty holders in meeting the requirements of the Electricity at Work Regulations, which detail the precautions to be taken against risk of death or personal injury from electricity in work activities.

Who should read this guidance?

This document will be of interest and practical help to those involved in the, operation and maintenance of electrical systems and equipment.

Main changes since the 2006 edition

- In Chapter 7, a new Table 3 on HV generators has been included.
- The model letters and appointments for Authorised Persons and Competent Persons have been simplified and reorganised to make the process more streamlined and less complex.
- The permit-to-work, sanction-for-test, limitation-of access and certificate of authorisation for live working safety documents have been amended. All have a "Received by" signature box in Parts 1 and 2 of the forms. In Part 4 on cancellation, the word "destroyed" has now been replaced by "cancelled". The corresponding text in the main body of the HTM has also been amended to ensure alignment.
- An addition in this revision is the option to produce electronic safety documents as an alternative to paper-based systems, providing advantages in reducing paperwork. No particular electronic system is endorsed or prescribed; however, whichever electronic system is chosen, electronic safety documents should be prepared with the same diligence as paper versions and incorporate, as a minimum, the essential elements shown in the relevant templates exemplified in Appendix 2.

- The role of Senior Operational Manager (SOM) has been introduced as the “informed client” in this revised edition to bring the guidance in line with the recommended professional structure in HTM 00 – ‘Policies and principles of healthcare engineering’.
- Chapter 5 has been revised to provide more guidance on situations where healthcare organisations appoint a distribution network operator or third-party contractor to control, operate and maintain the healthcare organisation’s HV equipment under a control, operation and maintenance agreement (COMA). It gives guidance on roles, safety compliance and record-keeping.
- A new “certificate of boundary demarcation” form has been added to the safety documents.
- A new “transfer of control certificate” form has been added to the safety documents.
- In this revision, the provision of the Authorised Person’s (HV) logbook has been discontinued. Instead Authorised Persons are advised to create their own individual logbooks. Entries within the logbook should show:
  - training courses attended including refresher training
  - a record of the familiarisation training prior to the Authorising Engineers’s interview with the Authorised Person
  - a record of the Authorising Engineer’s initial and subsequent interviews
  - date when Authorised Person’s (HV) duties were accepted
  - record of personal switching including times and dates
  - a record of the Authorising Engineer’s (HV) review signed by the Authorising Engineer (HV).
- To facilitate easier navigation between HTM 06-02 and HTM 06-03, the structure of the chapters has been closely aligned, allowing readers to easily locate corresponding chapters/ sections in both documents.
- All references have been updated.

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Mark Richards, Technical author, Health Engineering Services FM Limited

Nigel Bolan, Senior Performance Standards Engineer, NHS Wales Shared Services Partnership-Specialist Estates Services

Paul Wheldon, Authorising Engineer, EMCOR Group (UK) plc

Peter Handforth, Peter Handforth Associates Ltd

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Contents

1 Scope

General

This 2023 version of Health Technical Memorandum (HTM) 06-03 supersedes all previous versions of HTM 06-03 'Electrical safety guidance for high voltage systems'.

1.1 Guidance in this HTM applies to all healthcare facilities containing high electrical voltage systems.

1.2 This HTM is intended to assist Duty Holders (see Chapter 2 for definitions) to meet the requirements of the Electricity at Work Regulations ("the Regulations"), which are made under the Health and Safety at Work etc. Act 1974. It is not an authoritative interpretation of the regulations or other laws. Only the courts can make such interpretation.

1.3 Inadequate control and/or improper use of electricity is a danger to life and property. Owners, occupiers, general managers/chief executives and those responsible for electrical services as "Duty Holders" are accountable for ensuring control; they are also responsible for the safe management, design, installation, operation and maintenance of the electrical systems.

1.4 As an employer, the Management of a healthcare facility has a legal responsibility to ensure that relevant regulations are complied with. Statutory instruments referred to within this document should be deemed to be the current versions including any revisions or amendments which have occurred since the date of the original statute.

1.5 The reliance on electrical supplies has increased to a point where they are essential for the operation of any organisation. In hospitals, there has been a substantial increase in reliance on electrical supplies, and particularly in the use of modern technologies – diagnostic equipment, intensive care, computer systems and bedhead services to name a few. The loss of supplies to these services is unacceptable, and most hospitals would be unable to function without resilient electrical supplies. HTM 06-01 – 'Electrical services supply and distribution' addresses the security of supply and emergency-generation issues; however, this would be of little use if the distribution circuits were compromised. This document provides procedural guidance on the safe isolation, operation and maintenance of electrical equipment.

1.6 This document should be used by all person (s) with roles and duties as described within Chapter 4 to ensure that the electrical systems and equipment are safe and fit for purpose. They have a responsibility to ensure the safety of personnel who are using or who are near such equipment.

1.7 Changes to the existing equipment and systems are inevitable. Any changes made to the installation/system(s) should be carried out in line with HTM 06-01, and the relevant standards and regulations and should meet the requirements of this guidance. Where major alterations or additions are proposed, including the procurement of major plant (which could adversely affect the existing installation) the Authorised Person(s),

Authorising Engineer and Electrical Safety Group (ESG) should be consulted. This is to ensure the electrical systems and equipment remain fit for use and any changes do not affect the safety of the electrical system or inhibit the operation and maintenance of the system. (See Chapter 4 for appointment, roles and duties of personnel.)

Purpose

1.8 The provision of effective procedures and their formalising into written instructions is essential for ensuring a safe system of working where this involves work on conductors or equipment of high voltage (HV) systems. This document makes recommendations for the allocation of duties to personnel and the manner in which these duties should be performed.

Procedures

1.9 High voltage electrical systems associated with healthcare premises vary considerably in size and complexity. The procedures advocated in this document therefore cannot cover every circumstance and consequently, in specific instances, may need to be supplemented by local written procedures or rules. These local arrangements should only be considered when, in the opinion of the Authorising Engineer (HV), the guidance given in this document is inadequate for the particular circumstances. Any such supplementary procedures which are produced should therefore maintain the same standards of electrical safety as prescribed in this HTM.

1.10 Because of the specialist nature of the risks, it is important that carefully prepared procedures exist for dealing with the routine servicing of high voltage installations and with any emergencies that arise.

1.11 The consequences – in terms of patient safety and well-being – of undertaking electrical maintenance or switching operations should be fully considered following appropriate consultation between estates staff and necessary medical and administrative staff. Permission to interrupt supplies should be sought from the end-users or designated staff.

Note:

Where there is a disagreement or permission is refused, the Management should be consulted and any further activity and requirements should be agreed with the ESG.

Standards

1.12 This HTM is concerned with the safe operation and maintenance of high voltage equipment, but it is equally important that the high voltage equipment installed:

a. complies with the appropriate British Standards and, where applicable, international and/or European Standards

b. has been satisfactorily tested and commissioned

c. is maintained in accordance with manufacturers' recommendations.

1.13 It is important that operating and maintenance manuals (including, but not limited to, "as-fitted" drawings, switchgear and transformer (S&T) schedules and discrimination studies) for the high voltage system and equipment should be available to those involved in its operation and servicing. In order to maintain their value, these documents should be regularly updated to include details of all modifications and extensions to the buildings, plant and equipment as and when they occur.

1.14. The economies of providing high voltage equipment of the same type and manufacture should be considered as far as practicable against the potential loss in resilience of the system as set out in HTM 06-01. Where manufacturers produce special attachments to

facilitate servicing and testing, these should be bought with the electrical equipment and placed with other safety equipment.

Duties

1.15 Under health and safety legislation, there is a legal obligation on all persons who may be concerned with the operation of, or who work on, the electrical equipment and systems, to conduct their work so as to prevent danger or injury to themselves and/or others. Those persons should be thoroughly conversant with all the regulations and duties governing the work that they may have to undertake; they must comply fully with the safe systems of work for the electrical system on which they are to work.

Security of information

1.16 The Electricity at Work Regulations highlight a need for the efficient recording of information which, in the event of any proceedings legal or otherwise arising from any contravention of the regulations, may be used to form the basis of the Duty Holder's main defence. Consequently, the Management should consider its policy for the retention of information and contemplate how it will maintain, if at all, back-up copies of documents.

Application of this HTM

Note:

Regulation 16 of the Electricity at Work Regulations requires persons to be competent to prevent danger and injury. The Health and Safety Executive (HSE) publication 'HSR25: Memorandum of guidance on the Electricity at Work Regulations 1989' provides guidance on this.

1.17 The safety guidance as detailed in this document should be applied to any high voltage (HV) electrical installation under the control of the healthcare organisation or its agent, including but not being exclusive to:

a. the high voltage switchgear and cables from the first point of isolation on the high voltage system

b. HV electrical equipment under the ownership or control of the Management.

1.18 Where isolation of low voltage switchgear is associated with high voltage work, any switching and isolation on LV equipment should be included within the safety documents as described within this guidance document.

1.19 The guidance within this HTM should be considered as representing best practice for all persons (whether or not directly employed by the Management) working on, working near, testing or operating electrical equipment and systems for which the Management is in control of the electrical danger.

1.20 This HTM is written to provide a safe framework within which work or testing can be carried out safely on permanently connected electrical equipment (equipment which has been isolated via a switch or disconnector is considered to be permanently connected).

1.21 In the event of an apparent conflict between this HTM and a statutory requirement, the latter should be followed, and the Authorising Engineer (HV) should advise the Designated Person.

1.22 If it is necessary to depart from any requirement of this HTM, the Authorising Engineer (HV) should agree such departure in writing with the Designated Person. The Senior Operational Manager (SOM), Authorised Persons (HV) and ESG should also be notified. All variations should be recorded in the operational procedures manual (OPM) (see note on departures and derogations in the Preface).

1.23 Where control of the electrical danger is divided between the Management and others, Chapter 5 of this HTM should be followed.

1.24 Further advice on the application of this HTM should be obtained from the Authorising Engineer (HV).

Other safety guidance, related documents and procedures

1.25 Where the Management employees are required to work near HV electrical systems and associated HV electrical equipment not owned or controlled by the Management, this document and related procedures should be used as a guide to safe working practice, but the owner's safe system of work should be followed when instructed.

Information, instruction and training

1.26 Arrangements should be made by the Management to ensure:

a. all employees are adequately trained, informed and instructed as required for the systems and electrical equipment which are affected by a particular operation or work (whether or not they are owned or operated by the Management) and for which legal requirements, safety guidance, related documents and procedures should apply, and they understand the information and instructions provided

b. so far as is reasonably practicable, that other persons who are not employees, but who may be exposed to danger by the operations or work, also receive adequate information and instruction and they understand the information and instructions provided.

Access to this HTM

1.27 This HTM and, as appropriate, related documents and procedures should be stored in the OPM. All Management personnel actively involved with the HV systems should sign a register to state they are aware of where the guidance, related documents and procedures (plus any amendments) are held so they can be referenced as necessary when work is being carried out under this guidance.

Objections

1.28 When any person receives instructions regarding the operation of, or work on, the high voltage electrical system and associated electrical equipment at the managed premises, they should report any objections (on safety grounds) to the carrying out of such instructions to the person(s) issuing them, who should then have the matter investigated and, if necessary, referred to a more senior level for a decision before proceeding.

Associated regulations and documents

1.29 This HTM is based on the associated regulations and documents listed in the References.

2 Definitions

2.1 The following definitions apply to this HTM (HV).

Personnel

Designated Person

2.2 The Designated Person is an individual appointed by a healthcare organisation (a board member or a person with responsibilities to the board) who has overall authority and responsibility for the high voltage electrical systems within the premises and who has a duty under the Health and Safety at Work etc. Act to prepare and issue a general policy statement on health and safety at work, including the organisation and arrangements for carrying out that policy. This person should not be the Authorising Engineer (HV). See also chapter 3 in HTM 00.

Duty Holder

2.3 The Duty Holder is a person on whom the Electricity at Work Regulations impose a duty in connection with electrical safety.

Management

2.4 The Management is defined as the owner, occupier, employer, general manager, chief executive or other person in a healthcare organisation, or their appointed responsible contractor, who is accountable for the premises and who is responsible for issuing and implementing the Management Policy (see Chapter 3).

Senior Operational Manager (SOM)

2.5 The SOM should have operational and professional responsibility for the electrical services. It is important that the SOM has access to robust, service-specific independent professional support which can promote and maintain the role of the “informed client” within the healthcare organisation. This will embrace both the maintenance and development of service-specific improvements, support the provision of the intelligent customer role and give assurance of service quality.

Authorising Engineer (HV)

2.6 An Authorising Engineer (HV) is a suitably qualified engineer who has been appointed in writing by the Designated Person to take responsibility for the effective compliance auditing of this HTM and to provide technical advice. The person appointed should possess the necessary degree of independence from local Management to take action within this HTM.

Authorised Person (HV)

2.7 An Authorised Person (HV) is appointed in writing by the Designated Person on recommendation by the Authorising Engineer (HV) and is responsible for the practical implementation and operation with regard to work on, or the testing of, defined electrical equipment, in accordance with this HTM. See HTM 00 for a recommended management structure.

Duty Authorised Person (HV)

2.8 The Authorised Person (HV) on site with current responsibility for the system or installation who has accepted the Authorised Person duties and recorded the acceptance of this in the HV site logbook (see paragraph 4.16).

Competent Person (HV)

2.9 A person who possesses, as appropriate to the nature of the work to be undertaken, adequate education, training and practical skills, and who is able to prevent danger or, where appropriate, injury, and has been formally appointed in writing by an Authorised Person (HV), and who accepts a safety document for defined work.

Note:

The "defined work" may be work on the electrical system under control of the Authorised Person (HV) but may also be non-electrical tasks that are to be carried out within areas under control of Authorised Persons (HV). Any restrictions on a Competent Person's (HV) appointment should be clearly recorded on the Certificate of Appointment (see Chapter 4).

Accompanying Safety Person (HV)

2.10 An Accompanying Safety Person is a person not directly involved in the work or test who has received training in emergency first-aid for electric shock and who has adequate knowledge, experience and the ability to avoid danger, keep watch, prevent interruption, apply first-aid and summon help. The person should be familiar with the system or installation being worked on or tested and should have been instructed on the action to be taken to safely rescue a person in the event of an accident.

Safety documents

Permit-to-work (HV)

2.11 A written authority signed and issued by the Duty Authorised Person (HV) to allow work to be undertaken on electrical equipment that has been made safe to work on, isolated, made dead and earthed.

Sanction-for-test

2.12 A written authority issued by the Duty Authorised Person (HV) to allow testing to be undertaken on electrical equipment where an earth is applied and can be removed for the purposes of the test.

Limitation-of-access

2.13 A written authority issued by the Duty Authorised Person (HV) for specified tasks to be undertaken in an area or location which is under the control of the Authorised Person(s) (HV) for electrical safety reasons, and for which a permit-to-work or sanction-for-test are not appropriate.

Safety signs

Caution sign

2.14 This is a temporary, non-metallic sign bearing the words "caution – persons working on equipment" and "do not switch on" which should be used at a point-of-isolation.

Danger sign

2.15 This sign is a temporary, non-metallic sign bearing the words "danger live equipment" and "do not touch" which should be placed where there is live equipment adjacent to a point of work.

Warning sign

2.16 This sign is a permanent, non-metallic sign bearing the words "danger of death", or may be a combined warning sign and notice.

The relevant voltage, if in excess of low voltage, should be displayed below the words “danger of death” in black letters and in the same letter size.

Voltage range

2.17 The following ranges of voltage (rms values for AC) are defined as follows:

Extra low voltage: not exceeding 50 V AC or 120 V ripple-free DC whether between conductors or to earth

Low voltage (LV): not exceeding 1000 V AC or 1500 V DC between conductors, or 600 V AC or 900 V DC between a conductor and earth

High voltage (HV) : a potential exceeding low voltage.

General definitions

Additional earth: earthing equipment of an approved type applied after the issue of a safety document (for example an earth applied at a point-of-work).

Audit: the structured process of collecting independent information on the efficiency, effectiveness and reliability of the safe system of work, and drawing up plans for corrective action (see Appendix 4). (“Independent” does not necessarily mean external to the organisation.)

Authorised Person’s (HV) key: a key that controls access to the key cabinet.

Authorised Person’s (HV) key box: a single locked box that is used for the control of the Authorised Person’s (HV) key.

Charged: the item has acquired a charge either because it is live or because it has become charged by other means such as by static or induction charging, or has retained or regained a charge due to capacitance effects even though it may be disconnected from the rest of the system.

Circuit breaker: a device capable of making, carrying and breaking normal load currents and also making and automatically breaking, under pre-determined conditions, abnormal currents such as short-circuit currents. It is usually required to operate infrequently although some types are suitable for frequent operation.

Circuit main earth (CME): a safety earthing connection of an approved type, secured where practicable by a Safety Lock, applied by an Authorised Person (HV) and its position recorded before the issue of a safety document.

Competent/Competence: application of skill, knowledge, experience and behaviour consistently to achieve a specific outcome.

Conductor: a conductor of electrical energy.

Confirm dead: demonstrate dead with the use of suitable test equipment designed for the purpose that no electrical potential liable to cause danger or injury is present once conductors are made accessible, after the issue of safety documentation.

Note: the test equipment should be checked for correct operation before and after use.

Danger: risk of injury or death.

Dangerous condition: a condition that is likely to lead to a dangerous occurrence.

Dangerous occurrence: an incident involving a discharge of electrical energy by overload or short circuit, or accidental damage to electrical plant which may cause significant risk of death to any person, or results in stoppage of electrical plant for a period longer than 24 hours.

Dead: a conductor that is neither “live” nor “charged” at a potential equal to or not

significantly different from that of earth at the worksite.

Defect notification: a written safety instruction, in the form of DIN (Dangerous Incident), SOP (Suspension of Operational Practice), NEDeRS (National Equipment Defect Reporting Scheme) or Defect issued via the Energy Networks Association, or similar official instruction issued by the Authorising Engineer (HV), notifying of a dangerous occurrence with the potential to alter the normal operating procedures associated with a particular type of equipment.

Distribution network operator (DNO) (also known as distribution system operator (DSO)): organisation that owns and operates the electric power distribution system (power lines and infrastructure) which delivers electricity to end-users.

Earthed: connected to the general mass of earth in such a manner as to ensure at all times an immediate discharge of electrical energy without danger or harm.

Note: this term is not to be used in the context of a functional earth.

Electrical equipment: anything used, intended to be used or installed for use in order to generate, provide, transmit, transform, rectify, convert, conduct, distribute, control, store, measure or use electrical energy.

Electrical Safety Group (ESG): a multi-disciplinary group responsible for ensuring that all electrical safety issues are monitored, recorded and acted on, in line with the relevant legislation and guidance. (See chapter 3 in HTM 06-01 for a more comprehensive description.)

Energised: implies connection to a source of electricity at a potential significantly different from that of earth at the worksite and which presents an electrical hazard.

Healthcare organisation: organisation that provides or intends to provide healthcare services.

High voltage enclosure: a location which has a specified degree of protection against approach to or contact with live parts and against contact with moving parts

HV site logbook: a book in which all matters relating to the HV electrical system should be recorded.

Informed client: an informed client recognises and adopts best practice in policies and procedures to ensure electrical safety is maintained. A client is “informed” when:

- it understands its capability and capacity and also where it is lacking in relation to discharging their duties
- it is effective in gaining and using knowledge to make informed decisions
- it is efficient at organising itself for the task, and
- it designs and retains a sufficient degree of flexibility to be able to adapt to the demands of the operational estate.

Injury: death or personal injury as a direct or indirect consequence of electric shock, electrical burn, electrical explosion or arcing, or from fire or explosion initiated by electrical energy, where any such death or injury is associated with the generation, provision, transmission, transformation, rectification, conversion, conduction, distribution, control, measurement or use of electrical energy.

Isolate: disconnect and separate electrical equipment from every source of electrical energy in such a way that the disconnection and separation is secure.

Isolation and earthing diagram: a diagram attached to a permit-to-work or sanction-for-test illustrating the safety measures taken.

Key cabinet: a cabinet for the sole purpose of retaining all keys relative to the site's HV/LV system(s) to which the Authorised Person (HV) has control.

Key register: a record of keys held in the OPM issued by the Authorised Person (HV) to persons authorised to access HV substations.

Live: implies connection to a source of electrical energy.

Live functional testing: the testing of electrical equipment/system while live which does not involve live working.

Live working: the connection/disconnection of electrical equipment or components while live and/or working near to exposed electrical connections or conductors.

Note: work on live HV conductors would not take place.

Lockable document cabinet: a lockable cabinet suitable for storing the electrical safety documents, temporary safety signs, distribution system records, etc. used in the application of this HTM. This cabinet should not be used to store anything not associated with this HTM.

Mimic diagram: a single line diagram of an electrical distribution system so made that the symbol for each item of switchgear may be adjusted to indicate the "on", "off" or "earthed" positions.

NHS Premises Assurance Model: the NHS has developed the NHS Premises Assurance Model (NHS PAM), whose remit is to provide assurance for the healthcare environment and to ensure patients, staff and visitors are protected against risks associated with hazards such as unsafe premises.

Operational procedures manual (OPM): a hard-copy folder and/or electronic filing system containing information relating to the control and operation of the high voltage system in accordance with this HTM.

Personal supervision: supervision given by a person having adequate technical knowledge and experience, who is present at all times.

Practice improvement notice: a notice issued by the Authorising Engineer requiring improvements to be made in the observed working practices. The notice will relate to specific task(s) and will give a target date and/or time by which the improvements must be in place before similar task(s) can continue to be carried out.

Protective equipment: equipment used to protect persons from danger in the working environment. Protective equipment includes items such as special tools, protective clothing, insulating screens, safety harnesses, protective visors, etc.

Prove dead: demonstrate dead with the use of approved test equipment designed for the purpose that no electrical potential liable to cause danger is present (before safety documentation is issued).

Note: the test equipment should be checked for correct operation before and after use.

Reasonably practicable: where a statement is qualified by the words "reasonably practicable", it means the following as defined in 'HSR25: Memorandum of guidance on the Electricity at Work Regulations 1989': "Generally, you should do everything 'reasonably practicable' to protect people from harm. This means balancing the level of risk against the measures needed to control the real risk in terms of money, time or trouble. However, you do not need to take action if it would be grossly disproportionate to the level of risk. In the context of the Regulations, where the risk is very often that of death, e.g. from electrocution, and where the nature of the precautions which can be taken are so often very simple and cheap, e.g. insulation,

the level of duty to prevent that danger approaches that of an absolute duty."

Risk assessment: the analysis of the risks to health and safety inherent in a system and their significance in a particular context.

Safety key-box: a box having two locks, each of which should have only one key. It should be be so arranged that both locks must be released before access can be gained to the contents of the box.

Safety lock: a padlock indelibly coloured red, with a metal hasp, having a single key that differs from all other keys provided for the system or installation, used for securing the means of isolation and prevent the removal of circuit main earths where fitted.

Safety programme: a written programme prepared by an Authorised Person (HV) setting out the sequence of operations to be followed before safety documents are issued and the operations to be followed to restore supplies. It should include the purpose of the proposed work or test, the sequence of safety operations to be performed and details of the safety documents issued including the reinstatement process for the electrical system on completion of the work and/or test.

Single line drawing: a single line drawing of the whole site system showing all major HV equipment in its normal operational state.

Spiking gun: an item of safety equipment used to demonstrate that a cable is dead.

Standard operating procedures (SoP): local written procedures for electrical equipment. Written authority, applicable for up to three years and reviewed annually, issued by an Authorised Person to undertake regular defined tasks.

Substation: any premises, or part thereof, which contain equipment for either transforming or converting energy to or from high voltage (other than transforming or converting solely for the operation of switching devices or instruments), or for switching, controlling or regulating energy at high voltage.

Substation logbook: a book held in each substation into which every entry to the room is recorded and the reason; this book is also used to record the Authorised Person's (HV) three monthly inspections.

Sulphur hexafluoride (SF6): a gas that is used in electrical power equipment. The Climate Change Act 2008 named SF6 as one of the six major greenhouse gases.

Note: where practicable, SF6 should be reclaimed during maintenance or end-of-life treatment in order to minimise its accumulation in the atmosphere.

Suspension notice: a notice issued by the Authorising Engineer or regulatory body requiring specified works in progress to be suspended immediately pending action to ensure that compliance with the existing safe system of work can be achieved or a modified system introduced. This may follow an Authorising Engineer's or regulatory body's system improvement notice being issued.

Switchgear: an assembly of main and auxiliary switching equipment for operation, regulation, protection or other control of an electrical installation.

Switchroom: a room or enclosure which contains low voltage distribution switchgear.

System (electrical system): includes all parts of a system (for example, conductors and electrical equipment connected to a single source or multiple sources of electrical energy).

Working lock: A padlock that is not a safety lock, which is used to secure equipment that is either in the "off" or "on" position, to prevent unauthorised operation whilst in an operational state.

3 Management policy

3.1 The Management and its nominated staff as “Duty Holders” are responsible for the safety of high voltage (HV) electrical systems on their premises. The Electricity at Work Regulations impose duties on “employers” to comply with these insofar as they relate to matters that are within their control. These duties are in addition to those imposed by the Health and Safety at Work etc. Act.

3.2 To satisfy these requirements, the Management should have:

- a clearly defined electrical safety policy
- a programme for the operation and servicing of their high voltage system(s) and equipment
- a means by which the policy and programme can be managed, implemented, monitored, and reviewed.

3.3 In addition to ensuring that all statutory requirements relating to electrical safety are observed, the Management should have:

- a clearly defined electrical safety policy
- a structure, appropriate to the complexity of the work, for implementing the policy – including an outline description of individual’s duties and responsibilities
- procedures for ensuring the effective administration of the policy
- a system of monitoring to ensure that the policy is being effectively pursued within the managed premises
- a programme of training to ensure the awareness of all staff on the use of electricity and general electrical safety
- appropriate training for relevant professional and technical staff
- a procedure for dealing with any emergencies that may arise
- electrical business continuity plans in place for prolonged loss of power.

3.4 The Management should formally nominate and appoint in writing a Designated Person with responsibility for the HV electrical safety policy.

3.5 Within the Management structure a Senior Operational Manager (SOM) should be appointed, who has access to robust, service-specific independent professional support which can promote and maintain the role of the “informed client” within the healthcare organisation.

3.6 The electrical safety policy should demonstrate the commitment of the Management to self-regulation and reflect the uniqueness and special needs of the managed premises for which it is written by (but not limited to):

- recognising the importance of the subject
- ensuring that responsibilities both legal and managerial are clearly defined and understood throughout the organisation

- establishing an ESG in accordance with chapter 3 in HTM 06-01. The ESG is a multidisciplinary group formed to assess all aspects of electrical safety and resilience required for the safe development and operation of healthcare premises, and it should inform the following areas:
  - the design process for new healthcare premises
  - the design process for modifications to existing premises
  - commissioning
  - operational management
  - maintenance
  - decommissioning and removal of equipment
- establishing the arrangements for preventing danger or injury to persons from electrical causes in connection with work activities and ensuring that high standards of electrical safety are reflected in the management, design, installation, operation and maintenance of systems and equipment in respect of premises owned or occupied by them
- monitoring and reviewing at regular intervals and not exceeding three years the effectiveness of the policy and progress concerning its implementation
- ensuring that clear and concise records are kept of all activities involved in the implementation of the policy.

3.7 An electrical engineer should be formally appointed as an Authorising Engineer (HV) with the responsibility for advising the Management on implementing, administering and monitoring the application of the requirements of this document. The person appointed to fill this position needs to have a commitment to the role and the responsibilities which it involves, and should be independent of the organisation. The Management who are responsible for the appointment also have a duty to monitor the effectiveness of the Authorising Engineer (HV) in fulfilling this role. This monitoring requirement is particularly important if the Authorising Engineer (HV) is either self-employed or employed by an organisation outside the management structure. Appendix 4 contains an audit procedure and forms.

3.8 The operation and servicing of high voltage equipment in accordance with clearly defined rules and procedures should be entrusted only to persons who are technically competent and appropriately trained. These should be Authorised Persons (HV), Competent Persons (HV), a DNO/DSO or third-party contractors who have been assessed to be competent (see Chapter 5).

3.9 It is strongly recommended that the Management should aim to become independent of third parties in respect of the management of the operation of their high voltage systems. This should be achieved by recruiting, training and appointing staff to manage the systems.

3.10 Where services are delivered in-house, a full audit trail of performance and effectiveness of appointed roles should be monitored by the Authorising Engineer and maintained by the SOM or the Designated Person. Alternatively, where this is not considered practicable, it will be necessary to make arrangements using an independent third-party organisation (that is, a local distribution network operator or other suitable contractor). Any appointed independent third-party organisation must demonstrate suitable competencies to undertake the appointed roles, which should be regularly audited by the Management to ensure ongoing compliance with this guidance.

3.11 The extent to which control of systems and/or equipment is delegated to an independent third-party organisation should take into account the inherent risks involved to patients and/or sensitive equipment and the complexity of the installation. Accordingly, it is

recommended that a level of control, commensurate with the risk, should be maintained by Management personnel.

Note:

Regulation 3 of the Electricity at Work Regulations places duties on all those involved with electrical work insofar as they relate to matters under their control. The employment of contractors to carry out electrical work does not allow the Management to escape responsibility.

3.12 The Management should record and maintain a system of equipment registration and control. The system should ensure that all HV electrical equipment and associated buildings for which they have a responsibility, and which is used at establishments which come within their control, is not only suitable for its purpose but is also maintained in an electrically safe and reliable condition.

3.13 A formal acceptance procedure is necessary in order to ensure that the entry of all electrical equipment into service is properly administered. The Management should also allocate responsibility for ensuring that the appropriate acceptance procedures are initiated, coordinated and carried through.

3.14 Where the contractual arrangement of a site is such that a third-party organisation has the responsibility for the management and/or operation of high voltage systems and equipment (for example, PFI), it is strongly recommended that their organisational structure and operating procedures align with the recommendations of this HTM.

3.15 The healthcare organisation should ensure that appropriate monitoring regimes are in place for the period of such a concession and that this is incorporated into the concession contract.

3.16 Where the healthcare organisation employs staff at the workplace, or in any way has control of the workplace or the maintenance of it, then the healthcare organisation will retain a “Duty Holder” responsibility although it will not necessarily be the sole Duty Holder.

Electronic versions of safety documentation

3.17 There are advantages in reducing the amount of paperwork associated with the safety document process. Therefore, rather than being paper-based, safety documents (for example, permit to work, limitation of access and any other safety documents required by this HTM) can be produced electronically. A number of healthcare organisations are now using this type of system. In the first instance, authorisation for introducing such a system should be given by the ESG and the Authorising Engineer. However, whatever system is chosen, electronic safety documents must be prepared with the same diligence as paper versions of safety documents and incorporate, as a minimum, the essential elements shown in the relevant templates exemplified in Appendix 2, with date and time stamp and the system used must comply with applicable guidance given in this HTM. Suitable back-up systems should be available in the event of software failure or power outage. Whatever system is used, access to the records should be protected and limited to those who need access only.

Management of an adverse event

3.18 The Management is responsible for determining the appropriate level and format of any investigation into reported adverse events and safety incidents, including near misses, injury or death. In determining the course of action, the Management should consider any potential conflict of interest that may exist with persons who are appointed under this HTM and ensure that investigations remain impartial and

independent at all times. Persons leading any investigations should be suitably trained to undertake this task. This may require an independent specialist third party or, on occasion, it may be appropriate to utilise the services of the Authorising Engineer (HV) where no conflict of interest has been identified.

4 Appointment, roles and duties of personnel

General

4.1 Any person who works on high voltage electrical equipment or systems (including the control, operation or testing thereof) to which this HTM (HV) applies has the responsibility to ensure that they comply with, and implement, the principles and processes outlined in this HTM together with any relevant regulations, codes of practice or procedures. Ignorance of the relevant legal requirements, codes and procedures, and the guidance given in this HTM may not be accepted as an excuse for neglect of duty.

4.2 The responsibilities placed on persons may include all or part of those detailed in this section, depending on the role of the persons.

4.3 Any written authorisation given to persons to perform their designated role in implementing this HTM should indicate the class of operation and/or work permitted and the section of the electrical system to which the authorisation applies.

4.4 Persons involved in achieving safety from the inherent dangers of the system in order to allow work or testing to commence on equipment and its subsequent restoration to service will have separate broadly identifiable areas of responsibility as follows:

a. control – including:

   (i) before work commences – receiving permissions, giving instructions on how to implement precautions, and sanctioning the issue of safety documents

   (ii) after completion of work – acknowledging cancellation of safety documents and giving instructions on how to safely restore equipment or the system to service

b. making safe or restoring equipment – including:

   (i) before work commences – taking action to make equipment or system safe for work, and issuing safety documents

   (ii) after completion of work – cancelling safety documents, and taking action to safely restore equipment or the system to service

c. work – which includes receipt of a safety document, execution of the required work to its completion, testing, cancellation and clearance of the safety document.

4.5 It is strongly recommended that the personnel assigned to the roles and duties defined in this chapter are only appointed to

undertake the duties associated with a single designated role.

4.6 Persons involved with electrical safety should form part of the electrical safety group (ESG) and carry out the functions in accordance with HTM 06-01, HTM 06-02 and HTM 06-03.

Roles and duties of the Designated Person (HV)

4.7 Each healthcare organisation should appoint a person as Designated Person. The roles in relation to this HTM are described below.

a. appoint in writing an Authorising Engineer (HV) for all systems and installations for which the Management has responsibility

b. appoint in writing the SOM for all electrical systems for which the Management is responsible

c. review the Authorising Engineer's (HV) appointment annually to ensure the Authorising Engineer's (HV) duties have been carried out in accordance with this HTM

d. ensure that sufficient potential Authorised Persons (HV) are identified and nominated to meet the number identified as required by the Authorising Engineer

e. appoint in writing Authorised Persons (HV) after receiving recommendation from the Authorising Engineer (HV) and taking into consideration the number of Authorised Person disciplines undertaken by the individual person

f. ensure that sufficient funding is provided for training of staff to manage the high voltage systems

g. agree any local variations to this guidance with the Authorising Engineer (HV), Authorised Persons (HV) and the ESG.

Role and duties of the Senior Operational Manager

4.8 The Senior Operational Manager (Electrical) will maintain the role of the "informed client" within the healthcare organisation. The role in relation to this HTM is described below.

a. Ensure this HTM and, as appropriate, related documents and procedures are available to certain Management employees and other persons as determined by the Authorising Engineer (HV). Such employees and other persons should sign a receipt for a copy of this HTM, related documents and procedures (plus any amendments), keep them in good condition and have them available for reference as necessary when work is being carried out under this HTM.

b. Agree any local variations from this HTM. The Authorising Engineer (HV) should agree such departure in writing with the Designated Person. The SOM and the ESG should also be notified.

c. Liaise with the Authorising Engineer (HV), acknowledge receipt of the audit report from the Authorising Engineer (HV), make any comments considered necessary and compile an action plan in consultation with the site Authorised Persons (HV) and the Authorising Engineer (HV). The Authorising Engineer (HV) should review the progress on the action plan at the next audit.

d. Carry out duties assigned or delegated to them by the Designated Person (as described in Chapter 3 of HTM 00).

Role and duties of the Authorising Engineer (HV)

4.9 The Authorising Engineer (HV) is the independent advisor to the healthcare organisation with responsibility for monitoring and auditing the application of this HTM. The Authorising Engineer's (HV) roles include the following:

a. assess and recommend in writing sufficient Authorised Persons (HV) to provide the necessary cover for all systems and installations for which the Management has responsibility

b. define the exact extent of the systems and installations for which each Authorised Person (HV) is responsible and, where appropriate, any part of the system which is excluded from the Authorised Person (HV)'s responsibilities

c. if necessary, suspend or cancel the appointment of an Authorised Person (HV) and recommend the withdrawal of the certificate

d. maintain a register of all Authorised Persons (HV)

e. ensure that candidates for appointment as Authorised Persons (HV):

   (i) satisfy the qualification requirements

   (ii) satisfy the training and familiarisation requirements

   (iii) can demonstrate adequate knowledge of each system, installation and type of equipment for which authorisation is sought

   (iv) have satisfied the Authorising Engineer (HV) as to their competence and ability

f. be part of the ESG.

4.10 The Authorising Engineer (HV) should also:

- ensure on appointment, a certificate valid for a period not exceeding three years has been issued to each Authorised Person (HV)
- report to the Management any deficiency in the number of suitably trained and experienced Authorised Persons (HV) where this significantly impairs Management's ability to provide a safe and efficient service
- review each Authorised Person (HV)'s operational experience at intervals not exceeding three years by examining the relevant operating records of the system(s), and recommend refresher training as necessary
- audit the performance and record the operational experience of each Authorised Person (HV) every 12 months
- undertake comprehensive audits, in accordance with the application of this HTM, to all systems and installations
- ensure that defect notifications received have been sent out, retained, actioned and evidenced in the OPM
- notify NHS England of any known defect notifications which affect site operations or which arise locally
- when requested by the ESG, support investigations of reported injuries and dangerous occurrences involving electrical systems and installations within the Authorising Engineer's (HV) sphere of responsibility, when not assigned as investigation lead by the ESG.

4.11 In addition the Authorising Engineer should:

- sanction any interpretation of this HTM, any local house rules and any deviation that may be necessary for their application, and agree in writing with the ESG, Authorised Persons (HV), SOM

and Designated Person, as appropriate, any local deviation from this HTM that may be necessary for their application to a particular item of equipment or location

- ensure that any amendments to this HTM are brought formally to the attention of, and are understood by, all Authorised Persons (HV)
- ensure that the Management is informed of any known defect notifications issued by a distribution network operator, manufacturer or supplier of electrical equipment which is applicable to equipment within the areas for which the Authorising Engineer (HV) is responsible
- ensure that a system is in place to circulate relevant information on defect notifications and dangerous occurrences to all Authorised Persons (HV) (see paragraphs 6.30–6.39)
- investigate all dangerous occurrences involving electrical equipment, systems and installations for which the Authorising Engineer (HV) is responsible
- where live working is considered appropriate, and a certificate of authorisation for live working is being considered, give written authority to an Authorised Person (HV) before the live working takes place
- agree in writing any local deviation from this HTM that may be necessary for their application to a particular item of equipment or location.

4.12 The Authorising Engineer (HV) should undertake audits at intervals not exceeding 12 months. These audits should review the competency of all Authorised Persons (HV) and the issue and cancellation of safety documents as well as a review of the site safety equipment and operating records, including the safe systems of work and safety procedures recommended by this HTM. The Authorising Engineer's (HV) audit should include a meeting with Authorised Persons (HV) and an inspection of the systems or installations to which their appointments refer. Separate audits should be carried out for each site or geographical area to which the Authorising Engineer (HV) has been appointed.

4.13 A written report of the audit should be compiled, listing unsatisfactory items seen and any deficiencies found, recommendations made and any training or retraining of Authorised Persons (HV) considered necessary. This should include an assessment against the NHS PAM and be issued to the Designated Person or SOM and Authorised Persons (HV). Items identified in the audit report should be reported to the ESG and actioned as necessary.

Roles and duties of the Authorised Person (HV)

4.14 The Authorised Person (HV) should be responsible for:

- the practical implementation and operation of this HTM, and
- the systems and installations for which the Management is in control of danger and for which the Authorised Person (HV) has been appointed.

4.15 The Authorised Person's (HV) instructions and decisions on electrical matters may be considered final and should be complied with. In the case of a dispute, the Authorised Person (HV) should stop the work or test and refer the matter to the Authorising Engineer (HV) for adjudication.

4.16 More than one Authorised Person (HV) may be appointed for a system or installation but, at any one time, only one Authorised Person (HV) should take on the responsibility of Duty Authorised Person (HV). The name of the Duty Authorised Person (HV) should be displayed in a prominent position that can only be altered by an Authorised Person (HV). Transfer of responsibilities between Authorised

Persons (HV) should be recorded in the HV site logbook.

4.17 Where there is more than one Authorised Person (HV) appointed for a system or installation, the Authorising Engineer (HV) should be advised of the Authorised Person (HV) who is nominated as being in overall charge with responsibility for multiple sites, and who is in control of records and contractors, etc. Where an Authorised Person (HV) is nominated to be in overall charge, this should be recorded in the OPM.

4.18 The duties of Authorised Persons (HV) are summarised as follows:

a. control the work on high voltage systems, prepare inspection, maintenance and safety programmes, and progress the work

b. ensure that any alterations or installation of equipment do not compromise the electrical system

c. ensure that all records (including maintenance, testing and commissioning records) concerning high voltage systems are kept up-to-date

d. record all high voltage switching operations in the HV site logbook

e. ensure that any person working on the system is competent to do so

f. ensure that test equipment is maintained in good condition

g. cooperate with the Authorising Engineer (HV) in matters of policy concerning high voltage systems

h. report in writing any dangerous and/or unusual occurrences to the Designated Person and Authorising Engineer (HV)

i. appoint in writing Competent Persons (HV) and maintain a register of all appointments

j. define the duties of appointed Competent Persons (HV) on the certificate of appointment

k. make routine inspections of substations

l. ensure that the necessary safety posters and signs are displayed at the substations at all times

m. issue and cancel safety documents in accordance with this HTM

n. implement and maintain a system of:

(i) routine inspection and testing of substation earthing

(ii) routine inspection and testing of transformers and switchgear

(iii) routine inspection and testing of high voltage protection systems including batteries.

4.19 The Authorised Person (HV) should inform the Authorising Engineer (HV) of:

a. any defects found in electrical equipment

b. any dangerous occurrence

c. any dangerous practices observed in the course of his duties.

4.20 The Authorised Person (HV) also:

- arranges for, supervises or undertakes cable detection or location work within the geographical area of the Authorised Person's (HV) appointment
- appoints Competent Persons (HV) for defined work and maintains a register of Competent Person (HV) appointments including dates of appointment, the date the appointment is due to expire and details of training and training dates. This register should be kept in the OPM with copies of all current Competent Person (HV) certificates
- confirms the competencies of any HV contractors carrying out any work on the

HV system and obtains letters of competency from the employer (this is expected to be carried out at the time of contractor tender evaluation or as required by the Authorising Engineer). (Note: this should be controlled under a Control of Contractors policy.) Documents should be stored within the OPM

- ensures that all records for the system including cable routes, electrical schematics, operating manuals and maintenance schedules for which the Authorised Person (HV) is appointed are completed and kept up-to-date.

4.21 Authorised Persons (HV) should monitor the performance of all Competent Persons (HV) in carrying out their duties under this HTM. Monitoring should be carried out to ensure the Competent Persons (HV) maintain the relevant level of competency and adherence to the safe systems of work. This should include:

a. visiting work sites and communicating on safety issues

b. visiting substations, switchrooms and electrical enclosures to ensure high standards of tidiness and availability of appropriate safety equipment every three months.

4.22 Authorised Persons (HV) should take action to rectify and report in writing to the Authorising Engineer (HV) any deficiencies found. A copy of this report should be placed in the OPM.

Role and duties of the Competent Person (HV)

4.23 Competent Persons (HV) should comply with this HTM using the appropriate safety documentation when carrying out all work as instructed.

4.24 Competent Persons (HV) should use safe methods of work, safe means of access and the personal protective equipment and clothing provided for their safety.

4.25 Competent Persons, when recipients of a safety document, should:

a. be fully conversant with the nature and the extent of the work to be done

b. read the contents of any safety documentation issued and confirm to the person issuing this that they are fully understood

c. during the course of the work, adhere to, and instruct others under their charge to adhere to, any conditions, instructions or limits specified on the safety document

d. keep the safety document and (where appropriate) keys in safe custody, and correctly implement any management procedure to achieve this

e. when in charge of work, provide immediate or personal supervision as required

f. warn all persons as quickly as possible to withdraw from, and not to work on, the equipment or system or enter the area concerned until further notice if, during the course of work, a hazard which could result in danger arises or is suspected. The situation should be reported immediately by the Competent Person (HV) to the Duty Authorised Person (HV) in the first instance.

4.26 Competent Persons (HV) should not start or restart work under a safety document issued to another Competent Person (HV).

4.27 Having accepted a safety document, the Competent Person (HV) may only undertake or supervise the work or test specified until the task is complete and the Competent Person (HV) has signed part 3 of the permit, which is retained in the pad. Neither the Competent Person (HV) nor any person under the direct control of the Competent Person (HV) should attempt to undertake any other duties.

4.28 The Competent Person (HV) should not leave the location of the work to undertake other work or tests while the defined work is in progress. If the Competent Person (HV) has to temporarily leave the location of the work or test to carry out other work or tests, the task should be suspended, and adequate safety precautions taken to prevent danger. The task should not be resumed until the Competent Person (HV) has returned to the location of the work or test.

4.29 Competent Persons (HV) clearing a safety document should do so only after all persons working under the safety document have been withdrawn from, and warned not to work on, the high voltage equipment or system concerned. Where appropriate, they should ensure that all tools, gear and loose material have been removed, guards and access doors have been replaced and the workplace is left tidy.

Role and duties of the Accompanying Safety Person (HV)

4.30 The Accompanying Safety Person is a person not directly involved in the work or test, who should have adequate knowledge, experience and the ability to avoid danger. They are required to keep watch, prevent unauthorised interruption of the work or test, be able to apply first-aid and summon help.

4.31 The Accompanying Safety Person (HV) should have received training in emergency first-aid in accordance with this HTM.

4.32 The Duty Authorised Person (HV) and/or the Competent Person, as appropriate, who will be responsible for the work or test to be attended should ensure that the Accompanying Safety Person understands their intended role and fully understands how to disconnect the equipment being worked on or tested from all sources of supply and how to switch off any test equipment or disconnect it from its source of supply.

4.33 The Accompanying Safety Person should be in attendance when the Duty Authorised Person (HV) considers it necessary and in circumstances such as the following:

a. while equipment is being proved or confirmed dead
b. while equipment is being earthed, other than by means of a switch or circuit breaker
c. where equipment cannot be confirmed dead until the Competent Person (HV) has made conductors accessible
d. while the Authorised Person (HV) is spiking a cable
e. while testing is being undertaken at high voltage
f. while a high voltage potential indicator is in use
g. while voltage and phasing tests are being undertaken at high voltage
h. while any person is opening or working in a high voltage enclosure.

Appointment of an Authorising Engineer (HV)

4.34 An Authorising Engineer (HV) should be appointed in writing by the Designated Person on behalf of the Management. Due diligence reviews should be conducted when a new Authorising Engineer (HV) is appointed by the Management. Letters of appointment and acceptance of the appointment should be in the form illustrated in Appendix 3.

4.35 An Authorising Engineer (HV) should be appointed or reappointed for defined systems and installations for no longer than five years.

4.36 A person should be nominated by the Authorising Engineer (HV) and appointed by the Management to provide absence cover or deputise for the Authorising Engineer (HV). Any person appointed should, as far as is reasonably practicable, meet the criteria set

out in this HTM and be acceptable to the Management.

4.37 A copy of the letter of appointment should be in the OPM.

Appointment and reappointment of an Authorised Person (HV)

Appointment of an Authorised Person (HV)

4.38 An Authorised Person (HV) should be formally appointed by the Designated Person on the recommendation of the Authorising Engineer (HV) for periods not exceeding three years. Appointment will be by the issue and acceptance of a certificate of appointment signed by all three parties. Details of the recommended procedure, model letters and certificates are given in Appendix 3 together with additional guidance in Appendix 9.

4.39 Records should be held in the OPM.

Review of an Authorised Person's (HV) appointment

4.40 Each Authorised Person's (HV) appointment should be reviewed every three years to ensure that the Authorised Person (HV) is still suitable for appointment as an Authorised Person (HV). If suitable, the appointment process should be followed, the certificate of appointment form reissued and the appointment record in Appendix 3 completed.

Suspension of an Authorised Person's (HV) duties

4.41 The appointment of an Authorised Person (HV) may be suspended or cancelled for reasons of safety by the Authorising Engineer (HV). The Authorising Engineer (HV) should take the following actions:

a. arrange a meeting with the Authorised Person (HV) to discuss the suspension and, where necessary, the cancellation

b. arrange a meeting with the Designated Person and SOM to discuss the suspension or cancellation and any action necessary to maintain the availability of an Authorised Person (HV)

c. inform (in writing) the Authorised Person (HV), giving the reasons for the suspension or cancellation, details of any further training or experience considered necessary before reappointment and the expected duration of the suspension or cancellation

d. retrieve from the Authorised Person (HV) their certificate of appointment and all related items issued under the appointment procedure; in the case of cancellation, the Authorising Engineer (HV) should destroy the original certificate and overwrite all other copies with the word "cancelled" followed by the date and his signature

e. (with regard to the suspension or termination of the appointment) notify in writing all other Authorised Persons (HV) appointed for all systems and installations with which the Authorised Person (HV) was associated.

4.42 On suspension or withdrawal of an appointment, the key to the key-box should be returned, or the combination of the Authorised Person's (HV) key-box should be changed.

4.43 The Management, with assistance from the Authorising Engineer, should take the necessary action to ensure alternative cover is provided.

Note:

In the event of an Authorised Person (HV) stepping down from their duties for whatever reason, the Management should inform the Authorising Engineer (HV) and collect all equipment and keys issued as part of the Authorised Person's (HV) duties.

Appointment of a Competent Person (HV)

4.44 A Competent Person (HV) should be formally appointed for a maximum of three years in writing by an Authorised Person (HV) for duties which should be clearly defined on the certificate of appointment. Appointment should be by the issue and acceptance of the certificate, which should be signed by the Competent Person (HV) and the Authorised Person (HV).

4.45 The defined work for a Competent Person (HV) may be electrical work on the electrical system under control of the Authorised Person (HV) but may also be non-electrical tasks that are to be carried out within areas under control of the Authorised Person (HV). Any restrictions on a Competent Person's (HV) appointment should be clearly recorded on the Certificate of Appointment.

4.46 Details of the recommended procedure, pro forma and certificates are given in Appendix 3.

4.47 The certificate with a copy of the appointment record and review details should be retained in the OPM.

4.48 The Authorised Person (HV) should maintain a register of all Competent Person (HV) appointments. Each Competent Person's (HV) appointment should be reviewed/audited by the Authorised Person (HV) at intervals not exceeding one year and by each new Authorised Person (HV) as soon as practicable after appointment.

4.49 To be eligible for appointment, prospective Competent Persons (HV) should:

a. be competent to undertake work on, and testing of, the types of systems and equipment for which the appointment is sought

b. be familiar with the types of installation and equipment that they will be required to work on or test

c. possess the necessary technical knowledge, skill and experience relevant to the nature of the work or tests to be undertaken to prevent danger and injury

d. have an adequate knowledge of the relevant parts of this HTM, any agreed local variations and any regulations which are applicable to the installations and equipment on which work or tests are to be undertaken

e. have an adequate knowledge of first-aid, and – within the last three years – have successfully completed an emergency first-aid training course.

4.50 The prospective Competent Person (HV) should attend a formal interview with an Authorised Person (HV) appointed for the system or installations for which the appointment is sought.

4.51 If an Authorised Person (HV) is of the opinion that a Competent Person (HV) is not carrying out work in accordance with this HTM, or is working in an unsafe manner, the Authorised Person (HV) should stop the work, have the equipment or installation made safe and have the Competent Person (HV) removed from the working area.

Note:

In the event of a Competent Person (HV) stepping down from their duties for whatever reason, the Authorised Person should remove them from the Competent Person's register, inform the Authorising Engineer (HV), and collect all equipment and keys issued as part of the Competent Person's (HV) duties.

Suspension of a Competent Person's (HV) duties

4.52 The appointment of a Competent Person (HV) may be suspended or cancelled for reasons of safety by an Authorised Person (HV) who should take the following action:

a. retrieve from the Competent Person (HV) any substation key(s) for high voltage systems and any other related items issued under the appointment procedure

b. in the case of cancellation, destroy the original certificate and overwrite all other copies of the certificate with the word "cancelled". This should be followed by the date of cancellation and the signature of the Authorised Person (HV) or Authorising Engineer (HV) responsible for the action

c. note the cancellation on the Competent Person's (HV) appointment record

d. notify in writing the suspension or cancellation of the appointment to all other Authorised Persons appointed for all systems and installations with which the Competent Person (HV) was associated

e. inform in writing the Competent Person (HV), giving the reason for the suspension or cancellation, details of any further training or experience or any further action considered necessary before reappointment, and the expected duration of the suspension

f. arrange a meeting with the Competent Person (HV), where appropriate, to discuss the suspension and, where necessary, the cancellation

g. take the necessary action to ensure alternative cover is provided.

Contractor's Authorised Persons (HV) and/or Competent Persons (HV)

4.53 Where a contractor has been appointed to provide Authorised Persons (HV) and/or Competent Persons (HV) for a system and installation, it is the Management's responsibility to ensure that each contractor's Authorised Person (HV) and/or Competent Person (HV) is of a standard equivalent to that required by this guidance. The Management should seek the advice of their Authorising Engineer as required.

4.54 Where necessary, the Management should appoint their own Authorised Person (HV) (subject to recommendation by the Authorising Engineer) to coordinate work and assist the contractors' Authorised and Competent Persons in carrying out their duties. The roles and responsibilities of this Authorised Person should be clearly defined and recorded in the OPM along with any demarcation agreement with the contractor.

4.55 The contractor should provide to the Management a letter of competence detailing the Authorised Person's (HV) and/or Competent Person's (HV) technical knowledge and experience, associated with their appointment, which should be stored in the OPM.

4.56 If the Management or the appointed Authorised Person (HV) is of the opinion that a contractor's Authorised Person (HV) or Competent Person (HV) is not working in accordance with the requirements of this HTM,

or is working in a dangerous manner, the Management or the appointed Authorised Person (HV) has the authority to stop the work.

4.57 Where a contractor or third party is providing the services of an Authorised Person (HV) and/or Competent Person (HV), the contractor or third party should also be advised of any suspension or cancellation proceedings and be invited to attend any meetings.

Suspension notices

4.58 Improvement notices and/or prohibition notices for safety breaches on HV electrical systems can be issued by the Authorising Engineer (HV) or regulatory bodies such as the HSE.

5 Demarcation of responsibilities between the Management and others

General

5.1 Whenever there is a division of responsibilities between the Management and others, the Authorised Person (HV) appointed by the Management should issue instructions to other parties, as necessary, to prevent danger. Example documents associated with this Chapter are given in Appendix 2.

5.2 Where a specialist contractor has been appointed under contract or other arrangement by the Management, they should be required to comply with:

a. the Management's electrical safety guidance for high voltage systems

b. the requirements of this HTM or equivalent safety procedures (equal to or better than this HTM) which should be agreed in advance by the Designated Person/SOM, Authorised Person (HV) in conjunction with the Authorising Engineer (HV)

c. any instructions issued by the Management's Authorised Person (HV) in accordance with their electrical safety policy and procedures for high voltage systems.

5.3 Where there is a demarcation of responsibilities between the Management and others, the Authorised Person (HV) is, on relevant matters to Authorised Persons' (HV) duties, to liaise with the other party (or parties) as necessary to avoid danger including defining access protocols to substations.

5.4 Each demarcation of responsibilities should be recorded in writing and precisely described on a diagram. The point of demarcation must be at a cable termination and should be at the outgoing terminals of a switch or circuit breaker. An example demarcation form can be found in Appendix 2.

5.5 Each proposed demarcation of responsibilities should be approved by the Authorising Engineer (HV) before it is finally agreed with the other party (or parties) involved.

5.6 A copy of the diagram should be prominently displayed at each substation and switchroom under joint control.

5.7 One copy of the agreement, including the diagram, should be sent to the Authorising Engineer (HV) and another should be placed in the OPM.

5.8 Where another organisation transfers control of electrical danger to the Management for the duration of a contract, the Authorised Person (HV) appointed by the Management to

be in control of the electrical danger should request, from the other organisation, details in writing of any known hazards (including potentially explosive atmospheres, polychlorobiphenyls (PCBs), etc.) that are, or may be, present. A copy of these details should be placed in the OPM and another copy should be given to the Management contractor(s), if appointed.

Note

The other organisation has a duty to provide such details under Section 4 of the Health & Safety at Work etc. Act.

Where the Management has control of the danger for part of another organisation's system or installation

5.9 The Duty Authorised Person (HV) (or, for a new site, the Authorised Person (HV) Designate) should liaise with the other organisation's Duty Holder to agree the point of demarcation and the points of contact for both parties. Once the Authorising Engineer (HV) has approved this, the formal agreement should be drawn up and signed by both parties. The document should be located in the OPM.

Where the Management does not have control of the danger for a system or installation

5.10 The Management staff and the Management contractor's staff who are to undertake work or tests on parts of systems or installations for which the Management does not have control of the electrical danger are not required to comply with this guidance, but must comply with the statutory regulations and/or any safety rules and procedures issued by the organisation having control of the electrical danger.

Where contractors are to undertake installation work on an existing system or installation for which the Management has control of the danger

5.11 Before any installation work is undertaken by contractors on an existing system or installation for which the Management has control of the danger, the person responsible for that installation work must liaise directly with the Duty Authorised Person (HV) to ensure that the work is undertaken in accordance with this HTM and that the contractor's risk and method statements be made available prior to commencing the safety programme. The Duty Authorised Person (HV) should retain overall responsibility for the systems and installations. Where contractors or a distribution network operator (DNO) are carrying out work under their own safety rules, they still need to liaise with the Duty Authorised Person (HV).

For new work before the system or installation is accepted from the contractor

5.12 Prior to the construction period of the contract, the contractor(s) should agree in writing with the Management, the safety measures to be implemented in relation to the works including key provision and access arrangements and appropriate safe systems of work, including testing, switching, commissioning and handover arrangements.

5.13 During the construction period of the contract, the contractor(s) should have control of the management of all aspects of health and safety of the works including electrical

danger in accordance with the demarcation agreement and should comply with all relevant statutory regulations. The contractor(s) is not required to comply with this HTM unless they are imposed by the conditions of contract; however, where practicable it is strongly recommended that this HTM is followed to allow for an easier transition to the Management's safe systems of work at handover.

5.14 Where it is known that the Management will accept control of the electrical danger, it is recommended that the Authorising Engineer (HV), in conjunction with the Duty Holder for the site involved, appoints an Authorised Person (HV) to take responsibility for the new systems or installations when they are officially handed to the Management for day-to day operation and maintenance.

5.15 The Authorised Person(s) (HV) should liaise with the contractor's Duty Holder in order to become familiar with the systems or installations for which they will eventually take control of the electrical danger.

5.16 Where the contractor's Duty Holder is responsible for part of a system or installation, the exact extent of the contractor's responsibility should be agreed in writing. This should take the form of a demarcation agreement.

5.17 All electrical test certificates and the appropriate handover certificates for the new installations should be fully completed and signed by the contractor and presented to the Management for review and for formal acceptance by the Management before handover being accepted.

Where the Management appoint a distribution network operator (DNO) or third party to operate DNO and management-owned equipment (applicable to control, operation and maintenance agreements (COMA))

5.18 In some cases, the Management will appoint a distribution network operator (DNO) or third-party contractor under a contractual agreement to control, operate and maintain the healthcare organisation's HV equipment (referred to as a control, operation and maintenance agreement (COMA)). The agreement should indicate access arrangements into the substations by the Management. The agreement should be recorded in the OPM, and the healthcare organisation's Management team, their appointed Authorising Engineer (HV) and the healthcare organisation's Authorised Persons (HV), where appointed, should be aware of their roles and responsibilities with regard to the agreement. The Management should ensure that the DNO or third-party contractor are suitably competent and experienced.

5.19 Where any third-party organisation is contracted to perform Authorised Person (HV) duties as part of any agreement, the procedures, roles and responsibilities should be clearly defined and agreed between the Management, the Authorising Engineer (HV) and the third party, and any deviations from this guidance should be recorded in the OPM.

5.20 Any agreement between the Management and the third-party organisation should be included within the electrical safety policy and stored in the OPM along with the COMA.

5.21 When HV works are undertaken by a DNO or a third party, permission to carry out

the works should be agreed prior to commencement of the works. This should be arranged by the Management team through the ESG. In cases where the healthcare organisation does not have an Authorised Person (HV), the Authorised Person (LV) may assist in the planning of the works.

5.22 Any COMA does not relieve the Management of their overall responsibility to manage the HV equipment and systems.

5.23 Any action taken by a nominated Authorised Person (HV) under the COMA should comply with any agreement on safety rules and procedures between the third party and the Management and should be recorded in any documentation required by any agreement between the third party and the Management (such as site and substation logbooks).

6 General precautions

Security and admittance to substations

6.1 Every site should have a written key procedure and key register as part of the OPM. This should include details on the types of key in use (master key, switchroom/ substation specific keys, etc.) and levels of access permissions including procedure for issuing, returning or cancelling keys (for example, electronic access devices).

6.2 All access doors to each substation, switchroom and enclosure containing high voltage electrical equipment should be kept securely locked when unattended.

6.3 Each substation or switchroom should have dedicated key-suiting to ensure that, where keys are issued to a person(s), access be limited only to the area(s) covered under a safety document (for example, permit to work, sanction for test or limitation of access) issued by an Authorised Person (HV). The key-suiting may incorporate a master key that would grant access to all areas. The use of the master key should be limited to Duty Authorised Person(s) (HV) only. The master key should be kept in the Authorised Person's (HV) key cabinet and there should be some form of access control to allow the Duty Authorised Person (HV) to gain access to the master key in the key cabinet.

Notes:

1. A combination key box may be used in situations where the Authorised Person (HV) considers its use beneficial in managing the system.

2. The combination should be changed whenever it is suspected that the key system has been compromised.

6.4 Where considered appropriate under the safe systems of work, a Competent Person (HV) may also be issued with a key to a substation to carry out work. The issue and return of the key should be recorded by the Authorised Person (HV) in the key register and HV site logbook.

6.5 Unless in receipt of a safety document, no person other than an Authorised Person (HV) or Competent Person (HV) may enter a room containing high voltage equipment unless they are accompanied by an Authorised Person (HV) or a Competent Person (HV).

6.6 Where the substation is provided with an automatically controlled fire protection system, persons entering must be trained for entry into such rooms.

Authorised Persons' office

6.7 The Management should designate an appropriate room suitable for Authorised Persons to undertake their duties as specified in this HTM.

Security of electrical equipment

6.8 All electrical equipment should be secured against unauthorised access and operation. If electrical equipment is not located within a substation or other enclosure, access and operation of such equipment should only be by the use of a tool or key.

Operational keys

6.9 The following will apply:

a. Only Duty Authorised Persons (HV) should have access to the master key to the key cabinet.

b. All other keys to operational locks and padlocks associated with the high voltage equipment should be kept in the key cabinet when not in use. It is important that the key cabinet is kept locked to prevent unauthorised removal of keys.

c. The key cabinet should be kept locked except when keys are being removed from, or returned to, it. It is important that the key cabinet is kept locked to prevent unauthorised removal of keys.

Key cabinets

6.10 Except for any key-plates in use, the working key-plates should be kept in a closed and securely locked key cabinet installed with the mimic diagram. The working key cabinet key labelled “Authorised Person” should be held by the Duty Authorised Person (HV) while operating the system or during installation, or while permits or sanctions-for-test are being issued and cancelled, or in the Authorised Person’s (HV) key-box.

Key-plate system

6.11 There should be a key for each working lock provided for locking and switching operations of high voltage switchgear. The key for a working lock is not to open any other locks provided on a system or installation.

6.12 The keys for the high voltage switchgear in each substation should be held on an appropriately sized key-plate that should bear the identification of the substation, building or item of equipment to which the keys belong, or the purpose for which each key is intended.

Lockable document cabinet

6.13 All documents specified in this HTM should be kept in a lockable document cabinet situated in the Authorised Person’s (HV) office. The lockable document cabinet should be kept locked when not in use, and the key kept in the working key cabinet.

Mimic diagram

6.14 Either a glass-covered tilegram or electronic mimic diagram, or equivalent, should be provided for any high voltage distribution system for which the Management are responsible. A mimic diagram may also include other electrical equipment or systems associated with the HV network.

6.15 Where provided, the mimic diagram should be permanently installed in the same room as the working key cabinet. The mimic diagram should be kept locked to prevent unauthorised adjustment of the mimic diagram.

Note:

A mimic diagram should show, as a minimum, the electricity distribution system and equipment that is under the control of the Authorised Person (HV).

6.16 The mimic diagram should reflect the current operational state of the system it represents at all times, and any adjustments made should be recorded in the HV site logbook.

Safety locks

6.17 Before a permit-to-work is issued, and before a Competent Person (HV) commences work, safety locks must be applied at all points-of-isolation and where circuit main earths (CMEs) earths are applied.

6.18 Before a sanction-for-test is issued, safety locks must be applied at all points-of-isolation (CMEs), and working locks at all points where CMEs are applied, which can be removed under the sanction for test.

Safety key-boxes

6.19 A safety key-box as a minimum should have two locks, each of which should have only one key: one key should be issued to the Competent Person (HV) receiving the safety document and the other key should be retained by the Duty Authorised Person (HV). It should be so arranged that all locks must be released before access can be gained to the contents of the box.

6.20 The number or type of safety key-boxes should be discussed and agreed with the Authorising Engineer (HV):

- when in use, each safety key-box should contain the keys to safety locks associated with only one permit-to-work or one sanction for test
- after the safety locks have been applied, and before a permit-to-work or sanction for test is issued, the keys to all the safety locks should be placed in a safety key-box, and both locks of the box should be secured. When the permit is issued, the Authorised Person (HV) should retain the Duty Authorised Person's (HV) key and give the Competent Person's (HV) key to the Competent Person (HV)
- the Competent Person (HV) should retain the Competent Person's (HV) key until the permit-to-work or sanction for test is cancelled.

Operation of high voltage switchgear

6.21 The following points apply:

a. High voltage switching should be carried out by the Duty Authorised Person (HV) or by persons acting under his personal supervision (but see also paragraph 6.24). Circuit breakers should be fitted with locks preventing unauthorised reclosure. The Authorised Person (HV) should be informed of all high voltage emergency switching.

b. Locks should be applied as necessary to prevent unauthorised operation of switchgear (except emergency tripping as referred to above).

c. Oil circuit breakers (OCBs) should in general be reclosed a maximum of two times after opening under fault conditions. The equipment should be inspected at the first opportunity after opening under fault conditions.

d. With regard to SF6 switches, checks should be carried out prior to operation to ensure the gas is within operating limits.

e. When switchgear shows any sign of defect or malfunction after operating, its condition should be reported immediately to the Authorising Engineer (HV), and it should be examined before further operation.

f. No high voltage earthing switch should be operated or CME connection attached or removed except by the Duty Authorised Person (HV).

g. Making live or dead by visual signal, or by prearranged understanding after an agreed interval of time, is not an acceptable practice.

Action in an emergency

6.22 First, the Duty Authorised Person (HV) should go to the mimic diagram cabinet. The first Authorised Person on site should display the "work on high voltage system in progress" and the "Authorised Person on site" notices in a prominent position.

6.23 Any other Authorised Person (HV) attending the site, on seeing either of these notices, should take no action until he/she has contacted the Duty Authorised Person (HV) who displayed the notice.

6.24 When necessary to isolate in an emergency when a Competent Person (HV) has access to substations in which emergency tripping facilities are available, that person, without delay and with some urgency, must advise the Duty Authorised Person of the action taken.

High voltage enclosures

6.25 No person other than the Duty Authorised Person (HV) using a high voltage potential indicator designed for the purpose should be engaged in any work activity on or near any live conductor (other than one covered with insulating material so as to prevent danger) where danger may arise.

6.26 Except within a high voltage enclosure, access to live conductors should only be possible with the use of a tool or key.

6.27 All spout shutters not required for immediate work or operation should, if not otherwise made inaccessible, be locked shut.

6.28 A high voltage enclosure should be opened only by the Duty Authorised Person (HV) or a Competent Person (HV) acting on the instruction of, and personally supervised by, the Duty Authorised Person (HV).

6.29 A high voltage enclosure may only be entered by:

- the Duty Authorised Person (HV) accompanied by an Accompanying Safety Person (HV)
- a Competent Person (HV) acting on the verbal instructions of, and personally supervised by, the Duty Authorised Person (HV)
- the Competent Person (HV) in receipt of a sanction-for-test, accompanied by an Accompanying Safety Person (HV), when a high voltage test enclosure is created as part of the test procedure
- an assisting Competent Person acting on the verbal instructions of, and personally supervised by, the Competent Person (HV) in receipt of a sanction-for-test when a high voltage test enclosure is created as part of the test procedure.

Dangerous occurrences

6.30 A dangerous occurrence should be reported to the Duty Authorised Person (HV) as soon as reasonably practicable.

6.31 The Authorised Person (HV) should as soon as practicable send a preliminary report of the dangerous occurrence to the Authorising Engineer (HV), the healthcare organisation's safety group and/or ESG.

6.32 Any notifications and reports required to satisfy statutory or other management requirements should be issued.

6.33 Where required, dangerous occurrences must be reported to the Health & Safety Executive in line with the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR).

6.34 Upon instruction from the Management, the Authorising Engineer (HV) should investigate or assist with investigations into each dangerous occurrence and issue a report to the Designated Person. The report should be sufficiently detailed to enable the sequence of events leading to the occurrence

to be determined. Where reasonably practicable, the report should include photographs taken before any items of equipment involved in the dangerous occurrence are disturbed. In certain instances the Management may instruct an independent investigation.

6.35 To alleviate potential problems or criticism which may arise at any enquiry into a dangerous occurrence or incident, the Management should consider:

- the questionable conflict of interests and impartiality of any investigation or subsequent report where it is carried out by those directly involved
- the reliability of evidence involving self-judgement.

Defect notifications

6.36 A defect notification is a written safety instruction in the form of dangerous incident notification (DIN), suspension of operating practice (SOP) or national equipment defect report (NEDeRS) issued via the Energy Networks Association (ENA), notifying of a dangerous occurrence with the potential to alter the normal operating procedures associated with a particular type of equipment.

6.37 A record of all defect notifications is available to NHS Trust estates staff and the Management through NHS England's estates & facilities management team through the NHS Estates Team Collaboration Hub. To access the Hub, email: England.efmportalsubmissions@nhs.net.

6.38 Any identified defect that may result in the issue of a DIN, NEDeRS or SOP advised by the ENA must be notified without delay to the Authorising Engineer (HV) as soon as the Authorised Person (HV) on site is made aware. For reporting defects, email: England.mb-defectsandfailures@nhs.net

6.39 On receipt of a defect notification that applies to equipment on site, the Authorised Person (HV) should:

a. inform the Authorising Engineer (HV) and the ESG and in conjunction with the Authorising Engineer notify NHS England of the notification, indicating whether the equipment is included in the local system(s) or installations

b. record the receipt in the HV site logbook and the action taken

c. store a version of the notification signed by all site Authorised Persons (HV) in the OPM

d. arrange for any inspection and remedial work required

e. where the mimic diagram depicts the equipment referred to in the restriction, mark each item on the mimic to indicate the existence of a defect notification

f. where considered necessary, fix a defect notification on each item of equipment involved and report the satisfactory completion of any remedial works to the Authorising Engineer (HV).

Circuit main earths (CMEs)

6.40 The following precautions should be observed when high voltage electrical equipment is to be discharged and earthed:

a. The circuit breaker or specially provided earth switch should be used to make the earth connection. Where a circuit breaker is used, the electrical and mechanical trip mechanism should be rendered inoperative. After switching on, the circuit breaker or earth switch should be locked in the earth position while it is the CME.

b. Where (a) is not practicable, the high voltage electrical equipment should be tested to ensure that it is dead and should then be discharged and earthed by an approved earthing lead applied

by means of a pole or other approved method in accordance with this document.

6.41 The location of each CME should be recorded on the permit-to-work or sanction-for-test.

Earthing leads and connections

6.42 Earthing leads and associated clamps should be examined immediately before being used.

6.43 They should be of an "approved type" and of adequate capacity to carry the prospective fault current of the system at the point of application. ("Approved type" means "accessories manufactured and tested for the required duty and available from the equipment manufacturer or its recommended supplier for specific use with his equipment".)

6.44 Earthing leads and associated clamps should never be improvised. They should be properly stored, maintained and recorded.

Procedure for the use of earthing leads

6.45 The following procedure should be observed when using earthing leads:

a. It should be verified that the circuit is dead by means of a voltage indicator of an approved type, the indicator itself being tested immediately before and after use.

b. Earthing leads should be connected to the earth system before being secured to phase conductors. They should be secured to the phases only by means of a pole or other approved equipment. Care should be taken to ensure that good contact is made.

c. All phases should be earthed, even if work is to be carried out on one phase only.

d. Earthing leads should not be applied in any cell or compartment in which there is any exposed metal live at high voltage.

e. When earthing leads are being removed, they should be disconnected from phase conductors first and the earth system last.

f. The manufacturer's earthing equipment only should be used for the purpose of earthing spout contacts of switchgear. The insertion of hands or any tool in contact spouts for this purpose is an unacceptable practice.

Earthing equipment

6.46 Proprietary earthing equipment should be used where available. When not available, a suitable device designed for the purpose should be used.

6.47 Portable earthing equipment should be inspected by the user before and after use.

6.48 A Duty Authorised Person (HV) should inspect portable earthing equipment provided by the Management every 12 months, and the inspection recorded in the HV site logbook.

Location of underground cables

6.49 Where it is proposed to carry out excavation work on sites for which Authorised Persons (HV) have been appointed, it is the responsibility of the Duty Authorised Person (HV) to ensure that all underground power cables within the proposed areas of excavation are located and their positions marked before the ground is disturbed.

Note:

Hand digging should be utilised when excavating in the proximity of buried high/low voltage cables. Any party undertaking such work should provide site-specific risk assessments and method statements indicating the safety measures to be implemented.

The HSE's 'HSG47: Avoiding danger from underground services' outlines the potential dangers of working near underground services and gives advice on how to reduce risks. It explains the three basic elements of a safe system of work during excavation:

- planning the work
- locating and identifying buried services
- safe excavation.

6.50 No person should use cable location and tracing devices unless they are competent to do so and have been specifically trained in their use. A certificate should be issued by the instructor on successful completion of the training. A copy of this should be placed in the OPM.

6.51 Training in the use of cable location and tracing devices should normally be given by the manufacturers of the equipment, but alternatively it may be given by another training provider, certified and approved as being capable and competent to deliver the training.

Switching methods

Safety switching

6.52 Planned switching on any complex circuit or switching in preparation for the issue of a permit-to-work should be in accordance with the following sequence of events:

a. Write a safety programme (which details all switching and requires notification to users of any disconnections), an isolation and earthing diagram and arrange for another Authorised Person (HV) to check and countersign the safety documents if reasonably practical.

b. Write the programme a reasonable period in advance of the proposed start of the work.

c. Complete the necessary switching and issue of safety documents as detailed in the safety programme. Record times of each switching action/document issue.

d. Enter summary details of the switching undertaken and safety documents issued in the HV logbook. Reference serial numbers of the safety programme, isolation and earthing diagram and permit(s).

e. On completion of work, cancel the permit-to-work and complete switching to restore supplies to normal as detailed in the safety programme. Record times of each action.

f. File the completed safety programme, isolation and earthing diagram and cancelled safety documents in the OPM, in chronological order.

g. Return the permit-to-work book to the lockable document cabinet located within the Authorised Persons' office.

Fault-switching

6.53 Fault-switching is the switching of the HV network to disconnect a faulty part of the network and restore supply to the remaining healthy part of the system that was affected by the fault. Fault-switching is not emergency switching. Healthcare premises should have stand-by generators and uninterruptible power supply systems (UPS) to enable them to cope with a sudden unexpected loss of supply without an immediate life-threatening situation being created. However, loss of supply is a serious problem which could develop into an

emergency – prompt action is therefore required to restore supply.

6.54 If more than one person is switching, one Authorised Person (HV) should be in overall control of the fault-switching and should maintain an accurate record of the operational state of the network. The Duty Authorised Person will direct and sanction all fault-switching.

6.55 The essential steps in fault-switching are:

a. remain calm and assess the situation as it develops

b. record in writing what protection operated as the result of the initial fault

c. inspect all switchgear for signs of distress before operating it

d. plan fault-restoration switching a few steps at a time and write down planned switching before carrying it out. Record all switching activities and times.

Emergency switching

6.56 Emergency switching is switching that is required to remove an immediate threat to life.

6.57 Emergency switching, when required, may be undertaken without the need to complete any of the sequence steps detailed for planned or fault-switching.

6.58 Persons who undertake emergency switching should do so in a manner that does not put themselves or others at risk of injury.

Fire protection equipment

Automatic control

6.59 Before work or inspections are carried out in any enclosures protected by automatic fire-extinguishing equipment:

a. the automatic control must be rendered inoperative by the Authorised Person (HV) and the equipment left on hand-control. A caution sign should be attached and displayed whenever the automatic fire-extinguishing system is inoperative

b. precautions taken to render the automatic control inoperative must be noted on any safety document issued for work in the protected enclosure

c. the automatic control will be restored by the Authorised Person (HV) immediately after the persons engaged on the work or inspections have withdrawn from the protected enclosure.

Portable extinguishers

6.60 Only portable fire extinguishers rated for the electrical voltage to be encountered may be used near live electrical equipment, and a safety clearance of at least 1000 mm should be maintained.

6.61 After any explosion or fire, the space should be thoroughly ventilated before entry of personnel, unless suitable breathing apparatus is worn by suitably trained persons.

6.62 Portable firefighting equipment should only be used by staff who are trained and confident in its use and without putting themselves at risk (see also the HTM 05-03 series –'Fire safety in the NHS: operational provisions').

Coolant and arc-extinguishing media

6.63 The availability of economic and non-flammable substitutes to hydrocarbon insulating oil, as coolant and arc-extinguishing media, has led to the production of equipment containing these alternative agents and their installation within healthcare premises.

6.64 A number of these substitutes under certain conditions can be injurious to the health of employees. Health and safety

legislation requires employers to ensure, so far as is reasonably practicable, the health, safety and welfare of their employees. It is essential when using alternative cooling or arc-extinguishing media to ensure that the potential effects under all conditions have been fully investigated and safe working procedures produced to indicate the required action under both normal and emergency conditions, taking into account the environmental conditions.

6.65 Members of the emergency services who may attend the site must be made aware of any risks and advised accordingly.

6.66 Information on a selection of alternative cooling and extinguishing agents and their potential effects is given in HTM 06-01 –'Electrical services: supply and distribution'.

6.67 The information contained in HTM 06-01 should not be taken as an exhaustive list, as inevitably developments in this area will produce other alternatives.

6.68 The requirements of the Control of Substances Hazardous to Health (COSHH) Regulations must be considered when employing alternative cooling or arc-extinguishing agents, etc. within electrical equipment. In addition, appropriate procedures and actions necessary to protect the health and safety of individuals must be taken.

Note:

Under the COSHH Regulations, while the extinguishing agent may not be a listed substance in the formal sense, it may still be a "hazardous substance" in the sense of creating a hazard which is comparable to that caused by a listed substance. The HSE's 'The Control of Substances Hazardous to Health Regulations 2002. Approved Code of Practice and guidance L5' should be referred to for guidance.

Equipment containing sulphur hexafluoride (SF6)

Note:

The Climate Change Act 2008 named SF6 as one of the six major greenhouse gases. Under the Kyoto Protocol, long-term environmental considerations make it advisable to reclaim SF6 where practicable, during maintenance or end-of-life treatment, in order to minimise its accumulation in the atmosphere.The SF6 gas level gauge must be checked before and after each operation. Regular monthly inspections should be undertaken to ensure that gas charges are maintained. Inspections should be recorded in the HV substation logbook.

6.69 Work on any equipment containing sulphur hexafluoride (SF6) should be carried out in accordance with the special instructions specified by the manufacturer (see also HTM 06-01).

6.70 Under normal circumstances, SF6 is non-toxic; however, when exposed to an electric arc, it decomposes to form toxic compounds which will normally be contained within the equipment. In the rare event of any decomposition products being present in the atmosphere, warning indications such as a pungent odour similar to rotten eggs or irritation of the upper respiratory tract and eyes will become apparent. Where this occurs, personnel should immediately get fresh air even if no equipment failure is apparent. The Authorised Person (HV) must be informed, who should then report the incident to the Authorising Engineer (HV) and manufacturer.

6.71 Work on any equipment containing an alternative to hydrocarbon insulating oil as coolant and arc-extinguishing media should be carried out in accordance with any special instructions specified by the manufacturer (see also HTM 06-01).

Vessels containing oil or flammable liquids

6.72 The following points apply:

a. Prolonged exposure to mineral oils present in transformers and OCBs may lead to skin rashes and in extreme cases cancer. Contact with these oils should therefore be avoided whenever possible, and personal protective equipment should always be worn.

b. Smoking and exposed flames are prohibited in the vicinity of open vessels containing, or which have contained, oil or any other flammable substance, until the precautions specified in (c) have been taken.

c. Work on such vessels involving the application of heat is forbidden until all practicable steps have been taken to prevent fire or explosion, either by removal of the flammable substance and any fumes or by rendering them non-explosive and non-flammable.

Access to, and work in, underground chambers, vessels and confined spaces

6.73 The following points apply:

a. Arrangements for access and work, and the precautions to be taken, should be in accordance with the Confined Spaces Regulations, the HSE's 'Safe work in confined spaces: Confined Spaces Regulations 1997. Approved Code of Practice and guidance L101', local procedures and confined spaces permits.

b. No person at work should enter a confined space to carry out work for any purpose unless it is not reasonably practicable to achieve that purpose without such entry.

c. No safety document should be issued to any Competent Person (HV) for works in a confined space unless the individual(s) are trained, competent and certified to work in confined spaces.

d. The person who manages confined spaces for the healthcare organisation should be consulted when issuing safety documents for work in confined spaces.

e. Barriers, doors or gates restricting access to underground chambers or similar confined spaces, in which dangerous fumes or other hazards are present or likely to be present, should be kept locked and the control of keys be maintained in accordance with an approved procedure.

f. For any electrical work within a confined space, safety documentation associated with this HTM should be issued in addition to any safety documents for access to confined spaces.

7 Safety precautions and procedures for work on high voltage equipment

General

7.1 This guidance does not apply where equipment has been discharged, disconnected and removed from the system or installation.

7.2 Equipment that is considered by an Authorised Person (HV) to be in a dangerous condition should be isolated elsewhere. Action should also be taken to prevent it from being reconnected to the electricity supply.

7.3 Any work on, or testing of, high voltage equipment connected to a system should be authorised by a permit-to-work or a sanction-for-test following the procedures set out in Tables 1–3 in paragraph 7.34.

7.4 No hands or tool (unless the tool has been designed for the purpose) must make contact with any high voltage conductor unless that conductor has been confirmed dead by an Authorised Person (HV) in the presence of the Competent Person (HV).

7.5 Where any work or test requires an Accompanying Safety Person (HV) to be present, their requirement should be included in the safety programme. The Accompanying Safety Person (HV) should be in position before that work or testing can begin.

7.6 Voltage test indicators should be tested immediately before and after use against a test supply designed for the purpose.

7.7 Where the procedures involve the application of CMEs, the unauthorised removal of such earths should be prevented, wherever practicable, by the application of safety locks.

7.8 Where the procedures involve the removal of CMEs (for example, testing under a sanction-for-test), the earths should be secured with working locks. The keys to these locks should be retained by the Duty Authorised Person (HV), who should remove and replace the earths as requested.

Testing at high voltage

7.9 Where high voltage tests are to be undertaken, a sanction-for-test should be issued to the Competent Person (HV) who should be present throughout the duration of the tests.

7.10 The areas containing exposed live conductors, test equipment and any high voltage test connection should be regarded as high voltage enclosures and require the erection of a test enclosure.

High voltage test enclosures

7.11 Unauthorised access to a high voltage enclosure (see paragraph 6.29) should be prevented by, as a minimum, red-and-white-striped tape not less than 25 mm wide, suspended on posts, and by the display of high voltage danger signs. An Accompanying Safety Person (HV) or the Duty Authorised Person (HV) should be present throughout the duration of the tests, and the area should be continually watched while testing is in progress.

Withdrawable equipment

7.12 Voltage transformers must not be removed or replaced if any of the windings are energised. If they need to be removed, the equipment supplying the voltage transformer must be isolated.

7.13 When withdrawable electrical equipment has been disconnected from all supplies and withdrawn from its normal operational live position, its conductors must be discharged to earth but need not remain connected to earth. The enclosure and any shutters should be locked off, with the appropriate locks and notices.

Work on remotely and automatically controlled electrical equipment

7.14 Before work is carried out on remotely or automatically controlled equipment such as circuit breakers, isolators, tap-changing gear or associated air compressors, all remote-control and automatic features should first be rendered inoperative in such a manner that prevents any inadvertent operations being initiated (for example, deactivating signal ports or removal of actuators).

7.15 No work must be carried out on the controlling equipment, wiring or relays except by the Authorised Person (HV) or Competent Person (HV) working under the personal supervision of the Authorised Person (HV).

Electrical equipment which can be made live from a shared network supply system

Note:

Where an electrical system has the potential to be energised by a third party, consideration should be given to any simultaneous works being undertaken on the healthcare organisation's electrical systems to ensure that systems do not inadvertently become energised as a result of third-party activities. Works under the control of the healthcare organisation must be covered by an appropriate safety document. In some circumstances, the healthcare organisation's Authorised Person (HV) will need to notify third parties when accessing any healthcare organisation equipment that is connected to their system.

7.16 Except in an extreme emergency, any switching that may affect a shared network should be carried out with the full knowledge and agreement of the DNO concerned. The switching operation should be recorded by the Authorised Person (HV) in the HV site logbook. Emergency protocols should be documented as part of the local site safety policy and the demarcation agreement.

7.17 Switching to the DNO's instructions, or with their consent, should be carried out without delay. All switching – whether to a DNO's instructions or with their consent, or under conditions of emergency – should be reported to the DNO as soon as possible after each operation.

7.18 Where work is to be carried out on electrical equipment that is directly connected to a shared high voltage network, then any arrangements concerning switching, earthing,

the depositing of safety keys in the key safes and the issuing of any appropriate safety documentation should be the responsibility of an Authorised Person (HV) appointed by the DNO.

Identification and spiking of HV cables

7.19 Before the conductors of a cable are cut or exposed, the cable and the point-of-work on the cable must be identified with certainty.

7.20 The identification may be regarded as clear and certain if the cable can be clearly seen between a point-of-isolation and the point-of-work or if a rope loop is passed along those parts which are not visible.

7.21 Where a cable cannot be identified with certainty, the cable route plans for the site should be consulted. The cable should then be identified by signal injection via the cable cores using a cable identifier under a sanction-for-test. The cable should then be spiked at the point-of-work.

7.22 The spiking of cables must only be carried out by a person who has been specifically trained in the operation of the equipment in the presence of the Duty Authorised Person (HV).

Precautions prior to live voltage and phasing checks

7.23 Where live phasing is to be undertaken, the area containing exposed live conductors should be regarded as a high voltage test enclosure.

7.24 Approved equipment used for live voltage and phase checking at high voltage should be tested immediately before and after use against a high voltage test supply.

7.25 Live voltage and phase checking on high voltage equipment may only be undertaken by a Duty Authorised Person (HV) with assistance, if necessary, from a Competent Person (HV) acting on the instructions from the Duty Authorised Person (HV). Neither a permit-to-work nor a sanction-for-test is required but the Duty Authorised Person (HV) and any assistant should be accompanied by an Accompanying Safety Person (HV).

Work on busbar spouts of multi-panel switchboards

7.26 When work is to be carried out on busbar spouts, the following operations should be carried out in strict sequence:

a. The Authorised Person (HV) should record the details of necessary safety precautions and switching operations on a safety programme and produce an isolation and earthing diagram.

b. The section of the busbar spouts on which work is to be carried out must be isolated from all points of supply from which it can be made live.

c. The isolating arrangements should be locked so that they cannot be operated, and shutters of live spouts locked shut. Caution signs should be fixed to the isolating points.

d. Where applicable, danger signs should be attached on or adjacent to the **live** electrical equipment at the limits of the zone in which work is to be carried out.

e. Busbars should be checked by means of an approved voltage indicator to verify that they are dead**,** the indicator itself being tested immediately before and after use. The checking with the voltage indicator should be done on the panel to which the CMEs are to be applied. This test should also be made on the panel on which the work is carried out.

f. CMEs should be applied at a panel on the isolated section of the busbar other than that at which work is to be done using the method recommended by the

switchgear manufacturers. The insertion of hands or any tool into the contact spouts for this purpose is not an acceptable practice.

g. An additional earth connection should also be applied to all phases at the point-of-work.

h. The permit-to-work should be issued to cover the work to be done. During the course of the work, where applicable, the additional earth connection(s) at the point-of-work may be removed one phase at a time. Each phase earth connection must be replaced before a second-phase earth connection is removed.

i. On completion of the work, the permit-to-work should be cancelled.

Work on feeder spouts, voltage transformer spouts or single-panel busbar spouts

7.27 When work is to be carried out on feeder or voltage transformer spouts, or on busbar spouts of a single panel, the following operations should be carried out in strict sequence:

a. The Authorised Person (HV) should record the details of necessary safety precautions and switching operations on a safety programme and produce an isolation and earthing diagram.

b. The spouts on which work is to be carried out must be isolated from all points of supply from which they can be made live.

c. The isolating arrangements should be locked so they cannot be operated, and the shutters of live spouts should be locked shut. Caution signs should be fixed to all isolating points.

d. Where applicable, danger signs should be attached on or adjacent to the live electrical equipment at the limits of the zone in which work is to be carried out.

e. Spout contacts should be checked by means of an approved voltage indicator to verify that they are dead, the indicator itself being tested before and after use.

f. The circuit should be earthed with approved earthing equipment at the point-of-work and where practicable at all points of the isolation from the supply. For the purpose of earthing metal-clad switchgear, approved appliances only should be used. The insertion of hands or any tools into contact spouts for this purpose is not an acceptable practice.

g. A permit-to-work should be issued.

h. During the course of the work, where practicable, the earth connection(s) at the point-of-work may be removed one phase at a time. Each phase earth connection must be replaced before a second-phase earth connection is removed.

i. On completion of the work, the permit-to-work should be cancelled.

Work on distribution transformers

7.28 When work is to be carried out on the connections to, or the windings of, a distribution transformer:

a. The Authorised Person (HV) should record the details of necessary safety precautions and switching operations on a safety programme, and produce an isolation and earthing diagram.

b. The switchgear or fuse gear controlling the high voltage windings should be switched off, with a safety lock and

caution sign fitted and switched into cable earth with safety lock.

c. The low voltage output of the transformer switch or isolator should be switched off, and a safety lock and caution sign fitted to prevent the switch being energised during the course of the work.

d. Danger signs should be attached on or adjacent to the live electrical equipment at the limits of the zone in which work is to be carried out.

e. The transformer should be proved dead at the points-of-isolation if practicable. Where it is necessary to remove covers to confirm/demonstrate dead, this must be undertaken under a permit to work.

f. An earth should then be applied to the high voltage winding via the switchgear and a safety lock fitted. If the proprietary earthing gear is available for the low voltage switchgear, it should be fitted and safe locks applied (it is advisable to retest for dead before fitting this earthing gear).

g. Before a permit-to-work is issued, the Authorised Person (HV) should, at the point-of-work in the presence of the Competent Person (HV), identify and mark the transformer to be worked on. The permit-to-work and the key to the key safe should then be issued to the Competent Person (HV).

h. If the conductors of the transformer are exposed during the work, the Authorised Person (HV) should confirm dead via a high voltage indicator to the satisfaction of the Competent Person (HV) before any physical contact is made.

7.29 The transformer must be isolated from all common neutral earthing equipment from which it may become live**.** This does not require the disconnection of solidly earthed neutrals or neutral equipment connected solely to the transformer on which work is to be done.

Work on HV generators

7.30 When work is to be carried out on the connections to, or the windings of, a generator:

a. The Authorised Person (HV) should record the details of necessary safety precautions and switching operations on a safety programme and produce an isolation and earthing diagram.

b. The switchgear supplied by the high voltage windings should be switched off and a safety lock and caution sign fitted. Care should be taken to ensure that any auxiliary supplies are also isolated with safety locks and caution sign fitted.

c. The engine starting mechanism should be inhibited and safety locks and caution signs fitted. Caution signs should be fitted to the engine start panel.

d. Danger signs should be attached on or adjacent to the live electrical equipment at the limits of the zone in which work should be carried out.

e. The generator should be proved dead at the points-of-isolation if practicable.

f. The neutral earth resistors (NERs) should be isolated and an earth applied with safety lock and caution sign.

g. An earth should then be applied to the high voltage winding via the switchgear and a safety lock fitted.

h. Before a permit-to-work is issued, the Authorised Person (HV) should, at the point-of-work in the presence of the Competent Person (HV), identify and mark the generator to be worked on. The permit-to-work and the key to the key safe should then be issued to the Competent Person (HV).

i. If the conductors of the generator are exposed during the work, the Authorised Person (HV) should confirm dead via a high voltage indicator to the satisfaction of the Competent Person (HV) before any physical contact is made.

Issuing of a permit-to-work or sanction-for-test

7.31 Before a permit-to-work or a sanction-for-test is issued, the Duty Authorised Person (HV) should identify the equipment on which the work or test is to be undertaken. If the work involves, or may involve, obtaining access to items of equipment over which confusion could occur, the Duty Authorised Person (HV) should identify such items to the Competent Person (HV) and apply temporary marking/signs to them.

7.32 Before issuing a permit-to-work or sanction-for-test, the Authorised Person (HV) should show the Competent Person (HV) the isolation and earthing diagram and indicate the safety arrangements at the points-of-isolation and at the point-of-work or test. The Authorised Person (HV) should ensure that the Competent Person (HV) understands all the relevant safety procedures and precautions. If the Competent Person (HV) thereafter accepts the permit or sanction, that person becomes responsible for the defined work or test until the permit or sanction is cancelled.

7.33 Authorised Persons (HV) undertaking tasks requiring permits-to-work or sanctions-for-test should issue the documents to themselves. All such documents must be countersigned by a site-certified Authorised Person (HV) before the work or test starts. The Authorised Person (HV) then becomes the Competent Person (HV).

Summary

7.34 Tables 1–3 on the following pages summarise the procedures to be carried out for work/tests undertaken on high voltage equipment.

Table 1 – Procedures to be carried out by an Authorised Person (HV) to enable work on high voltage equipment

Steps1	Procedure
1 Plan work and prepare safety documentation	(i) Determine the scope of works, prepare and review required risk assessments, assess any potential control measures and access arrangements that are required as part of the works, and agree potential dates and times with appropriate personnel. This may require the preparation of a task-specific planning document, which may require approval by members of the ESG. (ii) Prepare a safety programme and an isolation and earthing diagram in duplicate, and obtain countersignatures from another Authorised Person (HV). Note: A separate safety programme and isolation and earthing diagram should be produced for issue of a permit to work and/or sanction for test. Restoration of the supplies and system should also be recorded on the safety programme; these can be part of the original safety programme or a new safety programme.
2 Isolate and fix signs	(i) Sign on as the Duty Authorised Person (HV), and post Authorised Person on duty and HV work in progress signs and check mimic diagram. (ii) Duty Authorised Person (HV) to confirm with the appropriate person(s) that the work is authorised to take place. (iii) Disconnect from all sources of supply, and fix safety locks and caution signs at all points of disconnection to prevent unauthorised reconnection. (iv) Fix danger signs on live equipment adjacent to the point of work.
3 Prove dead	(i) Prove dead with a high voltage potential indicator at all accessible points of isolation. (ii) Where appropriate, prove dead on the low voltage side of a transformer, that is LV feed pillars, LV distribution boards, etc. Note: Where not practical to prove dead, confirming dead will be required after the issue of safety documentation prior to commencement of the work/task.
4 Earth	(i) Earth conductors at all points of isolation and fix safety locks to earths. (ii) Identify cables with certainty or spike underground cables at the point(s) of work if the conductors are to be cut or exposed. (iii) Earth overhead lines near the working places.
5 Issue the permit-to-work	(i) Duty Authorised Person (HV) to clearly identify the equipment to be worked on. (ii) The Competent Person (HV) should be shown the safety arrangements carried out at all the points of isolation and at the locations of the work on the isolation and earthing diagram and should initial the isolation and earthing diagram. (iii) Issue the permit to work, isolation and earthing diagram and the key to the safety key-box to the Competent Person (HV). (iv) Where conductors are to be exposed as part of the work and it was not practicable to prove dead in Step 3, confirm dead* (see paragraph 8.66). (v) Adjust mimic diagram and complete the HV site logbook.
6 Undertake the work/test	The Competent Person (HV) should undertake or directly supervise the work.
7 Check the equipment	(i) Once the work/test has been completed, the Competent Person (HV) should confirm to the Duty Authorised Person (HV) that the work/test has been completed. The Duty Authorised Person (HV) to confirm they are satisfied the equipment is safe to energise or test. (ii) If the work/test has been stopped, check the equipment and area is safe.
8 Cancel the permit-to-work	(i) Competent Person (HV) to return the permit to work, isolation and earthing diagram and Competent Person key to the safety key-box to the Duty Authorised Person (HV). (ii) Competent Person (HV) to sign part 3 of the permit-to-work, Duty Authorised Person (HV) to sign part 4 and confirm that the permit-to-work is now cancelled and no further work can be carried out. (iii) Where tests are required, follow Table 2.
9 Restore to operational state	(i) Follow the steps in the safety programme for restoration of supplies. (ii) Adjust mimic, remove Authorised Person (HV) on duty and HV work in progress signs, complete HV site logbook and return keys, sign off as Duty Authorised Person (HV). (iii) Retain all documents associated with the work in the OPM.
Notes: 1 The Authorised Person (HV) is responsible for all tasks.	

Table 2 – Procedures to be carried out by an Authorised Person (HV) to enable testing on high voltage equipment

Steps1	Procedure
1 Plan work and prepare safety documentation	(i) Determine the scope of works, prepare and review required risk assessments, assess any potential control measures and access arrangements that are required as part of the works, and agree potential dates and times with appropriate personnel. This may require the preparation of a task-specific planning document, which may require approval by members of the ESG. (ii) Prepare a safety programme and an isolation and earthing diagram in duplicate, and obtain countersignatures from another Authorised Person (HV) Note: A separate safety programme and isolation and earthing diagram should be produced for issue of a permit to work and/or sanction for test. Restoration of the supplies and system should also be recorded on the safety programme; these can be part of the original safety programme or a new safety programme. These can either be on a single safety programme, or separate documents.
2 Isolate and fix signs	(i) Sign on as the Duty Authorised Person (HV), and post Authorised Person on duty and HV work in progress signs and check mimic diagram. (ii) Duty Authorised Person (HV) to confirm with the appropriate person(s) that the work is authorised to take place. (iii) Disconnect from all sources of supply, and fix safety locks and caution signs at all points of disconnection to prevent unauthorised reconnection. (iv) Fix danger signs on live equipment adjacent to the point of work. (v) If HV test enclosure is needed, set up barriers and fix danger signs.
3 Prove dead	(i) Prove dead with an approved high voltage potential indicator at all accessible points of isolation. (ii) Where appropriate, prove dead on the low voltage side of a transformer, that is LV feed pillars, LV distribution boards, etc. Note: Where not practical to prove dead, confirming dead will be required after the issue of safety documentation prior to commencement of test.
4 Earth	(i) Earth conductors at all points of isolation and fix safety locks to earths that cannot be removed as part of the sanction-for-test; fix working locks to earths that can be removed for testing purposes according to the sanction-for-test. (ii) Where applicable, replace safety locks on earths with working locks where earths are to be removed for testing following the cancellation of a permit-to-work. (iii) Earth overhead lines near the working places.
5 Issue the sanction-for-test	(i) Duty Authorised Person (HV) to clearly identify the equipment to be tested and the points of test. (ii) The Competent Person (HV) should be shown the safety arrangements carried out at all the point(s) of isolation and at the locations of the testing on the isolation and earthing diagram and should initial the isolation and earthing diagram. (iii) Issue the sanction-for-test, isolation and earthing diagram and the key to the safety key-box to the Competent Person (HV). (iv) Duty Authorised Person (HV) to retains keys to removable earths, and to remove and reapply earths as requested. (v) Where conductors are to be exposed as part of the work and it was not practicable to prove dead in Step 3, confirm dead* (see paragraph 8.66). (vi) Adjust mimic diagram and complete the HV site logbook.
6 Undertake the test	The Competent Person (HV) should undertake or directly supervise the test.
7 Check the equipment	(i) Once the test has been completed, the Competent Person (HV) should confirm to the Duty Authorised Person (HV) that the test has been completed. The Duty Authorised Person (HV) to confirm they are satisfied the equipment is safe to energise or test. (ii) If the test has been stopped, check the equipment and area is safe.

Continued

8 Cancel the sanction-for-test	(i) Competent Person (HV) to return the **sanction-for-test**, isolation and earthing diagram and Competent Person key to the safety key-box to the Duty Authorised Person (HV). (ii) Competent Person (HV) to sign part 3 of the sanction-for-test, Duty Authorised Person (HV) to sign part 4 and confirm that the sanction is now cancelled and no further testing can be carried out.
9 Restore to operational state	(i) Follow the steps in the safety programme for restoration of supplies. (ii) Adjust mimic, remove Authorised Person on duty and HV work in progress signs, complete HV site logbook and return keys, sign off as Duty Authorised Person (HV). (iii) Retain all documents prepared in the OPM.
Notes: 1 The Authorised Person (HV) is responsible for all tasks.	

Table 3 – Procedures to be carried out by an Authorised Person (HV) to enable work on high voltage generating equipment

Steps1	Procedure
1 Plan work and prepare safety documentation	(i) Determine the scope of works, prepare and review required risk assessments, method statements and any potential control measures and access arrangements that are required as part of the works, and agree potential dates and times with appropriate personnel. (ii) Prepare a safety programme and an isolation and earthing diagram in duplicate, and obtain countersignatures from another Authorised Person (HV). Note – A separate safety programme and isolation and earthing diagram should be produced for issue of a permit to work and/or sanction for test. Restoration of the supplies and system should also be recorded on the safety programme; these can be part of the original safety programme or a new safety programme. These can either be on a single safety programme or separate documents.
2 Isolate and fix signs	(i) Sign on as the Duty Authorised Person (HV), and post Authorised Person on duty and HV work in progress signs and check mimic diagram. (ii) Duty Authorised Person (HV) to confirm with the appropriate person(s) that the work is authorised to take place. (iii) Inhibit engine start. Isolate the generator and disconnect from all sources of supply, fix safety locks and caution signs at all points of isolation/disconnection to prevent unauthorised connection, operation or starting. (iv) Fix caution signs at all points of isolation, including the generator control panel. (v) Where practicable isolate the generator neutral earthing resistor and fix caution signs and safety lock. (vi) Fix danger signs on live equipment adjacent to the point of work.
3 Prove dead	Prove dead with an approved high voltage test indicator at all accessible points of isolation or accessible places of work.
4 Earth	Where practicable earth the neutral and line output terminals and conductors and fix safety locks, where practicable.
5 Issue the permit-to-work	(i) Duty Authorised Person (HV) to clearly identify and/or mark the point of work/equipment to be worked on. (ii) The Competent Person (HV) should be shown the safety arrangements carried out at all the point(s) of isolation and the location(s) of the work on the isolation and earthing diagram and should initial the isolation and earthing diagram. (iii) Issue the permit to work, isolation and earthing diagram and the key to the safety key-box to the Competent Person (HV). (iv) Where conductors are to be exposed as part of the work and it was not practicable to prove dead in Step 3, confirm dead* (see paragraph 8.66). (v) The Authorised Person (HV) is to remain with the Competent Person (HV) until the conductors have been made accessible to high voltage indicator and, the Authorised Person (HV) should confirm the equipment dead to the satisfaction of the Competent Person (HV). (vi) Adjust mimic diagram and complete the HV site logbook.
6 Undertake the work	The Competent Person (HV) should undertake or directly supervise the work and, on completion or when the work is stopped and made safe, return the original permit-to-work, isolation and earthing diagram and the HV key to the safety key-box to the Duty Authorised Person (HV) and complete and sign part 3 of the permit-to-work retained in the pad.
7 Check the equipment	(i) Once the work has been completed, the Duty Authorised Person (HV) to confirm they are satisfied the equipment is safe to energise or test. (ii) If the work has been stopped, check the equipment and area is safe.

Continued

8 Cancel the permit-to-work	(i) Competent Person (HV) to return the permit to work, isolation and earthing diagram and Competent Person key to the safety key-box to the Duty Authorised Person (HV). (ii) Competent Person (HV) to sign part 3 of the permit-to-work, Duty Authorised Person (HV) to sign part 4 and confirm that the permit-to work is now cancelled and no further work can be carried out.
9 Restore to operational state	(i) If testing is required then follow the steps in Table 2. (ii) Remove danger signs adjacent to point of work. (iii) Remove caution signs and safety locks. (iv) Follow the steps in the safety programme for restoration of the equipment to the normal operational state. (v) Adjust mimic, remove Authorised Person on duty and HV work in progress signs, complete HV site logbook and return keys, sign off as Duty Authorised Person (HV). (vi) Retain all documents associated with the work in the OPM
Notes: 1 The Authorised Person (HV) is responsible for all tasks.	

8 Operating records

In order to support the NHS's commitment to digital transformation and transfer to a paperless NHS, electronic versions of the safety documents, operating records and filing systems referred to in this HTM should be considered. Where implemented, they should be of at least an equal standard to that outlined in this HTM.

General

8.1 For each site for which Authorised Persons (HV) have been appointed, records should be kept as listed in the following sections. These records should be accurate and kept up-to-date.

8.2 All documentation for the site should be kept within the folder as appropriate either permanently or for a period of three years as indicated. Thereafter, the documents should be archived.

HV site logbook

8.3 For each site for which Authorised Persons (HV) have been appointed, an HV site logbook should be available.

8.4 The logbook should be clearly and indelibly marked with the name of the site, the location and the system or installation to which it refers, and should be kept in the lockable document cabinet when not in use.

8.5 The logbook should be retained by, and all entries should be made by, the Duty Authorised Person (HV) appointed for the particular geographical area.

8.6 Entries should be made in chronological order, each entry being ruled off with a horizontal line across the page. Entries should show:

a. a record of the Authorising Engineer's (HV) annual audit visit signed by the Authorising Engineer (HV)

b. the acceptance and relinquishing of Duty Authorised Persons' responsibilities between Authorised Persons (HV)

c. the removal, return and the transfer of the Authorised Person's (HV) key from the Authorised Person's (HV) key-box

d. the issue and return of any key for high voltage equipment, that is switchgear, substations, transformers, etc.

e. the issue, cancellation, loss or withdrawal of a safety document

f. the receipt, termination and remedial action associated with a defect notification

g. each individual operation of high voltage switchgear and the reasons which are not included in a safety programme

h. a summary of the operation of any automatic switching sequence including unforeseen events/incidents which affect the receipt, transmission or

supply of electrical power to the healthcare organisation

i. adjustment of the mimic diagram to indicate the present state of the system or installation

j. the withdrawal or replacement of the Authorised Person's (HV) duplicate key and of any other duplicate keys

k. quarterly inspection of substations

l. the annual inspection of protective equipment, test equipment and the six monthly inspection of portable earthing equipment

m. loss of electrical power to the healthcare site and reinstatement (could also include black starts)

n. issue of demarcation documentation and associated permit-to-work/ limitation-of-access.

8.7 On relinquishing their duties, the Authorised Person (HV) should double-underline the final entry

8.8 Completely filled logbooks should be retained in the lockable document cabinet for a period of three years after the date of the last entry.

Substation logbook

8.9 For each high voltage substation for which the Authorised Person is responsible, a bound hard-covered book (not loose-leaf) with sequentially numbered pages should be clearly and indelibly marked with the name of the substation to which it refers and should be kept in the substation at all times.

8.10 The substation logbook should be printed in black on white paper.

8.11 Entries should be made in chronological order, each entry being ruled off with a horizontal line across the page. Entries should show:

a. every entry into the substation and the reason for entry

b. the three monthly Authorised Person (HV) substation inspections

c. the times of deactivation and activation of any automatic fire suppression system.

8.12 Completely filled substation logbooks should be retained in the lockable document cabinet for a period of three years after the date of the last entry.

Authorised Person's (HV) logbook

8.13 Each Authorised Person (HV) should assemble an Authorised Person's (HV) logbook. Entries should show.

a. training courses attended including refresher training

b. a record of the familiarisation training prior to the Authorising Engineer's interview with the Authorised Person

c. a record of the Authorising Engineer's initial and subsequent interviews

d. date when Authorised Person's (HV) duties were accepted

e. record of personal switching including times and dates

f. a record of the Authorising Engineer's (HV) review signed by the Authorising Engineer (HV).

Operational procedures manual (OPM)

8.14 For each site for which Authorised Persons (HV) have been appointed, a folder entitled "Operational procedures manual" should be prepared. Note that this may constitute several files.

8.15 The folder should be clearly and indelibly marked with the name of the site, location, system or installation to which it refers and should be kept in the lockable document cabinet when not in use.

8.16 An electronic version of the OPM should constitute the same details as a hard-copy/ folder OPM. This should be agreed with the ESG on recommendation of the Authorising Engineer (HV). A document should be available detailing the file location(s) for the digital information.

8.17 The OPM should contain, in separate sections, a copy of each of the following:

a. the healthcare organisation's letter of appointment and certificate of appointment issued to the Authorised Person (HV), or a contractor's Authorised Person (HV)

b. the healthcare organisation's letter of appointment issued to the Authorising Engineer (HV)

c. certificate of appointment issued to a Competent Person (HV), or – for the contractor's Competent Person (HV) – a register of Competent Persons (HV) including details and dates of training, issue dates and review dates of certificates

d. RAMs for any maintenance and inspections on HV equipment

e. the site switchgear and transformer schedule detailing the manufacturer, type, serial numbers, protection settings, maintenance dates and frequency of maintenance completed/ expected

f. the site discrimination/protection study and a log of actions taken as a result of alterations to the system

g. an index of the current as-installed drawings of the electrical system(s) indicating substation locations

h. a log of received and cancelled defect notifications and the actions taken

i. inspection report and details of any remedial work undertaken in connection with a defect notification

j. demarcation agreements with other organisations

k. demarcation agreements with contractors and/or a DNO

l. any operational agreements with a DNO (COMA)

m. the original copy of every approved and completed safety programme, isolation and earthing diagram and cancelled permit-to-work/sanction-for-test including any completed and subsequently not used. All should be clearly identified in date order within the OPM and recorded in the HV site logbook

n. details of protective equipment, test equipment and portable earthing equipment kept within the establishment, including specifications, operators' or users' instructions, maintenance instructions and, where appropriate, calibration records

o. audits carried out in accordance with this HTM and associated action plans

p. valid standing operating procedures and local house rules

q. current copy of the electrical safety policy

r. any other document deemed relevant by the Authorising Engineer (HV) and Authorised Person (HV).

8.18 Each document added to a section of the OPM should be sequentially numbered.

8.19 Documents in the OPM should be retained for a period of three years after the date of their cancellation or termination and thereafter archived.

8.20 The OPM should also contain a reference copy of the current edition of HTM 06-03, Electricity at Work Regulations and any standards associated with the installation (or details of where the electronic version is accessible).

Operating and maintenance manuals

8.21 For each geographical area of responsibility for which Authorised Persons (HV) have been appointed, one or more folders/electronic files entitled “operating and maintenance manual” should be prepared.

8.22 The folder should be clearly labelled with the name of the site, location, system, installation or equipment to which it refers and kept in the lockable document cabinet when not in use.

8.23 The folder as a minimum should contain:

a. manufacturers’ maintenance and operating instructions for each type of high voltage distribution switchgear and transformers installed in the system or installation, with test certificates and relevant records

b. a copy of any action taken to remediate equipment following the issue of any current defect notifications (NeDeRS, DIN or SOP) applicable to any equipment installed in the system or installation

c. a copy of the current “as-installed” drawings of the system(s)

d. details of the maximum system fault levels and any changes to them (informed by the DNO)

e. the details of fuse-link type and ratings, relay settings and protection settings.

8.24 An electronic version of the manual should include the same details as a hard-copy folder.

Maintenance records

8.25 All maintenance records are of value in establishing the frequency of maintenance. Therefore, a careful note should be taken of relevant items each time maintenance is performed.

8.26 Electronic records of all documentation should be recorded and maintained.

8.27 The site switchgear and transformer (S&T) schedule should be updated when new equipment is installed and commissioned and should contain at least the following information:

a. the manufacturer’s details including nameplate particulars of the equipment installed, its serial number, the manufacturer’s order number (if known) and the date of installation

b. location of the manufacturer’s manual and list of recommended spares

c. dates of last maintenance operations and note of the operation counter reading at that time (if fitted) or an estimate of the number of operations

d. the type of maintenance carried out and the date when the next expected maintenance is due

e. records of any findings where the condition of the equipment varied from the expected, the action taken and the condition of important components when the equipment was put back in service

f. any special safety requirements, relating to the operation of installed equipment.

8.28 Every significant fault or breakdown should be recorded and analysed with a view to taking action to prevent its recurrence.

Safety documentation

8.29 Prior to any planned works or tests being carried out, the Duty Authorised Person (HV) should obtain all the necessary risk assessment method statements (RAMS) from contractors for review.

8.30 A permission for disconnection should be obtained and signed by the person in charge of the area to be affected prior to the execution of any planned work.

8.31 On completion of all works, all the associated documentation (for example, RAMS, permission for disconnection) should be retained in the OPM with the corresponding safety documentation.

8.32 In instances where it is deemed appropriate, the Authorising Engineer may, in the absence of a countersigning signatory Authorised Person (HV), countersign safety documentation.

8.33 If electronic safety documents are used/to be used, then they should match the templates in Appendix 2. Authorisation should be given by the ESG and the Authorising Engineer (HV) if electronic safety documents are used/to be used.

Isolation and earthing diagram

8.34 All original copies of completed isolation and earthing diagrams should be retained in the OPM for three years following the date of implementation.

8.35 The duplicate of the isolation and earthing diagram should remain in the pad.

8.36 An isolation and earthing diagram should be prepared before any permit-to-work or sanction-for-test is issued. The isolation and earthing diagram should indicate the safety arrangements that should be implemented at the points-of-isolation and the place/point of work to make the equipment safe for the execution of the work or test.

8.37 The isolation and earthing diagram should be printed in black on pale-green paper. It should have an original and a duplicate of each page, and each page of a diagram should bear the same pre-printed serial number. Pads of numbered forms should be used in sequence.

Content of isolation and earthing diagram

8.38 An isolation and earthing diagram should show:

a. the name, signature and date of the originating Authorised Person (HV)

b. the name, signature and date of the countersigning Authorised Person (HV)

c. the serial number and date of the safety programme and permit-to-work/sanction-for-test

d. the purpose of the proposed work or test

e. the equipment that the proposed sequence of operations will make safe for the work or test to be undertaken

f. a sketch including:

   (i) the cables and equipment to be worked on or tested

   (ii) the points-of-isolation where safety locks and caution signs are fitted

   (iii) the points-of-earthing where safety locks are fitted

   (iv) the points-of-work or test including additional earths

   (v) any danger signs fitted.

Implementing the isolation and earthing diagram

8.39 The Duty Authorised Person (HV) should note on the original copy of the isolation and earthing diagram the serial numbers of the safety programme, permit-to-work or sanction-for-test to enable them to be cross-referenced.

8.40 The Duty Authorised Person (HV) should show the isolation and earthing diagram to the Competent Person (HV) indicating the safety arrangements at the points-of-isolation and earthing at the point(s) of the work or test. The Competent Person (HV) should initial the document to indicate an understanding of the safety arrangements in place.

8.41 The isolation and earthing diagram should then be attached to the permit-to-work or sanction-for-test before being issued.

On completion of the work or test

8.42 On completion, the original isolation and earthing diagram should be placed in the OPM, with the corresponding cancelled permit or sanction-for-test, safety programme and relevant documents.

8.43 If the Competent Person (HV) has lost the original of the isolation and earthing diagram, the loss should be recorded in the HV site logbook by the Duty Authorised Person (HV). The Competent Person (HV) should countersign the duplicate to confirm the loss of the original.

Safety programme

8.44 All original copies of completed safety programmes should be retained in the OPM for three years following the date of implementation.

8.45 The duplicate of the safety programme should remain in the pad.

8.46 Before any permit-to-work or sanction-for-test is issued, a safety programme, detailing the intended sequence of safety operations to be performed to make the equipment safe for the execution of the work or test, should be prepared.

8.47 A safety programme should be printed in black on pale-green paper. It should have an original and a duplicate of each page, and each page of the safety programme should bear the same pre-printed serial number of the first page. Subsequent serial numbers should be crossed out.

8.48 Pads of numbered forms should be used in sequence.

Content of the safety programme

8.49 The safety programme should be completed in duplicate by the Duty Authorised Person (HV) who will be responsible for issuing the permit-to-work or sanction-for-test and should indicate:

a. confirmation, where applicable, that prior notification has been given to persons and/or departments who will be affected by the proposed operations and that contingency plans, where required for critical care areas, can be implemented in an emergency

b. the name and signature of the originating Duty Authorised Person (HV)

c. the name and signature of the countersigning Authorised Person (HV)

d. the date the countersigned programme is to commence

e. the purpose of the proposed work or test

f. the equipment that the proposed sequence of operations will make safe for the work or test to be undertaken

g. the sequence of operations to be undertaken up to and including the

issue of a permit-to-work or sanction-for-test

h. the location, including any name and identification code, at which each operation should be performed

i. the identity of each item of equipment to be operated (this should be what is stated on the local label on the switchgear or alternatively the generic type, manufacturer's name and type reference)

j. the operation to be performed and the reason for the operation

k. any "items required" (for example, keys, locks, safety signs, protective equipment, handles, document, etc.)

l. the requirement for an Accompanying Safety Person (HV) for a specific operation

m. any intended special instructions or safety measures to be included on the permit-to-work or sanction-for-test

n. issue of permit-to-work or sanction-for-test

o. the sequence of operations to be undertaken following the cancellation of the permit-to-work, sanction-for-test or certificate of isolation and earthing up to and including reinstatement of the system to normal operational status, including live voltage and phasing tests

p. acceptance and relinquishing of a certificate of isolation from a third party in control of the HV system, if applicable.

8.50 When a safety programme has been completed, if a countersignature is required, it should be countersigned by another Authorised Person (HV) who has a detailed working knowledge of the particular system involved.

Implementing the safety programme

8.51 Before commencing the sequence of operations detailed on the countersigned safety programme, the Duty Authorised Person (HV) should confirm that the person(s) responsible for the day-to-day operational management of the areas to be affected by the intended work or test are fully aware of the effect this will have on the electrical supplies to the affected area.

8.52 The Duty Authorised Person (HV) should refer to the original of the safety programme while carrying out the sequence of operations detailed on the programme. Subsequent pages of a safety programme should bear the serial number of the first page. Subsequent serial numbers should be crossed out.

8.53 The Duty Authorised Person (HV) should note on the original and duplicate copy of the safety programme the date and time of each switching operation.

8.54 The serial number of the isolation and earthing diagram, permit-to-work or sanction-for-test should be entered on the safety programme.

Completion of the safety programme

8.55 On completion of the sequence of operations detailed on the safety programme, a summary should be entered in the HV site logbook. This summary should include the safety programme serial number, start and finish times, and reason.

8.56 On completion, the original safety programme should be retained in the OPM with the corresponding permit, isolation and earthing diagram and relevant documents and be retained for three years following the date of implementation.

Permit-to-work

8.57 A permit-to-work should be printed in black on pale-blue paper. It should have an original and a duplicate page for part 1 and a

single page for parts 2, 3 and 4. Each page of a permit should bear the same serial number. Pads of numbered forms should be used in sequence.

8.58 Only one pad of permit-to-work forms should be used for the geographical area for which an Authorised Person (HV) has responsibility.

8.59 When not in use, the pads of permit-to-work forms should be kept in the lockable document cabinet in the Authorised Person's (HV) office.

Issue and acceptance of a permit-to-work

8.60 A permit-to-work should not be issued for any item of equipment, installation or system for which an existing permit-to-work remains valid, nor for any installation which is within an area for which a limitation-of-access exists unless a risk assessment indicates that it is safe to do so.

8.61 Except where an Authorised Person (HV) is to undertake the work personally, permits-to-work should be issued only to a Competent Person (HV).

8.62 Duty Authorised Persons (HV) undertaking tasks requiring a permit-to-work to be issued to themselves should have the document issued by another site-certified Authorised Person (HV). The Authorised Person (HV) receiving the safety document then becomes the Competent Person (HV).

8.63 Permits-to-work with the isolation and earthing diagram attached should be issued at the location of the work to be undertaken. The issue and cancellation of every permit should be recorded in the HV site logbook.

8.64 Before offering a permit-to-work to a Competent Person, the Authorised Person (HV) should:

a. physically identify by marking clearly to the Competent Person (HV) the equipment to be worked on

b. show the Competent Person (HV) the safety arrangements at the points of isolation and point of work indicated on the isolation and earthing diagram. The Competent Person (HV) should initial the isolation and earthing diagram to confirm their understanding

c. ensure the Competent Person (HV) is aware of the exact extent of the work to be undertaken

d. draw the attention of the Competent Person (HV) to any special instructions or safety measures noted in part 1 of the permit

e. demonstrate to the satisfaction of the Competent Person (HV) that the equipment is dead and safe to work on.

8.65 Alternatively, the Duty Authorised Person (HV) should remain with, and supervise, the Competent Person (HV) until conductors have been made accessible to a suitable voltage test indicator and the equipment confirmed dead to the satisfaction of the Competent Person (HV) before the work proceeds.

8.66 Exceptionally, for high voltage equipment where it is not practical to prove the equipment dead before issuing a permit-to-work, the Duty Authorised Person (HV), having issued the permit, should remain with and supervise the Competent Person (HV) until conductors have been made accessible to a suitable high voltage potential indicator (or voltage test indicator for proving dead at the low voltage conductors of a high voltage transformer). The Duty Authorised Person (HV) is then, without any delay, to confirm the equipment dead by means of an approved voltage testing device, which should be checked for correct operation before and after use before allowing the Competent Person (HV) to assume control of the work.

8.67 Before the permit-to-work is accepted, the Competent Person (HV) – having understood the work to be undertaken and being prepared to carry it out – should sign to accept any special instructions or safety measures noted in the permit and should complete and sign parts 1 and 2.

8.68 The Duty Authorised Person (HV) retains the duplicate of part 1 with parts 2, 3 and 4 in the permit pad.

8.69 After accepting the permit-to-work and the Competent Person's (HV) key to the safety key-box, the Competent Person (HV) becomes responsible for personally supervising or undertaking the defined work.

8.70 The Competent Person (HV) should not leave the location of the work or undertake other work or tests while the defined work is in progress.

8.71 During any temporary absence of the Competent Person (HV) from the location of the work, the work should be suspended and adequate safety precautions taken until the work is resumed on the return of the Competent Person (HV).

Cancellation of the permit-to-work

8.72 Having completed the work, withdrawn all persons, materials, instruments and tools from the location of the work and advised all persons associated with the work that it is no longer safe to work on the equipment, the Competent Person (HV) should complete and sign part 3 of the permit retained in the pad, and return the original of part 1 to the Authorised Person (HV).

8.73 Where the work has been suspended, the same procedures apply, but in addition the Competent Person (HV) confirms that the equipment has been made safe pending the issue of another permit-to-work or sanction-for-test from the Duty Authorised Person (HV).

8.74 Upon completion of the work, the Duty Authorised Person (HV) should check that the work has been satisfactorily completed and that the equipment is safe to return to an operational state.

8.75 The Duty Authorised Person (HV) should then cancel the permit by marking the original part 1 as "cancelled" and storing it in the OPM and completing and signing part 4 of the permit retained in the pad.

8.76 On completion, the original permit should be retained in the OPM with the corresponding safety programme, isolation and earthing diagram and relevant documents and be retained for three years following the date of implementation. The duplicate page should be retained in the pad.

8.77 If the Competent Person (HV) has lost the original of part 1 of the permit, the loss should be recorded by the Duty Authorised Person (HV) in part 4 of the permit in the pad and in the HV site logbook.

8.78 The Competent Person (HV) should countersign part 4 to confirm the loss of the original. The loss of a permit should be reported to the Authorising Engineer (HV).

8.79 Completed pads of permit forms should be retained in the lockable document cabinet for three years after the date of cancellation of the last permit issued from the pad.

Sanction-for-test

General

8.80 A sanction-for-test should be issued by an Authorised Person (HV) to a Competent Person (HV) before any testing of equipment at high voltage begins.

8.81 A sanction-for-test should be printed in black on pale-yellow paper. It should have an original and a duplicate page for part 1 and a single page for parts 2, 3 and 4. Each page of a sanction-for-test should bear the ssme serial number. Pads of numbered forms should be used in sequence.

8.82 Only one pad of sanction-for-test forms should be used for each geographical area for which an Authorised Person (HV) has responsibility.

8.83 When not in use, the pads of sanction-for-test forms should be kept in the relevant lockable document cabinet in the Authorised Person's (HV) office.

Issue and acceptance of sanction-for-test

8.84 A sanction-for-test should not be issued for any item of equipment, installation or system for which an existing sanction-for-test and/or permit-to-work remains valid, nor for any equipment which is within an area for which a limitation-of-access exists unless a risk assessment indicates that it is safe to do so.

8.85 Except where an Authorised Person (HV) is to undertake the work personally, sanctions-for-test should be issued only to Competent Persons (HV).

8.86 Duty Authorised Persons (HV) undertaking tasks requiring a sanction-for-test to be issued to themselves should have the document countersigned by another site-certified Authorised Person (HV). The Duty Authorised Person (HV) then becomes the Competent Person (HV).

8.87 Sanctions-for-test should be issued at the location of the work to be undertaken. The issue and cancellation of every sanction-for-test should be recorded in the HV site logbook.

8.88 Before offering a sanction-for-test to a Competent Person (HV), the Authorised Person (HV) should:

a. physically identify by marking to the Competent Person (HV) the equipment on which the test is to be undertaken

b. show the Competent Person (HV) the safety arrangements at the points of isolation and point of test indicated on the isolation and earthing diagram. The Competent Person (HV) should initial the isolation and earthing diagram to confirm their understanding

c. ensure the Competent Person (HV) is aware of the extent of the test to be undertaken

d. draw the attention of the Competent Person (HV) to any special instructions or safety measures noted in part 1 of the sanction-for-test

e. demonstrate to the satisfaction of the Competent Person (HV) that the equipment is dead and safe to test.

8.89 The Competent Person (HV) should sign the receipt for the sanction-for-test to allow the work to proceed.

8.90 Exceptionally, for high voltage equipment where it is not practical to prove the equipment dead before issuing a sanction-for-test, the Duty Authorised Person (HV), having issued the sanction, should remain with and supervise the Competent Person (HV) until conductors have been made accessible to an approved high voltage potential indicator (or voltage test indicator for proving dead at the low voltage conductors of a high voltage transformer). The Duty Authorised Person (HV) is then to confirm the equipment dead before allowing the Competent Person (HV) to assume control of the test.

8.91 Before the sanction-for-test is accepted, the Competent Person (HV) – having understood the test to be undertaken and being prepared to carry it out – should sign to accept any special instructions or safety measures noted in the sanction-for-test and should complete and sign parts 1 and 2.

8.92 The Duty Authorised Person (HV) retains the duplicate of part 1 with parts 2, 3 and 4 in the sanction-for-test pad.

8.93 After accepting the sanction-for-test, the Competent Person (HV) becomes responsible

for personally supervising or undertaking the defined test.

8.94 The Competent Person (HV) should not leave the location of the test or undertake other work or tests while the defined work is in progress.

8.95 During any temporary absence of the Competent Person (HV) from the location of the test, the test should be suspended and adequate safety precautions taken until the test is resumed on the return of the Competent Person (HV).

Cancellation of the sanction-for-test

8.96 Having completed the test, withdrawn all persons, materials, instruments and tools from the location of the test, and advised all persons associated with the test that it is no longer safe to work on or test the equipment, the Competent Person (HV) should complete and sign part 3 of the sanction retained in the pad, and return the original of part 1 to the Authorised Person (HV).

8.97 Where the test has been suspended, the same procedures apply, but in addition the Competent Person (HV) confirms that the equipment has been made safe pending the issue of another sanction-for-test or permit-to-work from the Duty Authorised Person (HV).

8.98 Upon completion of the test, the Duty Authorised Person (HV) should check that the test has been satisfactorily completed and that the equipment is safe to return to an operational state.

8.99 The Duty Authorised Person (HV) should then cancel the sanction-for-test by marking the original part 1 as “cancelled” and storing it in the OPM and completing and signing part 4 of the sanction-for-test retained in the pad.

8.100 On completion, the original sanction-for-test should be retained in the OPM with the corresponding safety programme, isolation and earthing diagram and relevant documents and be retained for three years following the date of implementation. The duplicate page should be retained in the pad.

8.101 If the Competent Person (HV) has lost the original of part 1 of the sanction-for-test, the loss should be recorded by the Duty Authorised Person (HV) in part 4 of the sanction in the pad and in the HV site logbook.

8.102 The Competent Person (HV) should countersign part 4 to confirm the loss of the original. The loss of a sanction-for-test should be reported to the Authorising Engineer (HV).

8.103 Completed pads of sanction-for-test forms should be retained in the lockable document cabinet for three years after the date of cancellation of the last sanction-for-test issued from the pad.

Limitation-of-access

8.104 In an area or location that is normally under the control of the Authorised Persons (HV) for electrical safety reasons, a limitation-of-access may be issued by the Authorised Person (HV) for any specified task other than one for which a sanction-for-test or permit-to-work is required.

8.105 A limitation-of-access should be printed in black on buff paper.

8.106 It should have an original and a duplicate page for part 1 and a single page for parts 2, 3 and 4. Each page of a limitation-of-access should bear the same serial number. Pads of numbered forms shouls be used in sequence.

8.107 Only one pad of limitation-of-access forms should be in use for each geographical area for which an Authorised Person (HV) has been appointed.

8.108 When not in use, the pads of limitation-of-access forms should be kept in the lockable document cabinet.

Issue and acceptance of limitations of access

8.109 A limitation-of-access may be offered to a person of any discipline or specialism who is competent to personally execute the work or to supervise the execution of the work by others.

8.110 Before issuing a limitation-of-access, the Duty Authorised Person (HV) should positively identify the scope and limits of the work to be carried out and the physical extent of the work at the location.

8.111 A limitation-of-access should be issued at the place where the work is to be undertaken. The issue and cancellation of every limitation-of-access should be recorded in the HV site logbook.

8.112 Before offering a limitation-of-access to the person carrying out the specified tasks, the Authorised Person (HV) should:

a. accompany and show that person the location where the work should be undertaken

b. confirm with that person who is carrying out the specified tasks in detail the exact extent of the work activities to be undertaken, including the scope and limits

c. indicate to the that person all items of live electrical equipment in or adjacent to the working area that should be identified by danger signs

d. draw to the attention of that person any special instructions or safety measures noted in part 1 of the limitation-of-access, and indicate the safety measures that have been applied by the Authorised Person (HV).

8.113 Before accepting a limitation-of-access, the person carrying out the specified tasks – having understood the scope, extent and limits of the work to be undertaken, and being prepared to undertake it – should sign to accept any special instructions or safety measures noted in part 1 and should complete and sign parts 1 and 2. The Duty Authorised Person (HV) retains the duplicate pages of part 1 with parts 2, 3 and 4 in the limitation-of-access pad.

8.114 On accepting the limitation-of-access, that person (now the recipient) becomes responsible for undertaking or supervising the work for which the access is required.

8.115 The recipient of the limitation of access should not leave the location of the work or undertake any other activities while the work is in progress.

8.116 A limitation-of-access should be issued at the location of the work to be undertaken. The issue and cancellation of every limitation-of-access should be recorded in the HV site logbook.

8.117 Provided that a risk assessment indicates that it is safe, a limitation-of-access may be issued for work to be undertaken in an area or location containing an item of equipment for which a permit-to-work remains valid.

8.118 A limitation-of-access should not be issued for any area for which a sanction-for-test remains valid or where a high voltage enclosure has been set up.

8.119 Where practicable, all items of live equipment at the location should be cordoned off from the working area covered by a limitation-of-access for the duration of the work. This should be achieved by temporary barriers, comprising, as a minimum, no-entry warning tape or equivalent prominent markers.

8.120 Danger signs should be prominently displayed on all items of live electrical equipment at and adjacent to the location to which the limitation-of-access applies and while it remains valid.

8.121 During the period the limitation-of-access remains valid, the Duty Authorised Person (HV) should arrange for the area

involved to be inspected at the end of each working period or day to ensure that:

a. any flammable or hazardous materials introduced into the area during the work activity are removed when the activities cease at the end of each working period or day

b. emergency escape routes, emergency exits and access to essential electrical equipment have not been obstructed.

Cancellation of a limitation-of-access

8.122 Having completed the work, and having withdrawn all persons, materials, instruments and tools from the working place, the recipient should complete and sign part 3 of the limitation-of-access in the pad, and return the original of part 1 to the Authorised Person (HV).

8.123 When the work has been completed, the Duty Authorised Person (HV) should check that the location has been left in a clean and tidy condition and is secured against unauthorised access.

8.124 The Duty Authorised Person (HV) should then cancel the limitation-of-access by marking the original of part 1 as “cancelled” and completing and signing part 4 retained in the pad. The duplicate pages of part 1 and the completed page of parts 2, 3 and 4 should be retained in the pad.

8.125 If the Authorised Person (HV) decides to stop the work, the limitation-of-access should be withdrawn and cancelled. The withdrawal should be noted in part 4 of the limitation-of-access retained in the pad, and the reasons for the withdrawal and the actions taken should be noted in the HV site logbook.

8.126 If the recipient has lost the original of part 1 of the limitation-of-access, the loss should be recorded by the Duty Authorised Person (HV) in part 4 of the limitation-of-access in the pad and in the HV site logbook.

8.127 The recipient should countersign part 4 to confirm the loss of the original. The loss of a limitation-of-access should be reported to the Authorising Engineer (HV).

8.128 Completed pads of limitation-of-access forms should be retained in the lockable document cabinet for three years after the date of cancellation of the last limitation-of-access issued from the pad.

9 Display of posters and safety signs

Display of posters

9.1 In each room containing high voltage electrical equipment, the following information should be prominently displayed:

a. a poster showing an approved method of treatment for electric shock

b. the poster “Extracts from Health Technical Memorandum 06-03 Safety Guidance” shown in Appendix 6

c. a schematic: a single line drawing of the whole site system indicating all HV and major LV equipment in its normal functional state of operation (that is, switched on–off).
If the room contains equipment containing sulphur hexafluoride, a notice stating this should be displayed

d. the Electricity at Work Regulations.

9.2 Where the Management has control of the danger, the Authorised Person (HV) should carry out an assessment to determine the requirement and location for the display of information in connection with this HTM. Information should be displayed permanently in suitable and prominent positions.

9.3 Other information and posters to be displayed may include relevant health and safety information.

Signage: design specification

9.4 The warning signs shown in Figures 1 and 2 should be designed to the proportions given in the Electricity Safety, Quality and Continuity Regulations.

9.5 The design and colours of the signs should be to BS ISO EN 7010. Colours should be to BS 5252 as follows:

- yellow 08E51;
- blue 18E53;
- red 04E53.

9.6 Signs should be manufactured from laminated plastic or other similar non-metallic weather-resistant material (thickness appropriate to the intended location and application).

9.7 Non-corrosive materials should be used when fixing permanent safety signs. Permanent signs should not be fixed with adhesives.

9.8 Permanent safety signs should be securely and permanently fixed in accordance with the paragraphs in this section.

Figure 1 Warning sign (a)

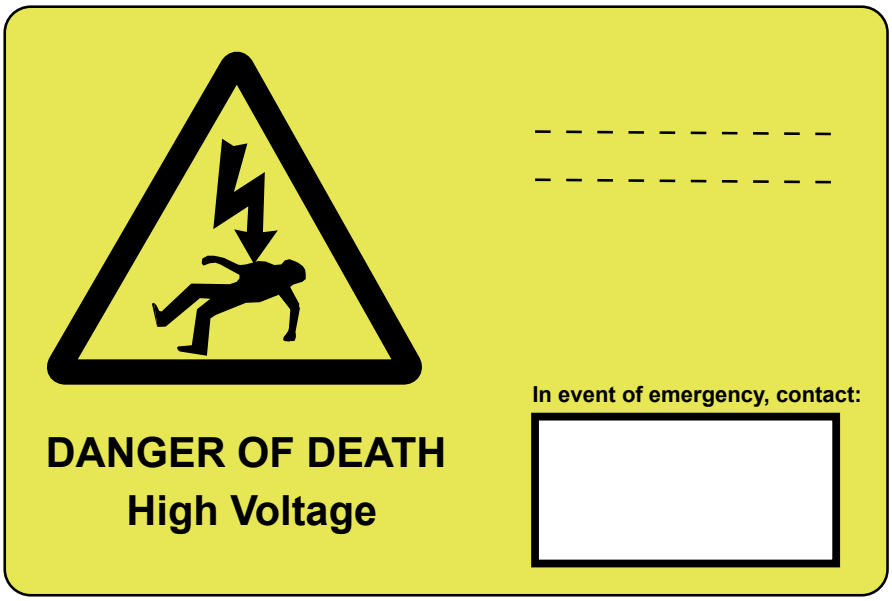


Figure 2 Warning sign (b)

Display of permanent safety signs

9.9 Where a “gas flooding system” is installed in a substation or accommodation where high voltage is present, a safety sign with appropriate text should be installed in a prominent position.

9.10 A warning sign should be displayed on any pole that supports high voltage conductors or equipment.

9.11 A warning sign and a notice identifying the installation should be displayed in a prominent position, at every angle of approach, outside every substation and high voltage stand-by set house to comply with table 11C of the Electricity Safety, Quality and Continuity Regulations, which requires duty-holders to erect three types of notices at substations:

a. One or more “danger of death” (see Figures 1 and 2) safety signs complying with Schedule 1 of the Regulations.

b. A property notice (Figure 3) giving the unique identification number or location of the substation and an emergency

Figure 3 Example of permanent sign

telephone number. Where several substations are located within a single industrial site (for example within a nuclear power station), property notices are still required for each substation for the benefit of infrequent visitors, including staff or contractors, who may observe something untoward in the substation. Each property notice must carry the name of the substation's current owner or operator.

c. Where necessary, other signs commensurate with the risk of

interference (for example, “keep out” signs).

The quantity, size and position of signs should be appropriate to the risk of danger from interference at each location (see Figure 3 for a typical example, which can be adapted for local conditions).

9.12 A notice giving the unique identification number or location of the substation should be also displayed within the substation adjacent to the single line diagram.

Display of temporary safety signs

9.13 All temporary signs should be provided with two 5 mm diameter holes for a suspension cord. The holes should be 10 mm from the top edge and 30 mm from each end for 150 mm wide signs, and 50 mm from each end for 200 mm wide signs.

Note:

Temporary signage can be sized to the installation with agreement of the Authorising Engineer (HV). The position, quantity and physical dimensions of the sign should be selected with regard to the circumstances in which it is used.

9.14 Temporary safety signs should be suspended from non-conducting cords and affixed and removed only by the Duty Authorised Person (HV).

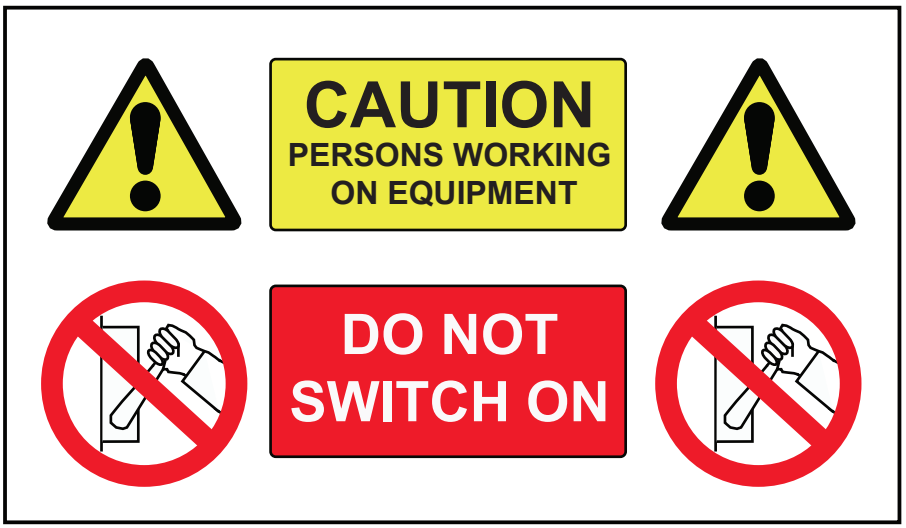
9.15 Caution signs (see Figure 4) should be prominently displayed and securely fixed at all points-of-isolation before the start of, and for the duration of, any work or testing, and before the issue of any permit-to-work or sanction-for-test.

9.16 Danger signs (see Figure 5) should be prominently displayed on any equipment which remains live and is adjacent to equipment to be worked on or tested before the start of, and for the duration of, the work or testing, and before the issue of any permit-to-work or sanction-for-test.

9.17 Danger signs (see Figure 5) should be prominently displayed so that they are visible from every angle of approach to a high voltage enclosure before any testing at high voltage is carried out and before the issue of, and for the duration of, any work or testing, and before the issue of any permit-to-work or sanction-for-test.

9.18 Where work or testing is to be undertaken on any part of a multi-cubicle switchboard, danger signs should be prominently displayed on the cubicles or compartments adjacent to the part being worked on or tested. If the

Figure 4 Caution sign (actual size: 200 x 100 x 1.5 mm white plastic)



board has rear access, danger signs should be similarly displayed at both the front and rear of the board. Reliance should not be placed on the switchboard labelling when identifying parts at the rear of the board. Any discrepancies found should be reported.

9.19 Danger signs should be prominently displayed on any equipment which is accessible, both in or adjacent to the area which is the subject of the limitation-of-access, before the issue of and for the duration of any limitation-of-access.

9.20 Point of work signs may be prominently displayed to indicate the point of work.

Figure 5 Danger sign (actual size: 200 x 100 x 1.5 mm white plastic)

Appendix 1 – Protective, test and earthing equipment

Introduction

1. The Electricity at Work Regulations, Regulation 4(4), states that “any equipment provided under these Regulations for the purpose of protecting persons at work on or near electrical equipment should be suitable for the use for which it is provided, be maintained in a condition suitable for that use and be properly used”.

2 The term “any equipment” has such a wide interpretation that it would be impossible, because of the extensive variation and complexity of electrical equipment employed within healthcare and personal social services premises, to identify the requirements for every location. The list of equipment recommended in this Appendix, therefore, can only be an indication of what is considered a minimum basic requirement, and is not exhaustive.

3 In some instances, expensive sophisticated proprietary equipment may be required or considered justified; in others, very basic equipment costing only a few pounds will suffice, and the Management will need to consider the individual requirements within its own geographical area of control.

4 The quality of construction and maintenance of any equipment provided is as vital for personal safety as the training and practical skills in its use. Where possible, items of equipment should comply with an approved standard, for example British Standards or European equivalent or electricity supply industry standards

Personal protective equipment

Note:

PPE should be used as a last resort. Wherever there are risks to health and safety that cannot be adequately controlled in other ways, the Personal Protective Equipment at Work Regulations require PPE to be supplied.

5 Appropriate personal protective equipment should be provided by the Management for those person(s) under the direct appointment of the Management. Where contractors are being employed, the responsibility for providing appropriate protective equipment will be that of the contractor and take cognisance of any requirements identified in the safety documents. It should be readily available at all times to those who need it and have training in its use. It should be worn or used whenever necessary to avoid danger and injury.

6 A PPE risk assessment together with an arc-flash risk assessment survey should be completed to determine any protective equipment requirements. This should be recorded in the OPM.

7 Protective equipment should be suitable for the purpose and be provided by the Management and its contractors. Protective equipment provided by the Competent Person (HV) employed by a contractor may be used if the Duty Authorised Person (HV) agrees. Such use should be recorded in the safety documents.

8 Protective equipment should be inspected by the user for visible defects before and after use. Any suspect item is not to be used; suspect items should be reported to the Duty Authorised Person (HV) who should consider its withdrawal and its replacement.

9 Unless more frequent intervals are specified, a Duty Authorised Person (HV) should inspect each item of safety equipment provided by the Management at least once a year for defects and wear, and should take remedial action where necessary. These inspections should be recorded in the OPM and a register held of the equipment.

10 The sharing of PPE is not recommended. It is best practice for individuals to be equipped with suitable PPE.

Test equipment

11 The Duty Authorised Person (HV) should arrange for the necessary test equipment to be available when required.

12 Test equipment should be inspected by the user for visible defects and ensure it is calibrated if required by the user.

13 Unless more frequent intervals are specified, the Authorised Person (HV) should inspect each item of test equipment provided by the Management at least once a year for defects and should take remedial action where necessary. These inspections should be recorded in the OPM.

14 The Authorised Person (HV) should ensure test equipment is maintained and, where appropriate, recalibrated in accordance with the manufacturer's instructions.

15 Authorised Persons (HV) should maintain a register of in-house HV test equipment in the OPM which includes the dates of inspections/ calibrations (see paragraph 8.17(n)).

16 The location of protective equipment, test equipment and portable earthing equipment should be prominently displayed adjacent to the working key cabinet.

17 Test equipment should only be used by person(s) trained/qualified and competent in the use of the equipment and authorised to use it by means of a safety document.

Contractors' test equipment

18 The inspection of contractors' test equipment/calibration records should be provided to the Duty Authorised Person (HV) as part of the RAMS before work is carried out on site.

Protective equipment

19 Competent Persons and Authorised Persons should use appropriate protective equipment when the circumstances require it. Items of protective equipment held or used within a site should comply with any relevant British Standards and should be marked as CE or UKCA. (Some British Standards may not be available for some of the items of protective equipment recommended i.e. arc-flash clothing.)

20 Reliance should not be placed on any single item of protective equipment.

21 The range of protective equipment that may be required for compliance with this guidance at each site for which Authorised Persons (HV) have been appointed could include, but is not limited to, the following items:

- insulated hand-tools
- insulated rubber boots

- insulated rubber gloves
- insulating rubber mats
- face shields (visors)
- insulating materials for temporary screening
- safety-belts and harnesses
- cable-spiking equipment
- cable-tracing equipment
- arc flash clothing.

22 The user of any item of protective equipment is responsible for carrying out a visual inspection before and after use. If an item is found to be defective or unsafe it should be reported to the Authorised Person (HV) as soon as possible.

23 All protective, test and earthing equipment must be stored, inspected, tested and, where appropriate, recalibrated in accordance with manufacturers' recommendations.

24 All protective, test and earthing equipment should be inspected by an Authorised Person (HV) at intervals recommended by the manufacturer but not exceeding 12 months and the results entered into the OPM. Any item of protective equipment found to be defective should be destroyed and replaced.

Protective equipment covered by a British Standard

25 The following items of equipment are covered by the British Standards indicated:

- insulated screwdrivers – BS 2559-3
- insulated pliers – BS 3087-1
- rubber gloves for electrical purposes – BS EN 60903
- rubber mats for electrical purposes – BS EN 61111
- face shields and visors – BS EN ISO 16321-1, BS EN ISO 18526-1 and BS EN 168
- safety-belts and harnesses – BS EN 354; BS EN 355; BS EN 361; BS EN 362; BS EN 363; BS EN 364 and BS EN 365.

26 Face shields and visors should provide protection against electrical flash, impact and molten metal particles.

27 They should be available to persons who may be exposed to the effects of electric arcs, for example when withdrawing fuses in older types of distribution cubicles, i.e. feeder pillars.

28 Many types of safety-belts and harnesses are available, each intended for a particular purpose. Safety-belts and harnesses manufactured to the relevant British Standard, and of the correct type, should be available to persons working in insecure locations, for example on overhead lines.

Protective equipment not covered by a British Standard

29 Cable spiking equipment in the form of an explosive cartridge-type must be operated in accordance with manufacturers' instructions by a suitably trained person. When using cartridge-operated equipment on small cables, care must be taken where there is a danger of severing the cable.

30 Insulating material for temporary screening may be required when working on or near live equipment or to separate isolated equipment from adjacent live equipment. Flexible insulating material may be used to prevent breakdown between conductors during high voltage tests. The material used should be suitable for the purpose. The material should be cut and fixed, as necessary, to suit the particular task.

31 When using insulating rubber boots as part of a safety system, reliance is not to be placed upon insulating rubber boots alone. There is a danger of metallic objects becoming embedded in the soles without this becoming apparent during inspection.

Voltage test indicators

32 Authorised Persons and Competent Persons must prove equipment is dead by using a voltage test indicator.

33 High voltage potential indicators and proving units should comply with the Energy Networks Association's (2012) 'Engineering Recommendation G9 – Voltage testing devices'. Extension rods, end adaptors, and other fittings should be available to suit the equipment on which work is to be undertaken.

34 Low voltage test indicators should comply with the recommendations of the HSE's Guidance Note 'GS38: Electrical test equipment for use on low voltage electrical systems' and BS EN 61243-3. Test indicators for use on 230/415 V systems should be suitable for use up to 500 V and should indicate a live supply down to 50 V. . It should also be able to differentiate between ac and dc.

35 Test indicators should be proved before and after use from a known supply.

Cable-locating devices

36 When selecting a cable-locating device for a particular task or location, refer to the guidance given by the manufacturer or supplier of the cable-locating equipment.

37 Cable-locating devices should, as a minimum, be rugged and weatherproof to a minimum of IP54, comply with the Electromagnetic Compatibility Regulations and be produced by **BS EN ISO 9001**-accredited manufacturers.

38 A cable-locating device that combines all three principles of operation – hum detector (power), radio frequency detector (radio) and transmitter/receiver locator (signal generator) – into one instrument should be selected.

39 No person should use cable-location and tracing devices unless they are competent to do so, have been specifically trained in their use and hold a certificate issued by the instructor indicating the training has been successfully completed. Training in the use of cable location and tracing devices should normally be given by the manufacturers of the equipment, but alternatively it may be given by a Competent Person (HV) person(s) who has been trained and certified by the manufacturers or an approved training provider as being capable of delivering training to others. Training certificates should be held in the OPM.

Earthing equipment

40 High voltage cables and equipment may be earthed by using integral or portable proprietary earthing devices operating within the equipment enclosure on which the earth is to be applied. An earthing device must be suitable for the use for which it is provided, be maintained in a condition suitable for that use and be properly used.

41 Where no proprietary earthing device is available, equipment may be purpose-made. The design must ensure that conductors are capable of carrying the prospective fault current for the time required for back-up protective devices to operate (normally three seconds) without creating danger or injury or damage to equipment.

Substation earthing

42 All earthing conductors and connections should be inspected at 12-monthly intervals, special attention being given to the more vulnerable parts such as the final connection to earth electrodes and other external parts of the earthing system.

43 The earthing systems should be tested annually in accordance with HTM 06-01 – 'Electrical services supply and distribution'.

Recommendations for the inspection, test and recalibration of protective, test equipment

44 Insulated hand tools should be supplied with a certificate stating that the tools have been electrically tested.

45 Rubber gloves should be kept in a dark place where they will not be subjected to mechanical or chemical damage. A container that is clean and free from grease and oil should be provided solely for storing the gloves.

46 Before use, each glove should be examined inside and out by the user. Each finger of each glove should be stretched by hand to ascertain that its mechanical strength is adequate. If either of the gloves is damaged or defective, the pair should be destroyed and replaced.

47 After each use, the gloves should be inspected by the Authorised Person for surface defects or materials embedded in the surface. If any glove appears defective, the pair should be destroyed and replaced.

48 Gloves that are used frequently should be tested at intervals not exceeding six months. Gloves that are used infrequently should be retested after each use, or at intervals not exceeding 12 months, whichever is the more frequent.

49 Gloves should be retested by the manufacturer or locally on equipment described in, and in accordance with, the procedures set out in BS EN 60903.

50 Face shields should be examined by the user before and after use.

51 Belts and harnesses should be stored in a cool, dry place, not subjected to direct sunlight and not subjected to unnecessary strain, pressure, excessive heat or humidity. The equipment should also be kept free from contact with sharp implements, corrosive substances and other possible causes of damage.

52 Where necessary, test equipment should be inspected and recalibrated at the intervals recommended by the manufacturer. This should be a maximum of 12 months.

53 The schedule should incorporate:

a. routine maintenance proposals, based on periodic inspections supplemented at more extended intervals with operational checks and examination as required

b. post-fault maintenance, which should be determined by consulting the manufacturer's handbook and by past experience.

Fire extinguisher installation and equipment

54 Inspections and checks should be made in accordance with BS 5306 and Firecode document HTM 05-03 Part K – 'General fire risk assessments'.

Appendix 2 – Safety documentation and model forms

Model form numbers

a. isolation and earthing diagram
b. safety programme
c. permit-to-work
d. limitation-of-access
e. sanction for test
f. logbook
g. certificate of boundary demarcation
h. transfer of control certificate.

Serial No 06/

Isolation and earthing diagram

(Complete precisely and legibly in BLOCK CAPITALS)

Safety programme no ..... Date .....

Permit-to-work/Sanction-for-test no ..... Date .....

Purpose of proposed work/test

Equipment which the proposed sequence of operations will make safe to work on/test

Sketch of isolation and earthing arrangements

Competent Person's initials

Authorised Person

Signed ..... Name ..... Date .....

Countersigning Authorised Person

Signed ..... Name ..... Date .....

Original (green) copy to
White copy to

HTM 06-02/03 IE1 Ver 1.0

Sheet of	**Serial No**	

Safety programme

Purpose of proposed work/test* (*Delete as appropriate)	**Equipment which the proposed sequence of operations will make safe to work on or test**

ITEM No	LOCATION	EQUIPMENT	OPERATION AND REASON	ITEMS REQUIRED	TIME & DATE

Date countersigned programme is required to commence .....

Authorised Person

Signed ..... Date .....

Countersigning Authorised Person

I hereby declare that I have checked the above Safety Programme, and I am satisfied that, to the best of my knowledge, it will enable the proposed work or test to be carried out safely and in accordance with the HTM guidance. I have knowledge of, and have access to the current diagram of, the system and equipment concerned.

Signed ..... Date .....

Original (green) copy to
White copy to

Serial No 06/ **Location**

Front – original

Permit-to-work

(Complete precisely and legibly in BLOCK CAPITALS)

Part 1: Issue

Issued to .....

I hereby declare that it is safe to work on the following electrical equipment which has been made **dead**, **isolated** from all **live** conductors and, in the case of high voltage equipment, is connected to **earth**:

All other electrical equipment is dangerous to work on

The system is **isolated** and safety locks and **caution** signs fitted at	
The equipment is **earthed** and safety locks fitted at	
Danger signs are posted	
Other precautions taken are	
The following work shall be carried out	

Authorised Person	**Received by**
Signed..... Date.....	Signed.....

Original (blue) copy to
White copy to

HTM 06-02/03 PW1 Ver 1.0

Serial No 06/

Location

Front – copy

Permit-to-work

(Complete precisely and legibly in BLOCK CAPITALS)

Part 1: Issue

Issued to .....

I hereby declare that it is safe to work on the following electrical equipment which has been made **dead**, **isolated** from all **live** conductors and, in the case of high voltage equipment, is connected to **earth**:

All other electrical equipment is dangerous to work on

The system is **isolated** and safety locks and **caution** signs fitted at	
The equipment is **earthed** and safety locks fitted at	
Danger signs are posted	
Other precautions taken are	
The following work shall be carried out	

Authorised Person	**Received by**
Signed..... Date.....	Signed.....

Original (blue) copy to
White copy to

HTM 06-02/03 PW1 Ver 1.0

Back – copy

Part 2: Receipt

I hereby declare that I accept responsibility for carrying out work on the electrical equipment as detailed on this permit-to-work and that no attempt will be made by me or by persons under my control to work on any other electrical equipment I have been shown and have initialled arrangements on the isolation and earthing diagram.

Signed ..... Print name .....

Time ..... Date .....

Part 3: Clearance

I hereby declare that the work for which this permit-to-work was issued is now suspended/completed* and that all persons under my charge have been withdrawn and warned that it is no longer safe to work on the electrical equipment specified on this permit-to-work and that all gear, tools etc have been removed.

Signed ..... Print name .....

Time ..... Date .....

* *Delete as appropriate*

Part 4: Cancellation

This permit-to-work is hereby cancelled. The original has been returned to me and cancelled in the presence of the signatory to Part 3.

Signed ..... Print name .....

Time ..... Date .....

Serial No 06/ **Location**

Front – original

Limitation-of-access

(Complete precisely and legibly in BLOCK CAPITALS)

1. **This form must not be used for work on electrical equipment for which an electrical permit-to-work or sanction-for-test is required.**
2. **On completion of the work, the holder must surrender this limitation-of-access as directed for cancellation, after which no work shall be done.**

Part 1: Issue

Issued to .....

in the employ of ..... being competent to carry out the specified tasks, is hereby given permission to carry out the work described below:

Location

Work

No other work shall be carried out

Remarks

Authorised Person	**Received by**
Signed..... Date.....	**Signed.....**

Original (buff) copy to
White copy to

HTM 06-02/03 LOA1 Ver 1.0

Serial No 06/

Location

Front – copy

Limitation-of-access

(Complete precisely and legibly in BLOCK CAPITALS)

1. **This form must not be used for work on electrical equipment for which an electrical permit-to-work or sanction-for-test is required.**
2. **On completion of the work, the holder must surrender this limitation-of-access as directed for cancellation, after which no work shall be done.**

Part 1: Issue

Issued to .....

in the employ of ..... being competent to carry out the specified tasks, is hereby given permission to carry out the work described below:

Location

Work

No other work shall be carried out

Remarks

Authorised Person	**Received by**
Signed..... Date.....	**Signed**.....

Original (buff) copy to
White copy to

HTM 06-02/03 LOA1 Ver 1.0

Back – copy

Part 2: Receipt

I hereby declare that I accept responsibility for carrying out work in accordance with this limitation-of-access and no other work will be done by me or the persons under my charge at the location referred to in Part 1 of this document.

Signed ..... Print name .....
(being the person to whom this form is issued)

Time ..... Date .....

Part 3: Clearance

I hereby declare that the work for which this limitation-of-access was issued is now suspended/ completed* and that all persons under my charge have been withdrawn.

Signed ..... Print name .....

Time ..... Date .....
* *Delete as appropriate*

Part 4: Cancellation

This limitation-of-access is hereby cancelled. The original has been returned to me and cancelled in the presence of the signatory to Part 3.

Signed ..... Print name .....

Time ..... Date .....

Serial No 06/ **Location**

Front – original

Sanction-for-test

(Complete precisely and legibly in BLOCK CAPITALS)

Part 1: Issue

Issued to .....

The following high voltage equipment has been made safe in accordance with Health Technical Memorandum 06-03 for the testing described on this sanction-for-test:

All other electrical equipment is dangerous to work on

The system is **isolated** and safety locks and **caution** signs fitted at	
The equipment is **earthed** and working locks fitted at	
Danger signs are posted at	
Other precautions taken are	
The following test(s) shall be carried out	

(*Issued by*) **Authorised Person**	(*Received by*) **Competent Person**
Signed..... Date.....	Signed..... Date.....

Original (yellow) copy to
White copy to

HTM 06-02/03 SFT1 Ver 1.0

Serial No 06/ **Location**

Front – copy

Sanction-for-test

(Complete precisely and legibly in BLOCK CAPITALS)

Part 1: Issue

Issued to .....

The following high voltage equipment has been made safe in accordance with Health Technical Memorandum 06-03 for the testing described on this sanction-for-test:

All other electrical equipment is dangerous to work on

The system is **isolated** and safety locks and **caution** signs fitted at	
The equipment is **earthed** and working locks fitted at	
Danger signs are posted at	
Other precautions taken are	
The following test(s) shall be carried out	

(*Issued by*) **Authorised Person**	(*Received by*) **Competent Person**
Signed..... Date.....	Signed..... Date.....

Original (yellow) copy to
White copy to

HTM 06-02/03 SFT1 Ver 1.0

Back – copy

Part 2: Receipt

I hereby declare that I accept responsibility for carrying out the testing of the electrical equipment as detailed on this sanction-for-test and that no attempt will be made by me or by persons under my control to test any other electrical equipment I have been shown and have initialled arrangements on the isolation and earthing diagram.

Signed ..... Print name .....

Time ..... Date .....

Part 3: Clearance

I hereby declare that the test for which this sanction-for-test was issued is now suspended/ completed* and that all persons under my charge have been withdrawn and warned that it is no longer safe to work on the electrical equipment specified on this sanction-for-test and that all gear, tools etc have been removed.

Signed ..... Print name .....

Time ..... Date .....

* *Delete as appropriate*

Part 4: Cancellation

This sanction-for-test is hereby cancelled. The original has been returned to me and cancelled in the presence of the signatory to Part 3.

Signed ..... Print name .....

Time ..... Date .....

Logbook

Date	Time	Location	Circuit or switch concerned	Event or operation and reason	Safety programme and isolation and earthing diagram numbers	Safety document type and serial no	To whom issued	Signature of Authorised Person

Certificate of boundary demarcation

NHS Foundation Trust	HV /LV Certificate of boundary demarcation No.

Project No.		Site name	

1 Confirmation of demarcation and authorisation

This certificate of boundary demarcation (HV/LV) should only be used to provide formal documentary evidence of demarcation across boundaries, where the operational responsibility of the system/equipment detailed below is passed to a second party (different company) who will be responsible for the control of electrical danger under an electrical safe system of work. This certificate must not be issued instead of a permit to work or any other safety document by either party. The point of demarcation should be as formally agreed between the Trust's Duty Authorised Persons and the Authorised Person of the contracting company and be detailed on the relevant jointly agreed demarcation diagram. Danger signs should be affixed to adjacent live equipment/enclosures not included in the demarcation but forming part of the equipment/system being handed over.

System or equipment to be handed over to the contracting company
……
……
……
……

Specific points of demarcation secured with demarcation caution signs at the following points
……
……
……
……
……

Danger signs posted at
……
……
……
……

As the Duty Authorised Person HV/LV responsible for the operation of the equipment described in Part 1 above, I confirm that the work being undertaken satisfies the need for this boundary of demarcation to be issued.

Name of Authorised Person (HV/LV) sanctioning this certificate	Signature	Time & date	Department	Contact tel. no.

2 Issue

As the Duty Authorised Person HV/LV responsible for the operation of the equipment descried in Part 1 above, I confirm that operational responsibility is passed to the contacting company and that the boundary of demarcation has been demonstrated to the Authorised Person HV/LV of the contracting company. I undertake to ensure that no alterations are made to the above arrangements until this certificate of boundary demarcation (HV/LV) is cancelled.

Name of Authorised Person (HV/LV) issuing this certifica	Signatur	Time & date	Departmen	Contact tel. No

3 RECEIPT AND DECLARATION

As the contracting Duty Authorised Person HV/LV responsible for the safe systems of work, I accept this certificate of boundary of demarcation (HV/LV) on the understanding that all work under my control will be carried out under an electrical safe system of work and that no work should be carried out beyond the boundary of demarcation on equipment/system not under my operational responsibility. I also fully understand and have signed the demarcation diagram.

Name of Authorised Person (HV/LV) receiving this certificate	Signature	Time & date	Department	Contact tel. no.

4 Clearance

As the contracting Duty Authorised Person HV/LV responsible for the electrical safe system of work, I declare that all safety documentation related to this certificate of boundary demarcation (HV/LV) has been cancelled, it is safe for this boundary demarcation (HV/LV) to be cancelled and that all persons under my charge have been withdrawn and warned that is it no longer safe to work on the system/equipment specified above.

Name of Authorised Person (HV/LV) clearing this certifica	Signatur	Time & date	Departmen	Contact tel. No

5 Cancellation

As the Duty Authorised Person (HV/LV) responsible for the operation of the equipment described in Part 1 above, I acknowledge that the above boundary of demarcation is no longer required and that any work on the above equipment/system is now covered by the Trust's electrical HV/LV policy and electrical safe system of work.

Name of Authorised Person (HV/LV) cancelling this certificate	Signature	Time & date	Department	Contact tel. No.

High voltage/Low voltage* electrical network
Transfer of control certificate

*Delete as appropriate

Part (a)_____ Authorised Person's details

Name: ……..……..……..……

Authorisation:…HV/LV*……..……

Site address:

……..……..……..……

……

……..

Part (b) Transfer of HV/LV system control from _____ to an appointed contractor

I being the above named _____ Authorised Person HV/LV* hereby declare that the control of part/all* of the HV/LV* system at the above-specified location and defined on the attached signed and dated HV/LV* system diagram (control boundary points specified in Part (c) of this transfer of control certificate) is now transferred to:

Print name ……..……..being the contractor's control person employed by:

Company name……..……..……..

I also declare that there are no safety documents in issue on the transferred system and that I have informed all relevant employees of ……. and other contractors of this control transfer.

No access to switching operation or work should take place on the transferred HV/LV system without the consent of the above-named contractor's control person. At all stages, the above-named contractor's competent person will liaise with the Trust's Authorised Person if other electrical systems will be affected.

Signed ……..……..……Trust's Authorised Person.

Time …….…… Date……..……..……

Receipt

I hereby declare that I accept responsibility for the control of the transferred HV/LV* system as the contractor's control person.

Signed ……..…… Contractor's competent person

Time ……..……..…… Date……..……

Part (c) Limits of control transfer substation/switchroom/equipment	Circuit	Item

Part (d) Transfer of control from the contractor to the trust

I hereby declare that I relinquish control of the transferred HV/LV* system. All persons employed by the contractor have been informed and all issued safety documents have been cancelled.

Signed …… Contractor's control person

TimeDate…..……

*Attach any modified system diagram (duly signed and dated) if there are any system alterations.

I hereby declare that I have resumed control of the above system and this transfer of control certificate is cancelled (and have noted and understood any relevant alterations to the modified system diagram provided above).

Signed ……..…….. Trust's Authorised Person HV/LV*

Time ……..…… Date…..……

* Delete as necessary

Appendix 3 – Model procedures and letters

Appointment procedure for an Authorising Engineer (HV)

1 It is the responsibility of the Designated Person to ensure that any person appointed as Authorising Engineer is suitably qualified and adequately experienced to satisfy the requirements of this HTM, which has been compiled to enable the Management to meet its statutory obligation – to comply with the requirements of the Electricity at Work Regulations for work on electrical equipment.

2 Before an Authorising Engineer is appointed, the Designated Person must be satisfied that the prospective Authorising Engineer meets all the criteria set out in paragraphs 4.9–4.11 of this HTM.

3 The appointment of an Authorising Engineer should be by an exchange of letters.

Model letter for appointing an Authorised Engineer (HV)

Dear _____ (*Name of prospective Authorising Engineer*)

OFFER OF APPOINTMENT AS AUTHORISING ENGINEER (HV)

Being satisfied that you are suitably qualified and meet the requirements of Health Technical Memorandum 06-03 –'Electrical safety guidance for high voltage systems', I hereby offer you the appointment of Authorising Engineer for _____ to undertake the duties set out in Health Technical Memorandum 06-03 –'Electrical safety guidance for high voltage systems' until further notice. However this appointment will be reviewed and reconfirmed at * yearly intervals.

Please confirm your acceptance of this offer of appointment by signing and returning to me a copy of the attached letter.

Yours sincerely

_____

(*Designated Person*)

* Depending on contract

Model letter for accepting an appointment as an Authorised Engineer (HV)

Dear _____(*Name of Designated Person*)

ACCEPTANCE OF APPOINTMENT AS AUTHORISING ENGINEER (HV)

I acknowledge receipt of your letter dated _____ offering me appointment as an Authorising Engineer for _____

I confirm that, to the best of my knowledge, I satisfy the requirements for appointment as an Authorising Engineer indicated in Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems'

I accept the responsibilities of the Authorising Engineer and will, to the best of my ability, carry out the Authorising Engineer's duties set out in Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems'.

I note that I am required to attend an Authorising Engineer training course at intervals not exceeding five years, an Authorised Person refresher course at intervals not exceeding five years and a first-aid course at intervals not exceeding three years.

Yours sincerely,

_____

(*Authorising Engineer*)

Copies to: Operational Procedures Manual (OPM)

Certificate of Appointment Authorised Person (HV)

Healthcare organisation:

Certificate number:

Part 1 – Authorised Person details

Name: _____

Job Title: _____

Appointment type: new appointment/renewal/revised coverage*

**Delete as appropriate*

Technical qualifications:

Qualification title	Grade (if applicable)	Dates

Previous Authorised Person experience: Yes/No*

Location	Dates

Initial relevant training courses: (Authorised Person/first-aid/cable-tracing/cable-spiking)

Course	Location	Dates

Part 2 – Authorised Person nomination:

I wish to nominate _____ for appointment as an Authorised Person (HV) for the High Voltage system(s), installation(s) at the location(s) listed below:

Location 1 (site)	
Location 2 (site)	
Location 3 (site)	
Location 4 (site)	
Location 5 (site)	

Nominated by: (Designated Person)

Name:

Signed:

Date:

Part 3 – Authorising Engineer recommendation

I am satisfied that _____ has the required qualifications, knowledge, skills and experience to carry out the duties of Authorised Person (HV) for the HV system(s), installation(s) and location(s) as per the nomination detailed in Part 2.

Voltage	Type of system or installation	Location (site)				
		1	2	3	4	5
HV	Ring distribution system					
	Radial distribution system					
	Single generating set installation					
	Multiple generating set installation					
	Other (give details of any other HV systems or installations):					

Name:

Signed:

Date:

Part 4 – Offer of appointment by Designated Person

Name of Authorised Person: _____

You are hereby offered appointment as an Authorised Person (HV) for the duties identified in Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems' detailed in Part 2

Please confirm your acceptance of the appointment by completing Part 5 of this certificate.

Name:

Signed:

Date:

Part 5 – Acceptance of appointment by Authorised Person

I accept the appointment of Authorised Person (HV) for the system(s), installation(s) and location(s) detailed in Part 2.

I acknowledge the receipt of this certificate as my authority to act whilst on duty as an Authorised Person (HV) for the system(s), installation(s) and location(s) detailed in Part 2.

I note that whilst on duty as an Authorised Person (HV) I will be responsible for the practical implementation and operation of Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems' for the systems and installations for which I have been appointed.

Name:

Signed:

Date:

Part 6 – Appointment scope

This is to certify that _____[name]_____ is appointed as an Authorised Person (HV) for the purposes of the duties identified in Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems'.

The appointment applies only to the locations and to the electrical systems and installations set out in Part 2.

Restrictions (if any)

This certificate is valid until the last expiry date indicated below.

	Issue date	Expiry date	Authorising Engineer signature
1st Issue			
1st Review			
2nd Review			
3rd Review			

Notes

Designated Person

Name:

Signed:

Date:

Authorised Person

Name:

Signed:

Date:

Part 7 – Refresher training record

Relevant refresher training courses attended: (Authorised Person/first-aid/cable-tracing/cable-spiking)

Course	Location	Dates

Appointment procedure for a Competent Person (HV)

Part 1 – Details of proposed Competent Person (HV)

Name:_____

Healthcare organisation/Company: _____

Job title:_____

Appointment type: new appointment/renewal/revised coverage*

**Delete as appropriate*

Technical qualifications:

Qualification title	Grade (if applicable)	Dates

Details of previous electrical experience:

Location	Dates

Relevant Training Courses: (e.g. Competent Person/first-aid/cable-tracing, City & Guilds)

Course	Location	Dates

Part 2 – Proposed appointment (to be completed by Authorised Person HV)

I am satisfied that _____

has the required qualifications, knowledge, skills and experience to carry out the duties of Competent Person (HV) for the HV systems for the location(s) detailed below:

1.

2.

3.

Systems and equipment:

a.

b.

c.

Duties:

To accompany any non-Competent Person when entering a high voltage substation or enclosure for any purpose, except where that person is a Competent Person in possession of a valid limitation-of-access safety document and to remain within the building until the work is complete.

To carry out maintenance tasks within the building as directed by the Authorised Person (HV) in accordance with HTM 06-03 but not on high voltage equipment unless issued with a permit-to-work.

To trip high voltage switchgear in case of emergency.

(Add specific duties/restrictions if required)

Part 3 – Offer of appointment by Authorised Person (HV)

Name of Competent Person: _____

You are hereby offered appointment as a Competent Person (HV) for the duties identified in accordance with Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems' for a maximum period of three years commencing on the date this appointment form is signed and dated.

Please note that the appointment covers only the duties, locations, system(s) and installation(s) detailed in Part 2 of this appointment form and on the certificate of appointment.

Please confirm your acceptance of the appointment by completing Part 4 of this appointment form.

Name:

Signed:

Date:

Part 4 – Acceptance of appointment of prospective Competent Person (HV)

I accept the appointment of Competent Person (HV) for the purposes of Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems' for a maximum period of three years commencing on the date this appointment form is signed and dated.

I note that the appointment covers only the duties, locations, system(s) and installation(s) detailed in Part 2 of this appointment form and on the certificate of appointment and that whilst on duty as a Competent Person (HV) I will, so far as is reasonably practical, ensure that I and any others working with me or supervised by me, avoid danger to ourselves and others and will not cause damage to electrical equipment.

I will not carry out any work beyond the limits of the appointment scope unless I am under the direct supervision of an Authorised Person (HV).

Name:

Signed:

Date:

Certificate of appointment as a Competent Person (HV)

Certificate of appointment as a Competent Person (HV)
Certificate No.
This is to certify that _____ is appointed as a Competent Person (HV) for the following locations until the expiry date shown. 1. 2. 3.
Expiry date:
Duties:
Signed _____Authorised Person (HV) Name _____ Date _____ Signed _____ Authorised Person (HV) Name _____ Date _____ Signed _____ Authorised Person (HV) Name _____ Date _____ (This certificate is to be stored in the Operational Procedures Manual (OPM))

Appointment record for a Competent Person (HV)

(To be completed by an Authorised Person (HV))

Name of Competent Person (HV) _____

This certificate is only valid until the last expiry date indicated below:

Issue:	Issue Date:	Expiry date:	Signature:
First issue			
First renewal/ review			
Second renewal/ review			
Third renewal/ review			

(This appointment record is to be stored in the Operational Procedures Manual (OPM))

Appendix 4 – Audit of safe system of work and safety procedures

General

1 This section details the audit and monitoring procedures to be carried out by the Designated Person, Authorising Engineers and Authorised Persons.

Performance audits by the Designated Person/SOM

2 The Designated Person/SOM should continuously monitor the performance and effectiveness of the Authorising Engineer.

Compliance audits by Authorising Engineers

3 Authorising Engineers should carry out a compliance audit at each establishment for which they are appointed at a maximum of 12 monthly intervals.

Audit programme and progress reports

4 Authorising Engineers should prepare a programme of audits covering a period of 12 months. The programme should be prepared so that all significant installations for which they are appointed are seen over a maximum interval of three years. The programme should be distributed to the Designated Person, SOM and Authorised Persons at the establishment.

Compliance audits

5 The Authorising Engineer should review the action plan and progress of any outstanding recommendations from the previous audit.

6 The Authorising Engineer should examine the current and known future workload of the Authorised Person (HV) and should assess if sufficient Authorised Persons (HV) are appointed for the site in question, taking into account absences of incumbent Authorised Persons. The Authorising Engineer should also examine the register of appointed Competent Persons to ensure that sufficient persons are appointed.

Authorised person and documentation audit

7 The Authorising Engineer should review each Authorised Person to ascertain the quantity and quality of any safety documentation raised since the last audit. The Authorising Engineer should carry out a full audit trail of at least one activity carried out by each Authorised Person. This audit should review the activity from commencement to completion. In the case of low activity, the

Authorising Engineer should look at all documents produced and to assess the Authorised Person against a hypothetical scenario.

8 The Authorising Engineer should examine the HV site logbook to ensure that safety documentation has been used for all HV work requiring a safety document.

9 The Authorising Engineer should examine a representative sample of the documentation raised by each Authorised Person.

10 The Authorising Engineer should also examine a representative sample of the support documentation from the OPM and maintenance manuals for accuracy and suitability.

11 The Authorising Engineer should examine the training records and ensure that each person has maintained their qualification for the application of this Health Technical Memorandum including emergency first-aid.

Safety equipment

12 The Authorising Engineer should inspect a sample of the safety equipment to ensure that:

- adequate equipment is available at the establishment
- it is suitable for the intended purpose
- it has been properly maintained, recorded and
- the Authorised Persons, and other users, have been trained to use it safely.

Mimic diagram and system keys

13 This inspection should include the working keys, the mimic diagram, key cabinet and the duplicate key in the emergency “break glass” key box. The mimic should indicate the current state of the HV system, the status of switchgear and the names of the appointed Authorised Person(s) (HV).

Substations and other installations

14 The Authorising Engineer should examine a sample of electrical installations and substations and should ensure that all installations are inspected at a maximum interval of three years.

Non-compliances

15 Where non-compliances are found, the Authorising Engineer should take the following action:

- For non-compliances on completed jobs not adversely affecting the safety, investigate the reason and raise a non-compliance comment in the audit report.
- For non-compliances on completed work that could have adversely affected the safety, investigate the reason and raise an Authorising Engineer’s (HV) practice improvement notice.
- For non-compliances on work-in-progress that may adversely affect safety, suspend the work, investigate the reason and raise an Authorising Engineer’s (HV) suspension notice.

Audit report

16 The Authorising Engineer should agree the factual findings with the Authorised Persons before preparing the report. The report should include compliant items, any non-compliant findings and recommendations. The report should be issued within 28 days of completion of the site visit.

17 Copies of the report should be distributed to the Designated Person, SOM and the Authorised Persons.

Action plan

18 The Authorised Person(s) in consultation with the Authorising Engineer should prepare an action plan to implement any recommendations from the report. The action plan should be prepared within 28 days of receipt of the audit report and should include the action to be taken, the name of the Authorised Person who will carry out the action and the target date for completion. The Authorised Person should copy the agreed action plan to the Designated Person or SOM.

Short-notice compliance monitoring by the Authorising Engineer

19 In addition to the above procedures, where appropriate, the Authorising Engineer may carry out short-notice visits. These visits should be timed to coincide with any work-in-progress if at all possible. The purpose of the visit is to monitor Authorised Persons and ensure they are working in accordance with this guidance at all times. The report of the findings should be distributed to the individual Authorised Person and the Designated Person or the SOM.

Compliance monitoring by Authorised Persons

20 Authorised Persons should monitor work-in-progress regularly and should keep a record of the findings and any remedial action initiated or required. Copies of the Authorised Persons reports should be made available to the Authorising Engineer.

Auditing aids

21 The following generic checklists can be used as a guide for auditing the safe system of work for electrical distribution systems. Authorising Engineers can modify these to suit the particular installation(s) for which they are appointed. Photographs may be included in the report where appropriate.

22 Refer to the relevant section in the current version of the NHS PAM model for electrical systems to include the completion of an assessment against the NHS PAM.

Authorising Engineer's audit checklist (not exhaustive)

Complete column 3 "Yes/No" to show state as found.

Tick column 4 only if action is required.

Authorised Persons			
Authorised Person ……		Y/N	Action
1.	Is the Authorised Person currently certificated?		
2.	Is the Authorised Person due for refresher training within the next 12 months?		
3.	Is the Authorised Person due for emergency first-aid training within the next 12 months?		
4.	Is the Authorised Person due for training in use of cable tracing equipment?		
5.	Is the Authorised Person carrying out Authorised Person duties on a regular basis?		
6.	Is the Authorised Person carrying out monitoring of work-in-progress?		
7.	Are sufficient Authorised Persons appointed?		
8.	Are Authorised Person monitoring and auditing Competent Persons?		
Audit trail			
PTW number …… Originating Authorised Person ……			
9.	Does the safety programme follow the procedures in Table 1 to 3?		
10.	Is the safety programme clear, legible and unambiguous?		
11.	Was the safety programme countersigned by an appropriate person?		
12.	Does the Authorised Person have sufficient items of safety equipment to carry out the actions on the safety programme?		
13.	Is the isolation and earthing diagram clear, legible and unambiguous?		
14.	Is the permit-to-work clear, legible and unambiguous?		
15.	Was the permit-to-work issued to a Competent Person?		
16.	Was the permit-to-work cancelled correctly?		
17.	Is the sanction for test clear, legible and unambiguous?		
18.	Was the sanction for test issued to a Competent Person?		
19.	Was the sanction for test cancelled correctly?		
20.	Were the site records updated on completion of the work?		
Documentation			
21.	Are the documents kept in the lockable documents cabinet?		
22.	Does the Authorised Person have access to a controlled copy of HTM 06-03?		
23.	Are the single line network diagrams of the electrical distribution correct and up-to-date?		
24.	Is the switchgear and transformer schedule correct and up-to-date?		
25.	Is there a site discrimination study available?		
26.	Are the "as-laid" cable route drawings correct and up-to-date?		
27.	Are the "as-fitted" drawings correct and up-to-date?		
28.	Are copies of operation and maintenance manuals held for all equipment?		
29.	Are all events recorded in the HV site logbook?		
30.	Are defect notifications recorded in the HV site logbook?		
31.	Is all of the distribution system included in the planned maintenance programme?		
32.	Is the register of Competent Persons up-to-date?		

33.	Is the OPM current and up-to-date?		

Safety equipment

34.	Does the Authorised Person have sufficient safety locks, safety key boxes and multi-hasps for the likely number of concurrent jobs?		
35.	Does the Authorised Person have sufficient caution and danger signs for the likely number of concurrent jobs?		
36.	Are the potential indicator and proving unit satisfactory?		
37.	Is the other protective equipment inspected at annual intervals?		

Mimic diagram and system keys

38.	Does the mimic accurately reflect the current state of the system?		
39.	Is the name of the Duty Authorised Person shown on the mimic diagram?		
40.	Are the working keys held on marked key plates?		
41.	Are the arrangements for the “break glass” key box satisfactory?		
42.	Is a warning flag displayed on the mimic diagram for any defect notification?		

Substations

Substation externals

43.	Is there /are there suitable safety signs displayed at the entrances in accordance with ESQCR and this HTM?		
44.	Is the sign legible?		
45.	Is the name of the substation exactly the same as the switchgear schedule?		
46.	Is the sign securely fixed?		
47.	Is the correct contact telephone number shown?		

Substation security

48.	Is the door secure and sound?		
49.	Is there an emergency escape door?		
50.	If so, is it accessible and can it be opened from the inside?		
51.	Is there a clear escape route outside the substation?		
52.	Is there a 24-hour telephone point inside or other suitable means of communication in place?		
53.	Are any non-Authorised Person items stored in the substation?		
54.	Are the access arrangements correctly controlled?		

Substation structure

55.	Is the substation dry and clean?		
56.	Are duct covers fully in place?		
57.	Are there any signs of water ingress?		
58.	Are there any visible defects in the structure (such as damaged firebreaks)?		
59.	Are there any signs of rodents in the substation?		
60.	Is the working space and lighting adequate?		

61.	Is emergency lighting installed?		
62.	If so, is it included in the planned maintenance programme?		

Substation posters and labels

63.	Are suitable, up-to-date and relevant posters and schematics displayed?		
	HV switchgear		
64.	Is each item of switchgear clearly labelled?		
65.	Do the labels agree exactly with the switchgear schedule?		
66.	Are warning labels displayed on the rear panels of the switchgear?		
67.	Are switchgear operating mechanisms locked?		
68.	Does the switchgear condition agree with the maintenance record?		
69.	Is there excessive noise or heat from the switchgear?		
70.	Are there any signs of leakage visible from compound-filled cable terminations?		
71.	Is the condition of the tripping battery installation satisfactory?		
72.	Are there any defect notifications in place?		
73.	If so, are warning notices displayed?		

Fire precautions

74.	Are any rubbish or fire hazardous materials stored inside the substation?		
75.	Is a suitable fire extinguisher provided in the substation?		
76.	Has it been inspected?		
77.	Is there a “gas flooding” system installed?		
78.	If so, are there clear instructions displayed on how to inhibit the system when entering the substation?		

I confirm that, where actions are required, a report has been submitted to the Designated Person	…… Signature of Authorising Engineer (HV)

Appendix 5 – Mimic diagram and key locker

Mimic diagram

1 The mimic diagram should be of a suitable configuration to enable real-time modifications to be carried out. It should be:

a. provided at the intake high voltage substation/switchroom or in a suitable location designated for the system as agreed by the Authorising Engineer

b. in the form of a single line diagram indicating all high voltage circuits comprising the high voltage system together with any low voltage interconnecting circuits that can back feed to the high voltage system (generators, CHP and/or UPS systems, PV/battery systems, etc.)

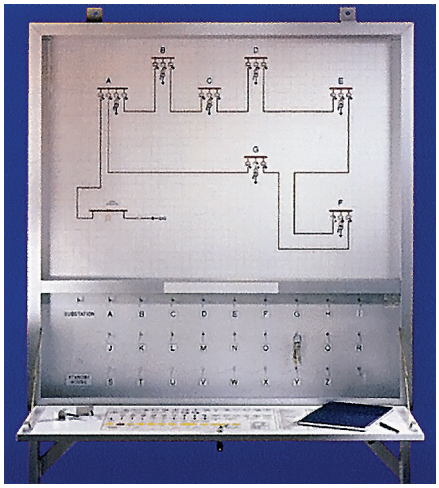
c. equipped with switch, circuit breaker, transformer, generator, and UPS, etc. symbols complying with the requirements of BS EN 60617

Note:

The standard is now represented by the IEC database available from its website. See also Appendix 8 for typical symbols.

The switching equipment symbols should incorporate the facility to indicate whether the switch contacts are open, closed or earthed

Mimic diagram cabinet typical example



d. an accurate representation of the system referred to in (ii) with all switching devices shown in their relative positions

e. drawn to show all equipment and switching devices, clearly and correctly labelled in the same orientation (layout) as the equipment viewed from the front

f. totally enclosed within a cabinet having full-width transparent doors complete with integral lock and facilities to display appropriate signs.

Keys

2 Complete sets of keys for each substation should be housed within the cabinet and

should be labelled to correspond with the nomenclature used on the mimic diagram.

3 The cabinet should be equipped with “work on high voltage system in progress” and “Authorised Person on site” notices so arranged that they can only be displayed by the Duty Authorised Person having a key to the key locker.

4 The mimic diagram may incorporate a lower section, either desktop console or drop-down door arrangement, secured by an integral lock to accommodate the key locker, danger/ caution notices, HV site logbook, safety documents and the keys to all safety locks associated with the system.

Appendix 6 – Safety signs and poster

1 The following is an extract from the Electricity Safety, Quality and Continuity Regulations 2002.

SCHEDULE 1

Regulations 11(c)(i) and 19(2)

DESIGN, COLOURS AND PROPORTIONS OF THE SAFETY SIGN

1. A safety sign shall incorporate a design, and shall be of the proportions, as shown in the diagram below, except that the height of the text may be increased to a maximum of **0.12** × L.

2. The triangle, symbol and text shall be shown in black on a yellow background.

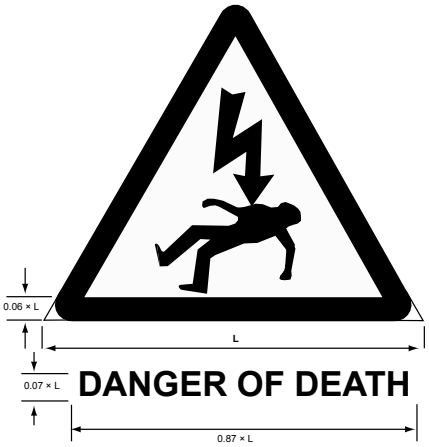
3. The symbol shall not occupy more than 50 per cent of the area within the triangle.

4. A safety sign may include additional text but any such text

a. shall be in black; and

b. shall be the same size as the text used on the safety sign,

and no part of any additional text shall appear on the sign higher than the base of the triangle.



Extracts from Health Technical Memorandum 06-03

General

Guidance in this Health Technical Memorandum applies to all healthcare facilities containing a high voltage system.

Guidance is intended to assist Duty Holders to meet the requirements of the Electricity at Work Regulations 1989 ("the Regulations"), which are made under the Health and Safety at Work etc Act 1974 (HSW Act 1974). It is not an authoritative interpretation of the regulations or other laws. Only the courts can make such interpretation.

Inadequate control and/or improper use of electricity is a danger to life and property. Owners, occupiers, general managers/chief executives and those responsible for electrical services as "Duty Holders" are accountable for ensuring control; they are also responsible for the safe management, design, installation, operation and maintenance of the electrical systems.

Purpose

The provision of effective procedures and their formalising into written instructions is essential for ensuring a safe system of working where this involves work on conductors or equipment of high voltage systems. This document makes recommendations for the allocation of duties to personnel and the manner in which these duties should be performed.

Procedures

High voltage systems associated with healthcare and social services premises vary considerably in size and complexity. The procedures advocated in this document therefore cannot cover every circumstance and consequently may, in specific instances, need to be supplemented by local written procedures. These local arrangements should only be considered when, in the opinion of the Authorising Engineer (HV), the guidance given in this document is inadequate for the particular circumstances. Any such supplementary procedures must therefore maintain the same standards of electrical safety outlined in this guidance.

Because of the specialist nature of the risks, it is important that a carefully prepared procedure exists for dealing with the routine servicing of high voltage installations and with any emergencies that arise.

Objections

When any person receives instructions regarding the operation of, or work on, the high voltage system and associated electrical equipment at the managed premises, they should report any objections (on safety grounds) to the carrying out of such instructions to the persons issuing them, who should then have the matter investigated and, if necessary, referred to a more senior level for a decision before proceeding.

Operation of high voltage switchgear

The following points apply:

a. high voltage switching should be carried out by the Duty Authorised Person (HV) or by persons acting under his/her personal supervision. Circuit breakers should be fitted with locks preventing unauthorised reclosure. The Authorised Person (HV) should be informed of all high voltage emergency switching.

b. locks should be applied as necessary to prevent unauthorised operation of switchgear (except emergency tripping as referred to above);

c. oil circuit breakers (OCBs) should in general be reclosed a maximum of two times after opening under fault conditions. The equipment should be inspected at the first opportunity after opening under fault conditions;

d. with regard to SF6 switches, checks should be carried out before operation to ensure the gas is within operating limits

e. when switchgear shows any sign of defect or malfunction after operating, its condition should be reported immediately to the Authorising Engineer (HV), and it should be examined before further operation;

f. no high voltage earthing switch should be operated or circuit main earth connection attached or removed except by an Authorised Person (HV);

g. making live or dead by visual signal, or by prearranged understanding after an agreed interval of time, is not an acceptable practice.

Health Technical Memorandum 06-03 does not apply where equipment has been discharged, disconnected and removed from the system or installation.

Equipment that is considered by an Authorised Person (HV) to be in a dangerous condition should be isolated elsewhere and action taken to prevent it from being reconnected to the electricity supply.

All work on, or testing of, high voltage equipment connected to a system should be authorised by a permit-to-work or a sanction-for-test following the procedures set out in Tables 1 to 3.

No hand or tool (unless the tool has been designed for the purpose) must make contact with any high voltage conductor unless that conductor has been confirmed dead by an Authorised Person (HV) in the presence of the Competent Person (HV).

Where any work or test requires an Accompanying Safety Person (HV) to be present, their requirement should be included in the safety programme. He/she should be in position before that work or testing can begin.

Voltage test indicators should be tested immediately before and after use against a test supply designed for the purpose.

Where the procedures involve the application of circuit main earths, the unauthorised removal of such earths should be prevented, wherever practicable, by the application of safety locks.

Role and duties of the Competent Person (HV)

Competent Persons (HV) should comply with Health Technical Memorandum 06-03 using the appropriate safety documentation when carrying out all work as instructed.

Competent Persons (HV) should use safe methods of work, safe means of access and the personal protective equipment and clothing provided for their safety.

Competent Persons, when recipients of a safety document, should:

a. be fully conversant with the nature, implications and the extent of the work to be done;

b. read the contents of any safety documentation and confirm to the person issuing this that they are fully understood;

c. during the course of the work, adhere to, and instruct others under their charge to adhere to, any conditions, instructions or limits specified on the safety document;

d. keep the safety document and (where appropriate) keys in safe custody, and correctly implement any management procedure to achieve this;

e. when in charge of work, provide immediate or personal supervision as required;

f. warn all persons as quickly as possible to withdraw from, and not to work on, the equipment concerned until further notice if, during the course of work, a hazard which could result in danger arises or is suspected. The situation should be reported immediately by the Competent Person (HV) to the Duty Authorised Person (HV).

Competent Persons (HV) should not start or restart work under a safety document issued to another Competent Person (HV).

Having accepted a safety document, the Competent Person (HV) may only undertake or supervise the work or test specified until the task is complete and the Competent Person (HV) has signed part 3 of the permit or sanction-for-test, which is retained in the pad. Neither the Competent Person nor any person under the direct control of the Competent Person (HV) is to attempt to undertake any other duties.

Unless it is unavoidable, the Competent Person (HV) is not to leave the location of the work or test until the task is completed. If the Competent Person (HV) has to temporarily leave the location of the work or test, the task should be suspended, and adequate safety precautions taken to prevent danger. The work or test is not to be resumed until the Competent Person (HV) has returned to the location of the work or test.

Competent Persons (HV) clearing a safety document should do so only after all persons working under the safety document have been withdrawn from, and warned not to work on, the high voltage equipment or system concerned. Where appropriate, they should ensure that all tools, gear and loose material have been removed, guards and access doors replaced and the workplace left tidy.

Table 1 – Procedures to be carried out by an Authorised Person (HV) to enable work on High Voltage equipment

Steps1	Procedure
1 -Plan work and prepare safety documentation	i. Determine the scope of works, prepare and review required Risk Assessments and assess any potential control measures, access arrangements that are required as part of the works and agree potential dates and times with appropriate personnel. This may require the preparation of a task specific planning document, which may require approval by members of the ESG. ii. Prepare a safety programme, plus an isolation and earthing diagram in duplicate, and obtain countersignatures from another Authorised Person (HV) Note – A separate safety programme and isolation and earthing diagram should be produced for issue of a permit to work and/or sanction for test. Restoration of the supplies and system should also be recorded on the safety programme; these can be part of the original safety programme or a new safety programme.
2 -Isolate and fix signs	i. Sign on as the Duty Authorised Person (HV), and post Authorised Person on duty and HV work in progress signs and check mimic diagram. ii. Duty Authorised Person to confirm with the appropriate person(s) that the work is authorised to take place iii. Disconnect from all sources of supply, fix safety locks and caution signs at all points of disconnection to prevent unauthorised reconnection. iv. Fix danger signs on live equipment adjacent to the point of work
3 -Prove dead	i. Prove dead with a high voltage potential indicator at all accessible points of isolation ii. Where appropriate, prove dead on the low voltage side of a transformer, that is LV feed pillars, LV distribution boards, etc. Note – Where not practical to prove dead, confirming dead will be required after the issue of safety documentation prior to commencement of work / task.
4 – Earth	i. Earth conductors at all points of isolation and fix safety locks to earths. ii. Identify with certainty or spike underground cables at the point (s) of work if the conductors are to be cut or exposed. iii. Earth overhead lines near the working places
5 -Issue the permit-to-work	i. Duty Authorised Person to clearly identify the equipment to be worked on. ii. The Competent Person (HV) should be shown the safety arrangements carried out at all the point/s of isolation and at the locations of the work on the isolation and earthing diagram and should initial the isolation and earthing diagram. iii. Issue the permit to work, isolation and earthing diagram, and the key to the safety key box to the Competent Person (HV) iv. Where conductors are to be exposed as part of the work and it was not practicable to prove dead in Step 3, Confirm dead* (see paragraph 8.66) v. Adjust mimic diagram and complete the HV site logbook
6 -Undertake the work / test	The Competent Person (HV) should undertake or directly supervise the work
7 -Check the equipment	i. Once the work / test has been completed, the Competent Person should confirm to the Duty Authorised Person (HV) that the work / test has been completed. The Duty Authorised Person to confirm they are satisfied the equipment is safe to energise or test. ii. If the work / test has been stopped, check the equipment and area is safe.
8 -Cancel the permit-to-work	i. Competent Person (HV) to return the permit to work, isolation and earthing diagram and Competent Person key to the Safety key box to the Duty Authorised Person (HV) ii. Competent Person (HV) to sign part 3 of the permit to work, Duty Authorised Person (HV) to sign part 4 and confirm that the permit to work is now cancelled and no further work can be carried out. iii. Where tests are required, follow Table 2.
9 -Restore to operational state	i. Follow the steps in the Safety Programme for restoration of supplies ii. Adjust mimic, remove Authorised Person on duty and HV work in progress signs, complete HV site logbook and return keys, sign off as duty Authorised Person iii. Retain all documents prepared in the Operational Procedures Manual
Notes: 1 The Authorised Person (HV) is responsible for all tasks.	

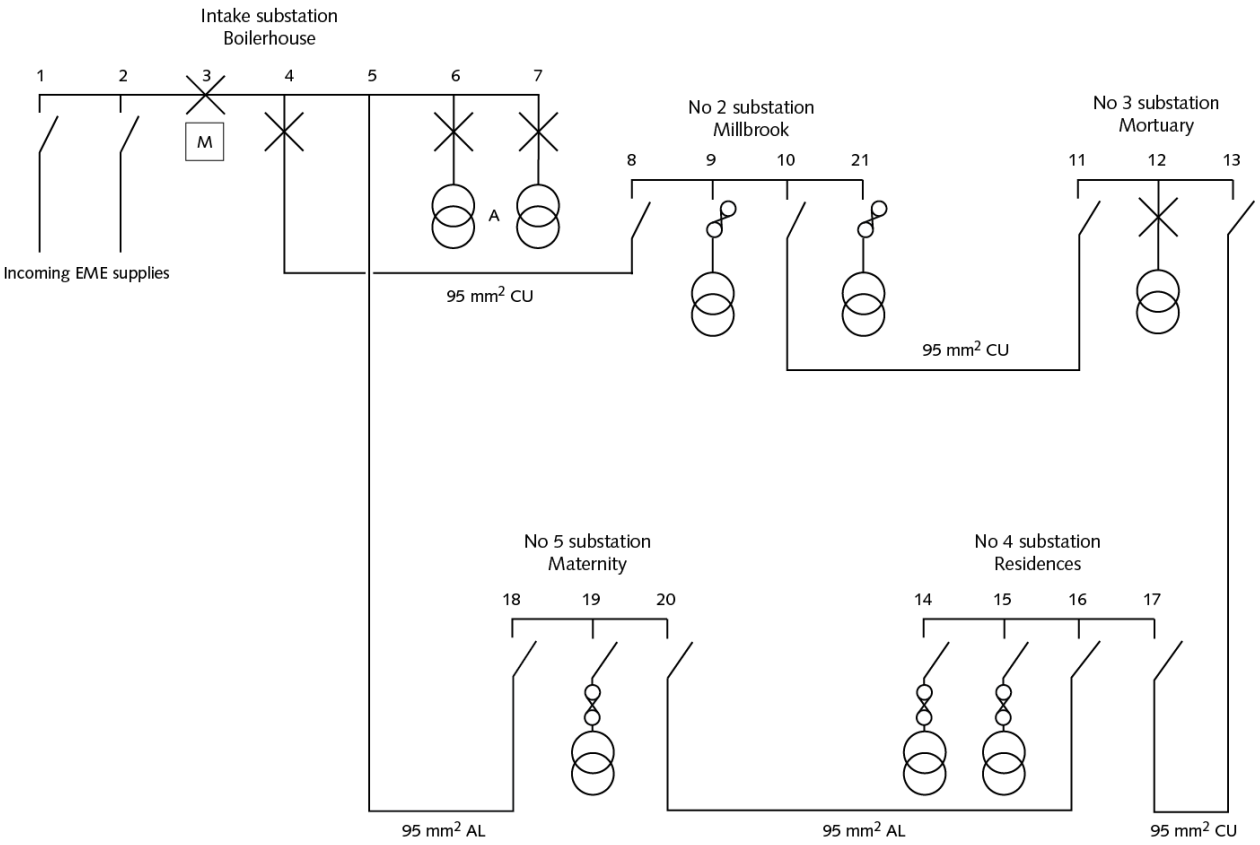
Table 2 – Procedures to be carried out by an Authorised Person (HV) to enable testing on High Voltage equipment

Steps1	Procedure
1 -Plan work and prepare safety documentation	i. Determine the scope of works, prepare and review required Risk Assessments and assess any potential control measures, access arrangements that are required as part of the works and agree potential dates and times with appropriate personnel. This may require the preparation of a task specific planning document, which may require approval by members of the ESG. ii. Prepare a safety programme, plus an isolation and earthing diagram in duplicate, and obtain countersignatures from another Authorised Person (HV) Note – A separate safety programme and isolation and earthing diagram should be produced for steps required to issue a Permit to Work and / or Sanction for Test. The steps required to restore supplies should also be included on a Safety Programme. These can either be on a single safety programme, or separate documents.
2 -Isolate and fix signs	i. Sign on as the Duty Authorised Person (HV), and post Authorised Person on duty and HV work in progress signs and check mimic diagram. ii. Duty Authorised Person to confirm with the appropriate person(s) that the work is authorised to take place iii. Disconnect from all sources of supply, fix safety locks and caution signs at all points of disconnection to prevent unauthorised reconnection. iv. Fix danger signs on live equipment adjacent to the point of work v. If HV test enclosure is needed, set up barriers and fix danger signs
3 -Prove dead	i. Prove dead with a high voltage potential indicator at all accessible points of isolation ii. Where appropriate, prove dead on the low voltage side of a transformer, that is LV feed pillars, LV distribution boards, etc. Note – Where not practical to prove dead, confirming dead will be required after the issue of safety documentation prior to commencement of test.
4 – Earth	i. Earth conductors at all points of isolation and fix safety locks to earths that cannot be removed as part of the sanction for test; fix working locks to earths that can be removed for testing purposes according to the sanction for test. ii. Where applicable, replace safety locks on earths with working locks where earths are to be removed for testing following the cancellation of a permit to work iii. Earth overhead lines near the working places
5 -Issue the sanction for test	i. Duty Authorised Person to clearly identify the equipment to be tested and the points of test. ii. The Competent Person (HV) should be shown the safety arrangements carried out at all the point/s of isolation and at the locations of the testing on the isolation and earthing diagram and should initial the isolation and earthing diagram. iii. Issue the sanction for test, isolation and earthing diagram, and the key to the safety key box to the Competent Person (HV) iv. Duty Authorised Person to retains keys to removable earths, remove and reapply earths as requested v. Where conductors are to be exposed as part of the work and it was not practicable to prove dead in Step 3, Confirm dead* (see paragraph 8.66) vi. Adjust mimic diagram and complete the HV site logbook
6 -Undertake the test	The Competent Person (HV) should undertake or directly supervise the test
7 -Check the equipment	i. Once the test has been completed, the Competent Person should confirm to the Duty Authorised Person (HV) that the test has been completed. The Duty Authorised Person to confirm they are satisfied the equipment is safe to energise or test. ii. If the test has been stopped, check the equipment and area is safe.
8 -Cancel the sanction for test	i. Competent Person (HV) to return the sanction for test, isolation and earthing diagram and Competent Person key to the Safety key box to the Duty Authorised Person (HV) ii. Competent Person (HV) to sign part 3 of the sanction for test, Duty Authorised Person (HV) to sign part 4 and confirm that the sanction is now cancelled and no further testing can be carried out.
9 Restore to operational state	i. Follow the steps in the Safety Programme for restoration of supplies ii. Adjust mimic, remove Authorised Person on duty and HV work in progress signs, complete HV site logbook and return keys, sign off as duty Authorised Person iii. Retain all documents prepared in the Operational Procedures Manual
Notes: 1 The Authorised Person (HV) is responsible for all tasks.	

Table 3 – Procedures to be carried out by an Authorised Person (HV) to enable work on High Voltage Generating Equipment

Steps1	Procedure
1 -Plan work and prepare safety documentation	i. Determine the scope of works, prepare and review required Risk Assessments, method statements and any potential control measures, access arrangements that are required as part of the works and agree potential dates and times with appropriate personnel. ii. Prepare a safety programme and the isolation and earthing diagram in duplicate, and obtain countersignatures from another Authorised Person (HV). Note – A separate safety programme and isolation and earthing diagram should be produced for issue of a Permit to Work and / or Sanction for Test. Restoration of the supplies and system should also be recorded on the safety programme, these can as part of the original Safety programme, or, a new safety programme. These can either be on a single safety programme, or separate documents.
2 -Isolate and fix signs	i. Sign on as the Duty Authorised Person (HV), and post AP on duty and HV work in progress signs and check mimic diagram. ii. Duty AP to confirm with the appropriate person(s) that the work is authorised to take place iii. Inhibit engine start. Isolate the generator and disconnect from all sources of supply, fix safety locks and caution signs at all points of isolation/disconnection to prevent unauthorised connection, operation or starting. iv. Fix caution signs at all points of isolation, including the generator control panel. v. Where practicable isolate the generator Neutral Earthing resistor and fix caution sign and safety lock vi. Fix danger signs on live equipment adjacent to the point of work.
Prove dead	Prove dead with an approved high voltage test indicator at all accessible points of isolation or accessible place of work.
4 – Earth	Where practicable earth the neutral and line output terminals and conductors and fix safety locks, where practicable.
5 -Issue the permit-to-work	i. The Duty AP is to clearly identify and/or mark the Point of Work/ equipment to be worked on. ii. The Competent Person (HV) is to be shown the safety arrangements carried out at all the point(s) of isolation and the location(s) of the work on the isolation and earthing diagram and is to initial the isolation and earthing diagram. iii. Issue the permit to work, isolation and earthing diagram, and the key to the safety key box to the Competent Person (HV). iv. Where conductors are to be exposed as part of the work and it was not practicable to prove dead in Step 3, Confirm dead* (see paragraph 8.66). v. The Authorised Person is to remain with the Competent Person until the conductors have been made accessible to High Voltage indicator and, the Authorised person is to confirm the equipment dead to the satisafction of the Competent Person. vi. Adjust the mimic diagram and complete the HV site logbook as soon as practicable.
6 -Undertake the work	The Competent Person (HV) is to undertake or directly supervise the work and, on completion or when the Work is stopped and made safe, returns the original permit to work, isolation and earthing diagram and the HV key to the safety key box to the Duty HV Authorised Person and completes and signs part 3 of the permit to work retained in the pad.
7 -Check the equipment	i. Once the work has been completed, the Duty AP to confirm they are satisfied the equipment is safe to energise or test. ii. If the work has been stopped, check the equipment and area is safe.
8 -Cancel the permit-to-work	i. CP (HV) to return the permit to work, isolation and earthing diagram and CP key to the Safety key box to the Duty AP (HV). ii. CP (HV) to sign part 3 of the permit to work, Duty AP (HV) to sign part 4 and confirm that the permit to work is now cancelled and no further work can be carried out.
9 -Restore to operational state	i. If testing is required then follow the steps in Table 2. ii. Remove danger signs adjacent to point of work. iii. Remove caution signs and safety locks. iv. Follow the steps in the Safety Programme for restoration of the equipment to the normal operational state. v. Adjust mimic, remove AP on duty and HV work in progress signs, complete HV site logbook, return keys and sign off as Duty AP vi. Retain all documents associated with the work in the Operational Procedures Manual
Notes: 1 The Authorised Person (HV) is responsible for all tasks.	

Appendix 7 – Typical single line diagram and switchgear and transformer schedules for a high voltage system



SUBSTATION	INTAKE SUBSTATION – BOILERHOUSE						
SWITCHGEAR NUMBER	1	2	3	4	5	6	7
LABEL	FOX & GUDGEON 'T'	BURN HILL 'T'	BUS SECTION	MILBROOK SUB	MATERNITY SUB	TRANSFORMER NO.1	TRANSFORMER NO.2
SWITCHGEAR TYPE	OILSWITCH IL/2	OILSWITCH IL/2	OCB VSI12	OCB VSI12	OCB VSI12	OCB VSI12	OCB VSI12
OWNER/MAKER	BHDC/BRUSH	BHDC/BRUSH	BHDC/BRUSH	HH/BRUSH	HH/BRUSH	HH/BRUSH	HH/BRUSH
MAKERS SERIAL NO.	5/45352/1	5/45352/2	A/45352/3	A/45367/4	A/45367/5	A/45367/6	A/45367/7
RATINGS NORMAL BUS BARS	800A	800A	800A	800A	800A	800A	800A
RATINGS NORMAL SWITCH/OCB	400A	400A	400A	400A	400A	400A	400A
RATINGS FAULT 3 secs. WITHSTAND	350 mVA	350 mVA	350 mVA	350 mVA	350 mVA	350 mVA	
TYPE OF CLOSING	MANUAL SPRING	MANUAL SPRING	MANUAL SPRING	MANUAL SPRING	MANUAL SPRING	MANUAL SPRING	MANUAL SPRING
TRIP COIL RATING			30V DC	30V DC	30V DC	2A AC	2A AC
RELAYS – FUNCTION & TYPE a) OVERCURRENT			IDMT	MCGG IDMT	MCGG IDMT	TLF	TLF
b) EARTH FAULT			IDMT	MCGG IDMT	MCGG IDMT		
c)				INSTANT. ON O/C	INSTANT. ON O/C		
d)				INSTANT. ON E/F	INSTANT. ON E/F		
PROTECTION SETTS. a) O/C PLUG SETT. & TMS			75% 0.3	1.25 0.1	1.25 0.1	12.5A	12.5A
b) E/F PLUG SETT. & TMS			30% 0.2	0.5 0.1	0.5 0.1		
c)				INF.	INF.		
d)				7	7		
INSTRUMENTS TYPE/SCALE RANGE			AMMETER 0–500A	AMMETER 0–200A	AMMETER 0–200A	AMMETER 0–50A	AMMETER 0–50A
CURRENT TRANSF.-No./VA/Class/P.amps			3 15/5P10 400/5	3 15/5P10 300/5	3 15/5P10 300/5	3 15/5P10 40/5	3 15/5P10 40/5
CABLE BOX ARRANGEMENT	REAR TRIF.	REAR TRIF.	REAR TRIF.	REAR TRIF.	REAR TRIF.	REAR TRIF.	REAR TRIF.
EARTHING ARRANGEMENT	INTEGRAL	INTEGRAL	INTEGRAL TRANSFER	INTEGRAL TRANSFER	INTEGRAL TRANSFER	INTEGRAL TRANSFER	INTEGRAL TRANSFER
MANUAL TRIP ARRANGEMENT			PUSH BUTTON	PUSH BUTTON	PUSH BUTTON	PUSH BUTTON	PUSH BUTTON
ADDITIONAL INFORMATION							

SITE SUPPLY DETAILS	
D.N.O. DETAILS	R.G.H. DISTRIBUTION COMPANY
SERVICE VOLTAGE	11000
FAULT LEVEL	88.3 mVA
MAX DEMAND	
RESERVE CAPACITY	
R.E.C. PROTECTION TYPE	IDMT
PROTECTION SETTS. a) O/C PLUG SETT. & TMS	125% 0.3
b) E/F PLUG SETT. & TMS	20% 0.2
CT RATIO	400/5

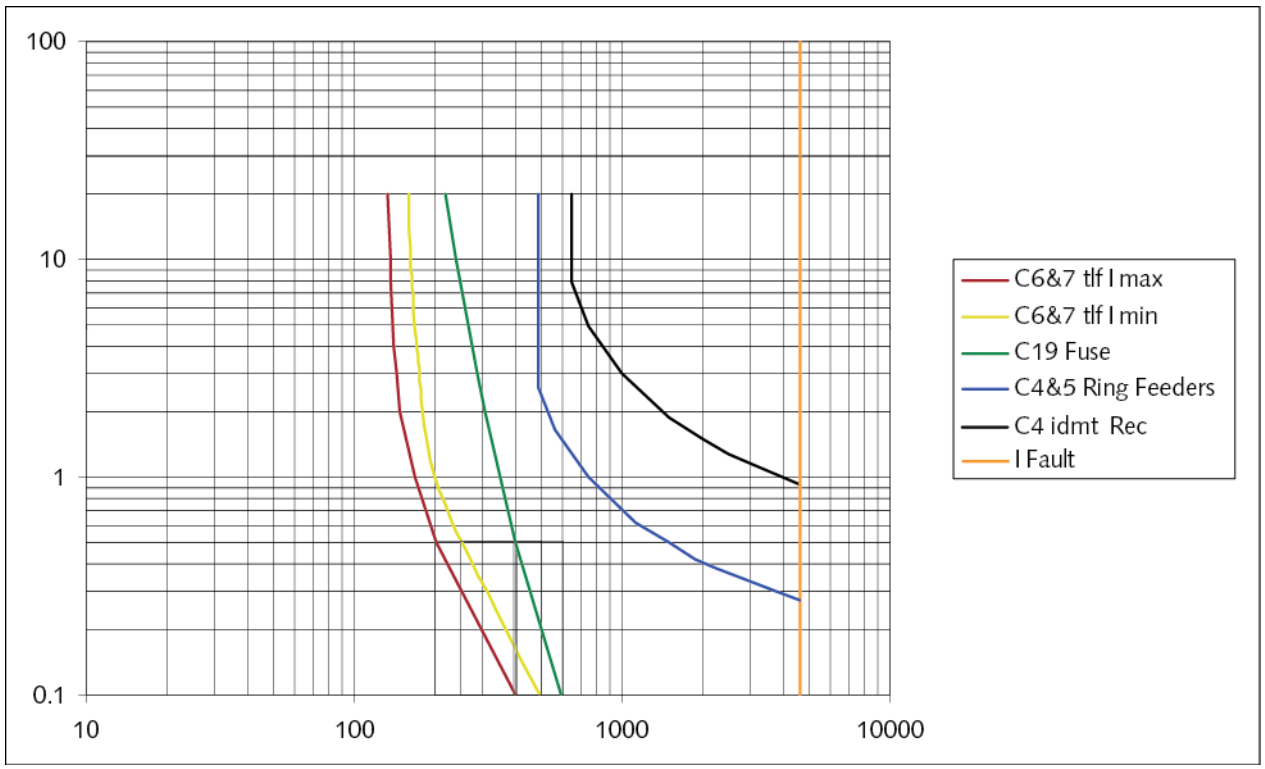
SUBSIDIARY EQUIPMENT
BRUSH OCB TEST PRODS.

TRANSFORMER		
KVA	500 kVA	500 kVA
VOLTAGE RATIO	11000/433	11000/433
VECTOR GROUP	Dyn11	Dyn11
% IMPEDANCE	4.69	4.69
COOLING METHOD	ONAN	ONAN
TAPPINGS	±2½% & ±5%	±2½% & ±5%
TAP	3	3
TOTAL WEIGHT	1747 Kg	1747 Kg
OIL CAPACITY	433 Lts	433 Lts
FITTINGS		
LABEL		
SERIAL NO.	KB317/1	KB317/2
LOW VOLTAGE PROT.		
SWITCHGEAR		
CURRENT TRANS.		
RELAY		
SETTINGS		

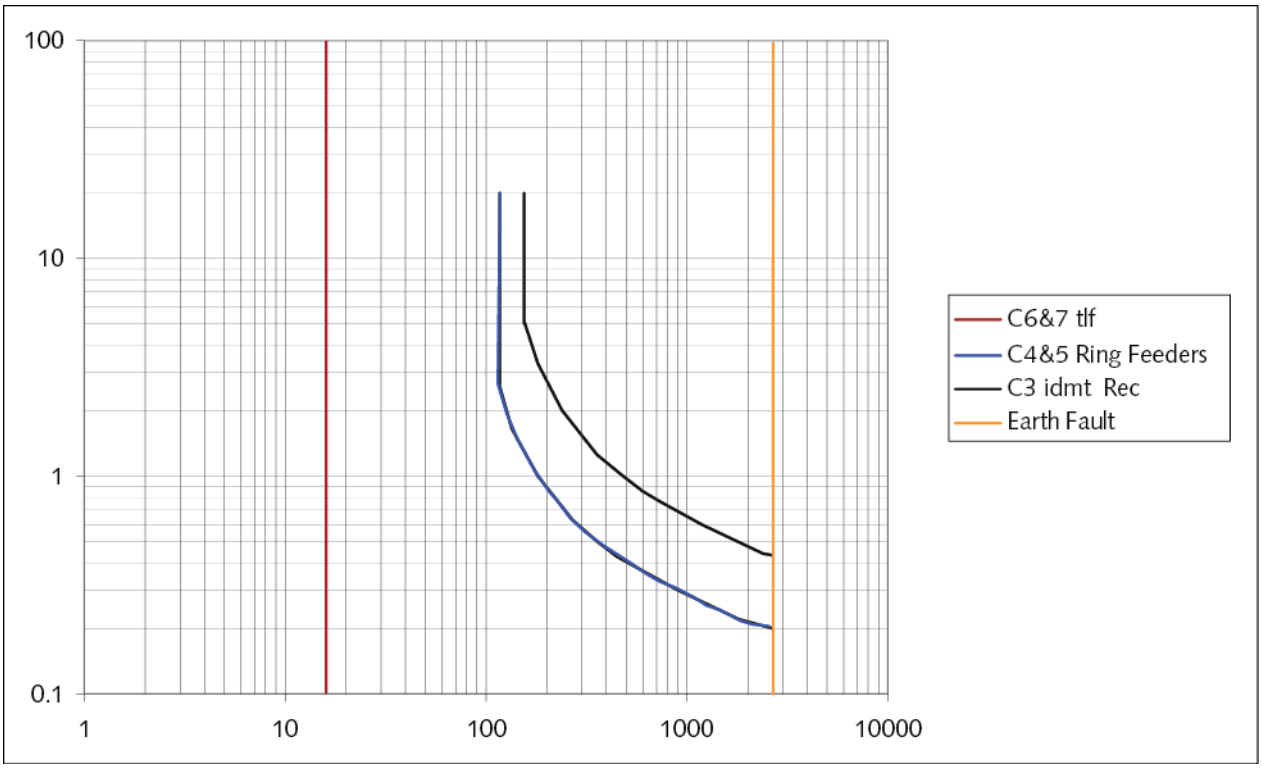
SUBSTATION	NO. 2 SUBSTATION – MILLBROOK				NO. 3 SUBSTATION – MORTUARY		
SWITCHGEAR NUMBER	8	9	10	21	11	12	13
LABEL	INTAKE SUBSTATION	TRANSFORMER No.1	MORTUARY SUB	TRANSFORMER No.2	MILLBROOK SUB	TRANSFORMER No.1	RESIDENCES SUB
SWITCHGEAR TYPE	OIL SWITCH J4	FUSE SWITCH GF3	OIL SWITCH J4	FUSE SWITCH GF3	Merlin Gerin Ringmaster RN2c-T1/21 SF6 Ring Main unit		
MANUFACTURER	LONG & CRAWFORD	LONG & CRAWFORD	LONG & CRAWFORD	LONG & CRAWFORD	Schneider Electric Ltd.		
MANUFACTURER'S SERIAL NO.	J4 850625	GF3 850107	J4 850626	GF3 891956	SR3L02224		
RATINGS NORMAL BUS BARS	800A	800A	800A	800A	630A		
RATINGS NORMAL SWITCH/FUSE SWITCH	630A	200A	630A	200A	630A	200A	630A
RATINGS FAULT 3 secs. WITHSTAND	350 mVA	350 MVA	350 MVA	350 MVA	16 kA 3 secs.	3.15 kA	16 kA 3 secs.
TYPE OF CLOSING	MANUAL SPRING	MANUAL SPRING	MANUAL SPRING	MANUAL SPRING	Independent Manual		
HRC FUSE RATING		50A		36A	5A TLF		
CABLE BOX ARRANGEMENT	REAR TRIF.	REAR TRIF.	REAR TRIF.	REAR TRIF.	Left Side Down	Rear Down	Right Side Down
EARTHING ARRANGEMENT	INTEGRAL	INTEGRAL	INTEGRAL	INTEGRAL	INTEGRAL		
MANUAL TRIP ARRANGEMENT		MAIN HANDLE		MAIN HANDLE	MAIN HANDLE		
ADDITIONAL INFORMATION		CABLE TEST FACILITY		CABLE TEST FACILITY	CT's connected at 100/5		
TRANSFORMERS							
LABEL		TRANSFORMER No.1		TRANSFORMER No.2		TRANSFORMER No.1	
MANUFACTURER		BRUSH		SOUTH WALES		BRUSH	
KVA		500 kVA		315 kVA		500 kVA	
VOLTAGE RATIO		11000/433		11000/433		11000/433	
VECTOR GROUP		Dyn11		Dyn11		Dyn 11	
% IMPEDANCE		4.66		4.49		4.67	
COOLING METHOD		ONAN		ONAN		LNAN	
TAPPINGS		±2½% & ±5%		±2½% & ±5%		±2½% ±5½%	
TAP		3		2		2	
TOTAL WEIGHT		1747 kg		1930 kg		1747 kg	
OIL CAPACITY		433 Litres		415 Litres		433 Litres	
FITTINGS						No drain plug	
SERIAL NO.		68298/1		112709		69317/2	
LOW VOLTAGE PROTECTION							
SWITCHGEAR							
CURRENT TRANSFORMERS							
RELAY							
SETTINGS a) O/C PLUG SETT. & TMS							
b) E/F PLUG SETT. & TMS							
SUBSIDIARY EQUIPMENT	TEST PRODS FOR FUSE SWITCH						

Grading charts

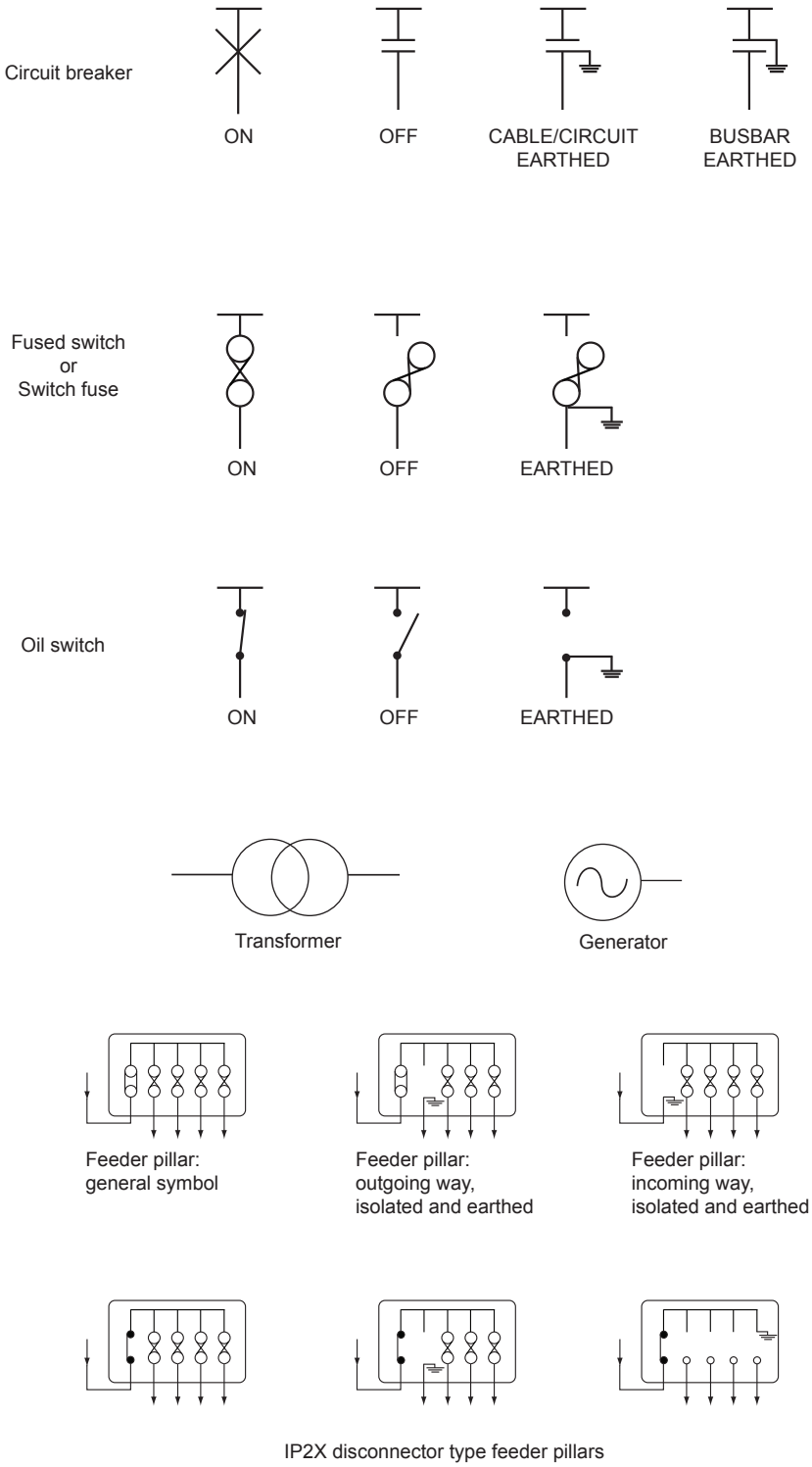
Overcurrent



Earth fault



Appendix 8 – Standard symbols for the isolation and earthing diagram



IP2X disconnector type feeder pillars

Switchgear

1 The terminology used to describe a piece of switchgear on a system should state:

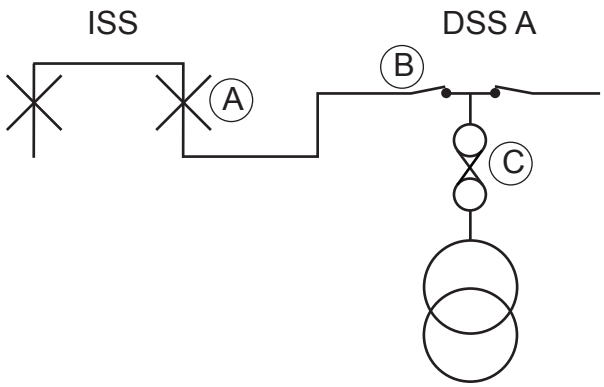
a. **where** the switchgear is located;

b. **what** type of switchgear is going to be operated;

c. **to where** does the switchgear connect.

(See Figure A1.)

Figure A1 Switchgear network diagram



	Where	What	To where
A	ISS	OCB	To DSS A
B	DSS A	Oil switch	To ISS
C	DSS A	Fuse switch	To transformer

Operation

2 The operation of the switchgear should be recorded as follows:

Switches/fused units

Switch to on
Switch to off
Switch to earth

Circuit breakers

Switch to on

Appendix 9 – Qualifications and training requirements

Qualifications of an Authorising Engineer

1 To be eligible for appointment, a prospective Authorising Engineer should:

a. be a chartered or an incorporated engineer with practical and relevant technical engineering experience of the types of systems and equipment relative to their appointment

b. have satisfactorily completed an approved Authorised Person initial training course in the last five years or within six months of a first-time nomination

c. have satisfactorily completed an approved Authorising Engineer training course in the last five years or within six months of a first-time nomination

d. be familiar with the different types of equipment, installations and systems in use within the area for which appointment is sought

e. have a basic knowledge of the systems and installations in use in the area for which they will become responsible, and become familiar with the more complex systems

f. be independent from the organisation which is important to exercise the duties of the post

g. be able to demonstrate their competency and suitability for the role by demonstrating a good understanding of the management tasks involved and knowledge of Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems' prior to appointment

h. have adequate knowledge of, and within the last three years successfully completed a training course on, emergency first-aid.

Authorising Engineer (HV) training

2 This HTM suggests that, in order to become eligible for appointment as an Authorising Engineer, candidates should have successfully completed an appropriate training course for Authorised Persons. The course profile is described in this Appendix.

3 This HTM suggests that, in order to become eligible for appointment as an Authorising Engineer, candidates should have successfully completed an appropriate training course for Authorising Engineers. The course profile is described in this Appendix.

4 This HTM suggests that an Authorising Engineer should attend an appropriate Authorised Persons' training course at intervals not exceeding five years.

5 This HTM suggests that that an Authorising Engineer should attend an appropriate Authorising Engineer refresher training course at intervals not exceeding five years.

Qualifications of Authorised Persons (HV)

6 Prospective Authorised Persons should be nominated by the Management and assessed, interviewed and recommended for appointment by the Authorising Engineer. The appointment should be for defined systems and installations and will be registered on a certificate of appointment signed by the Authorised Person, the Designated Person/ SOM and the Authorising Engineer.

7 To be eligible for appointment as an Authorised Person, the prospective Authorised Person should:

a. have suitable and sufficient skills, knowledge, experience and behaviour

b. be electrically qualified within the following range:

   (i) degree

   (ii) HND/HNC

   (iii) OND/ONC

   (iv) BTech 3 or above

   (v) NVQ at level III or above

f. have an adequate knowledge of this HTM and of those regulations that are applicable to the systems and installations for which the appointment is sought

g. be technically competent and qualified to safely operate, and make safe to work on or test, the equipment, systems or installations and for which appointment is sought

h. be familiar with the equipment, systems or installations for which the appointment is sought

i. have successfully completed a suitably accredited Authorised Persons (HV) training course

j. before being appointed, be able to demonstrate competency and suitability for the role through a formal interview carried out by the Authorising Engineer

k. have adequate knowledge of, and within the last three years have successfully completed, an emergency first-aid training course.

Initial training for an Authorised Person (HV)

8 Prospective Authorised Persons (HV) should successfully complete an Authorised Persons' (HV) training course to be considered for appointment as an Authorised Person.

9 Prospective Authorised Persons (HV) should successfully complete an emergency first-aid training course in accordance with this guidance to be considered for appointment as an Authorised Person.

Refresher training for an Authorised Person (HV)

10 All Authorised Persons (HV) should successfully complete an Authorised Persons' (HV) refresher training course at intervals not exceeding three years.

11 All Authorised Persons (HV) should successfully complete an emergency first-aid training course in accordance with this HTM at intervals not exceeding three years.

Familiarisation training

12 A suitable period of familiarisation training should be agreed with the prospective Authorised Person and Authorising Engineer and the SOM or mentoring Authorised Person.

13 At the end of the familiarisation period, for the systems, installations and equipment for

which the appointment is sought, the prospective Authorised Person should be able to demonstrate:

a. a good working knowledge of the procedures associated with the operation of this HTM, the role and duties of an Authorised Person and any agreed local variation

b. a good working knowledge of the layout of the electrical distribution, the location of the mimic diagram, safety key-boxes, working key cabinet and how to gain access to them

c. a good working knowledge of the operation – under normal, failure and fault conditions – of all the principal components of the systems and installations for which authorisation is being sought, such as switchgear, distribution equipment and standby generating sets

d. practical experience, under the direct supervision of an experienced Authorised Person, of the operation of the electrical equipment forming part of the system or installation

e. knowledge of the location of, how to obtain access to, and the use of, all appropriate protective equipment, test indicators (including appropriate test supplies (proving units)), where applicable low voltage potential indicators (including appropriate test supplies (proving units)), earthing equipment and safety signs

f. a good understanding of all the necessary safety measures to be taken to prevent danger or, where appropriate, injury, and to prevent damage to equipment

g. knowledge of any necessary liaison with local managers, clinicians, Authorised Persons of other disciplines, electricity supply authorities, and contractors having operation, repair or maintenance contracts.

On-site training

14 On-site training should consist of putting into practice, under the supervision of an experienced Authorised Person, the knowledge gained during the familiarisation period. During this period, the prospective Authorised Person should keep a record of each event attended in the Authorised Person's HV logbook detailing the actions taken both personally and by the Authorised Person. This logbook should be produced at the interview with the Authorising Engineer or a qualified nominated representative.

Approved courses

15 The Management has a duty to ensure that their employees receive training necessary to allow them to safely perform their duties.

16 Appropriate training courses are formal courses of instruction appropriate to the duties expected to be performed by a prospective or practising Authorised Person or Competent Person, which have been approved for the purpose by the Management in consultation with the Authorising Engineer.

17 Such courses should be designed to impart an adequate level of knowledge of these rules and of other matters necessary for the application of safe systems of work. In addition, they should include practical experience of applying safe working procedures on a range of typical high voltage equipment arranged to provide simulated circuits.

18 Students should be continually assessed in both written and practical exercises so that, on completion of the course, the training organisation can make an independent assessment of their suitability and technical competence for consideration by the Authorising Engineer or Authorised Person as appropriate. The students should also be informed directly of the results of the assessments.

19 Suitable training course profiles for this purpose are included in this Appendix. These are for general guidance only, and courses that are a composite of existing commercially run courses may be acceptable provided the Authorising Engineer has given approval.

Training course profiles

Training course profile for Authorising Engineer (HV)

20 Approved training courses for an Authorising Engineer should provide the necessary training and background information to prepare candidates to safely discharge the duties of an Authorising Engineer in accordance with this HTM.

21 The training should ensure that:

a. the Management's policy towards electrical safety is applied universally across the areas of management responsibility

b. Authorised Persons are correctly selected and appointed, and their application of Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems' is properly audited

c. the roles and duties of an Authorising Engineer with regard to the selection of Authorised Persons is looked at in detail

d. the procedures to be adopted when work is undertaken are carried out in a controlled environment.

22 The course should have a minimum duration of two days, and the scope should include:

a. an introduction to safe systems of work

b. the roles and responsibilities of persons

c. practical and procedural aspects of safe working practices

d. nomination, evaluation, appointment and auditing of Authorised Persons

e. candidate interview techniques

f. training requirements for new and in-service Authorised Persons

g. termination procedures for Authorised Persons

h. accident/incident investigation and reporting.

Training course profile for Authorised Person's (HV) initial training

23 Approved training courses for high voltage ring and radial distribution systems should provide the necessary basic training and background information to prepare students to safely discharge the duties, in accordance with Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems', as an Authorised Person in respect of the defined distribution systems.

24 The training should provide:

a. an adequate knowledge of the reasoning and content of Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems'

b. a thorough knowledge of, and practical experience in, the duties and responsibilities of an Authorised Person (HV)

c. an introduction to the theory, application, operation and maintenance of components of typical high voltage ring and radial distribution systems.

25 The background information should provide an understanding of the principles involved in the design, operation and maintenance of typical high voltage distribution systems and their associated protective devices.

26 The course should as a minimum last about ten days, and the scope should include:

a. statutory requirements relating to electrical safety

b. Health Technical Memorandum 06-03 – 'Electrical safety guidance for high voltage systems'

c. role and duties of personnel

d. types and functions of common high voltage distribution switchgear

e. voltage distribution equipment, including transformers and cables

f. operation of high voltage ring and radial distribution systems

g. protective devices, including relays, fuses and interlocks

h. operation and maintenance procedures for high voltage distribution equipment

i. operation and maintenance procedures for stand-by power supplies and equipment

j. practical exercises on switching simulated high voltage ring and radial distribution systems

k. practical exercises on making high voltage equipment safe to work on or test, including:

(i) procedures pertaining to permits-to-work and sanctions-for-test

(ii) cable detection, location and identification.

Training course profile for Authorised Person refresher training

27 For Authorised Persons (HV), approved refresher training courses are biased towards high voltage distribution systems.

28 The training should provide:

a. an update of the student's knowledge of the reasoning and content of Health Technical Memorandum 06-03

b. a reinforcement of the student's knowledge of, and practical experience in, the duties and responsibilities of an Authorised Person (Electrical).

29 The course should last about five days, and the scope should include the more practical application of:

a. statutory requirements relating to electrical safety

b. Health Technical Memorandum 06-03 – 'Electrical safety guidance for low voltage systems'

c. Authorised Person (HV) role and duties

d. types and functions of common high voltage distribution switchgear

e. types and functions of other common high voltage distribution equipment, including transformers and cables

f. operation of high voltage ring and radial distribution systems

g. protective devices, including relays, fuses and interlocks

h. operation and maintenance procedures for high voltage distribution equipment

i. operation and maintenance procedures for stand-by power supplies and equipment

j. practical exercises on switching simulated high voltage ring and radial distribution systems

k. practical exercises on making high voltage equipment safe to work on or test, including:

(i) procedures pertaining to permits-to-work and sanctions-for-test

(ii) cable detection, location and identification.

Competent Person (HV)

30 Prospective Competent Persons (HV) should have successfully completed a suitable training course to be considered for appointment as an Competent Person (HV).

31 Prospective Competent Persons (HV) should successfully complete an emergency first-aid training course in accordance with this guidance to be considered for appointment as a Competent Person (HV).

32 Competent Persons (HV) carrying out routine planned maintenance tasks should have completed a HV substation access course.

Emergency first-aid training and equipment

33 All Authorised Persons, Competent Persons and Accompanying Safety Persons should successfully complete emergency first-aid training course at intervals not exceeding three years.

34 Training in emergency first-aid should be provided by organisations whose training and qualifications for first-aiders are approved by the Health and Safety Executive for the purposes of the Health and Safety (First-Aid) Regulations.

35 Training courses should be of at least six hours' contact time, and should include the following subjects:

a. resuscitation (as appropriate for the treatment of electric shock)
b. treatment of burns
c. control of bleeding
d. treatment of the unconscious casualty
e. contents of first-aid box
f. communication.

36 This training should be repeated, as a minimum, every three years.

37 Copies of certificates issued to Authorised Persons should be held by the Authorising Engineer.

38 Copies of the certificates issued by first-aid trainers for Competent Persons and Accompanying Safety Persons should be held in the OPM.

39 A current list of first-aiders for the appropriate locations, including, where appropriate, their telephone numbers, should be held in the OPM.

Contractors' staff

40 All contractors' staff working on or testing electrical installations, systems and equipment for which the Management has control of the electrical danger should receive, as a minimum, the emergency first-aid training indicated above.

41 Copies of the certificates issued by first-aid trainers for contractors' Competent Persons and Accompanying Safety Persons should be held in OPM.

Assessment of Authorised and Competent Persons

42 Examination of Authorised and Competent Persons to determine suitability for appointment should take the form of practical exercises and an interview.

43 Exercises and interview questions should cover topics to a level appropriate to the proposed duties and responsibilities of the appointment.

44 Practical exercises for an Authorised Person (HV) appointment should include the preparation and issue of a safety programme, isolation and earthing diagram, permit-to-work and/or sanction-for-test

Note:

Paragraph 44 will be carried out using the local on-site HV network. If it is not practical to arrange isolation of the HV system (chosen for the safety programme), the candidate and Authorising Engineer should physically visit each switching location, and the candidate should describe to the satisfaction of the Authorising Engineer any actions they would take to ensure safety.

45 The Authorising Engineer should witness the candidate physically switching to achieve isolation, testing to prove dead and phasing-out using other circuits on the local network if the dispensation described in the note above is used.

46 Practical exercises for a Competent Person (HV) appointment should include issue (by the Authorised Person conducting the examination) to the candidate a permit-to-work including questioning to confirm the candidate's knowledge. The candidate should then explain how they will brief and supervise members of the working party working under their control. This exercise should be carried out in a substation with danger signs posted to simulate conditions described in the permit-to-work, but without the need to actually isolate the circuit.

47 Interview questions and candidate (summary) replies should be recorded.

48 An assessment should be repeated prior to reappointment of individuals.

References

Note:

Standards and other specification documents are continually being updated. Readers should ensure that they consult the latest editions of such documents, including any amendments issued after publication, to keep abreast of changing requirements.

Acts and regulations

Confined Spaces Regulations. SI 1997 No 1713.
https://www.legislation.gov.uk/uksi/1997/1713/made

Control of Substances Hazardous to Health (COSHH) Regulations. SI 2002 No 2677
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Electricity at Work Regulations. SI 1989 No 635.
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Electricity Safety, Quality and Continuity Regulations. SI 2002 No 2665.
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https://www.legislation.gov.uk/ukpga/1974/37/contents

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https://www.england.nhs.uk/publication/building-engineering-in-the-health-sector-htm-00/

Health Technical Memorandum 05-03. Fire safety in the NHS: operational provisions.
https://www.england.nhs.uk/publication/fire-safety-in-the-nhs-health-technical-memorandum-05-03/

Health Technical Memorandum 05-03. Part K – General fire risk assessments.
https://www.england.nhs.uk/publication/fire-safety-in-the-nhs-health-technical-memorandum-05-03/

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NHS Premises Assurance Model. https://www.england.nhs.uk/estates/nhs-premises-assurance-model/

Health and Safety Executive guidance

GS38: Electrical test equipment for use on low voltage electrical systems. https://www.hse.gov.uk/pubns/books/gs38.htm

HSG47: Avoiding danger from underground services. https://www.hse.gov.uk/pubns/books/hsg47.htm

HSG230: Keeping electrical switchgear safe. https://www.hse.gov.uk/pubns/books/hsg230.htm

HSR25: Memorandum of guidance on the Electricity at Work Regulations 1989. https://www.hse.gov.uk/pubns/books/hsr25.htm

Safe work in confined spaces: Confined Spaces Regulations 1997. Approved Code of Practice and guidance L101. https://www.hse.gov.uk/pubns/books/l101.htm

The Control of Substances Hazardous to Health Regulations 2002. Approved Code of Practice and guidance L5. https://www.hse.gov.uk/pubns/books/l5.htm

British/European Standards

BS 2559-3. Specification for screwdrivers. Insulated screwdrivers. British Standards Institution.

BS 3087-1. Pliers and nippers. General introduction. British Standards Institution.

BS 5252. Framework for colour co-ordination for building purposes. British Standards Institution

BS 5306. Fire extinguishing installations and equipment on premises. British Standards Institution.

BS 7671:2018+A2:2022. Requirements for electrical installations. IET Wiring Regulations. Institution of Engineering and Technology/ British Standards Institution.

BS EN 168. Personal eye-protection. Non-optical test methods. British Standards Institution.

BS EN 354. Personal fall protection equipment. Lanyards. British Standards Institution.

BS EN 355. Personal protective equipment against falls from a height. Energy absorbers. British Standards Institution.

BS EN 361. Personal protective equipment against falls from a height. Full body harnesses. British Standards Institution.

BS EN 362. Personal protective equipment against falls from a height. Connectors. British Standards Institution.

BS EN 363. Personal fall protection equipment. Personal fall protection systems. British Standards Institution.

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BS EN 60617. Graphical symbols for diagrams. British Standards Institution.

BS EN 60903. Live working. Gloves of insulating material. British Standards Institution.

BS EN 61111. Live working. Electrical insulating matting. British Standards Institution.

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Other guidance

Energy Networks Association (2012). Engineering Recommendation G9: Voltage testing devices. https://www.ena-eng.org/ENA-Docs/D0C3XTRACT/ENA_EREC_G09_Extract_180902050607.pdf

NHS England
Wellington House
133–155 Waterloo Road
London
SE1 8UG

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