Facilities, Residential and Commercial Services

Electrical Safety Rules for High Voltage Systems

PP&T Ref	FM000223
Title	Electrical Safety Rules for High Voltage Systems
Version	2
Last updated	31st August 2018
Review Date	31st August 2022
Owner	Engineering Maintenance Manager
Unit	FRCS Maintenance
Approved by	Owner

ISSUE SECTION

Copy Number……

This copy of the Electrical Safety Rules for High Voltage Systems has been issued to

Name…….

Employer……

Signature……

Date……..

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RECEIPT SECTION

I acknowledge receipt of these Electrical Safety Rules for High Voltage Systems and agree to keep them in my possession and to produce them when requested.

Copy Number……

Name…….

Employer……

Signature……

Date……..

Remember – If you're not sure, STOP AND ASK FOR HELP

1. Introduction

The University of Liverpool (the University) has a duty under Health and Safety at Work legislation to prepare and issue a general policy statement on health and safety at work, including the organisation and arrangements for carrying out that policy. For particular work or activities, special rules, related documents and procedures are necessary in support of these policy statements. These 'Electrical Safety Rules for High Voltage Systems' hereinafter abbreviated to "these Rules" or equivalent safety rules are used to cover work and activities associated with the High Voltage systems and equipment at premises managed by the University. These Rules are intended as a guide to safe working for employees when they are required to work on or near the electrical equipment at the managed premises.

1.1 Scope and application of these Rules

These Rules Shall be applied to:

(a) High Voltage (HV) systems up to and including 11,000volts.
(b) The Low Voltage (LV) cables and switchgear associated HV/LV transformers up to and including the first isolation point on the Low Voltage system.
(c) Associated electrical equipment under the ownership or control of the University under whose authority they have been issued.

These, or equivalent safety rules, Shall normally be the only rules applicable to such systems and electrical equipment and Shall have application, in accordance with University instructions, together with related documents and procedures, the whole course of the work for which they are intended.

1.2 Other safety rules, related documents and procedures

In addition, or as an alternative, to the application of these Rules and related documents and Codes of Practice, other rules, documents and procedures issued by University or by other authorities Shall be complied with in accordance with University instructions. Although the Codes of Practice associated with these Rules are not, in themselves, individual electrical safety rules for High Voltage systems, they Shall be read in conjunction with the rules to which they relate and form important supporting information for the implementation of these Rules.

Where University employees are required to work near electrical systems and associated electrical equipment not owned or controlled by the University, these Rules and related procedures Shall be used as a guide to safe working practice.

1.3 Issue of these Rules

A copy of these Rules and, as appropriate, related documents and procedures Shall be issued to such employees of the University and such other persons as determined by the Authorising Engineer. Such employees and other persons Shall sign a receipt for a copy of these Rules, related documents and procedures (plus any amendments) and Shall keep them in good condition and have them available for reference as necessary when work in being carried out under these Rules.

1.5 Variation of these Rules

In exceptional or special circumstances these Rules may be varied to such an extent as is necessary and Approved by the Authorising Engineer. Such variation Shall always be in writing and Shall ensure, as far as reasonably practicable, that safety requirements are satisfied in some other way.

2. Contents

3. Definitions

Terms printed in initial capitals in these Rules are defined terms as follows.

Approved

Of a type sanctioned for use by the University

Code of Practice

A document issued by the Engineering Maintenance Manager giving further information, guidance and assistance in the application of these rules. Although a Code of Practice does not, in itself form an individual electrical safety rule(s), it Shall be read in conjunction with the section of these Rules to which it relates and provide important supporting information for the implementation of these Rules.

Control

The responsibility for the immediate operation of a System and the Danger arising from that operation

Danger

A risk of injury or death from electricity

Dead

At or about zero voltage and disconnected from any live System.

Earthed

Connected to the general mass of earth in such a manner as will ensure at all times an immediate discharge of electrical energy without danger; when applied to electrical equipment and conductors, all phases short-circuited and efficiently connected to earth.

Circuit Main Earth – a safety earthing connection of an Approved type applied by an Authorised Person and its position recorded before the issue of a Safety Document.

Additional Earth – earthing equipment of an Approved type which is applied after the issue of a Safety Document (e.g. an earth applied at a point of work).

High Voltage Enclosure

A location normally associated with High Voltage testing, within which a Live High Voltage conductor is, or can be, exposed without the use of a tool or key.

Isolated

The disconnection and separation of electrical equipment and circuit conductors, by use of an isolating device or alternative means, from every source of electrical energy in such a way that its disconnection and separation is secure

Isolation and Earthing Diagram

A diagram attached to the Permit-to-Work or Sanction-for-Test illustrating the safety measures taken.

Key Safe

A box having at least two locks, each of which is to have only one key, with one being

labelled "Authorised Person's key" and the other "Person in Charge key". It is arranged that both locks Shall be released before access can be gained to the contents of the box. The box is to be used for the safe retention of the keys to Safety Locks issued under a Safety Document.

Operations Locker

An enclosure, in the 11kV switchroom at the 33kV substation containing the System Logbook, completed Safety Documents, Danger/Caution Signs and the keys to System Locks associated with each substation. The enclosure Shall be kept locked and the keys to the lock Shall be available only to an Authorised Person.

Live

The presence of an electrical potential, electrical charge, or from connection to a source of electricity.

Logbook

System Logbook - a logbook kept in a lockable compartment in the 11kV switchroom at the 33kV substation in which should be recorded:

(a) All switching operations and precautionary measures taken.
(b) Switching Programme serial numbers.
(c) The issue and cancellation of Safety Documents.
(d) Dangerous occurrences as required to be reported by the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR).
(e) Other unusual occurrences.

Substation Logbook - a book kept in every substation into which entry to the substation is recorded together with the reason, and any switching operations carried out in the substation.

Operational Restriction

A specific written instruction, issued by the Authorising Engineer, modifying the normal operating procedures associated with a particular type of equipment.

Personnel

Vice Chancellor – the person who has overall authority and responsibility for the High Voltage System and who has a duty under the HSW 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.

Engineering Maintenance Manager - A qualified electrical engineer with appropriate knowledge of electrical systems, appointed in writing by the Director of Estates. The Engineering Maintenance Manager Shall have day to day responsibility for the University's electrical systems and may from time to time, seek advice from the Authorising Engineer or functional advisors.

Authorising Engineer – a Chartered Electrical Engineer with appropriate experience, possessing the necessary degree of independence from the University, who is appointed in writing by the Engineering Maintenance Manager to implement, administer and monitor the safety arrangements for the High Voltage electrical supply and distribution systems, to achieve as far as reasonably practicable, compliance with the Electricity at Work Regulations

and to assess the suitability and appointment of candidates in writing to be Authorised Persons.

Authorised Person – a Competent Person, possessing adequate technical knowledge and having received appropriate training, appointed in writing by the Engineering Maintenance Manager on the recommendation of the Authorising Engineer to be responsible for the practical implementation and operation of University's safety policy and procedures on defined electrical systems.

Duty Authorised Person – An Authorised Person who has current responsibility for the High Voltage system as recorded in the Operations Logbook and whose name is displayed at the 11kV switchroom in the 33kV substation.

Competent Person – a person appointed in writing by an Authorised Person, having sufficient technical knowledge and experience to enable him/her to avoid danger and who may be nominated to receive and clear specified Safety Documents.

Accountable Person – a person who has been given permission in writing by an Authorised Person for a particular non-electrical task where it is considered that the inherent risk of danger and/or injury from electrical equipment requires extra vigilance. Permission Shall be by the issue and acceptance of a Limited Work Certificate.

Distribution Control Engineer – an engineer employed by a Distribution Network Operator and specifically authorised by that company to exercise the function of Control over that company's switching operations.

Safety Signs

Caution Sign – a sign in Approved form attached to electrical equipment conveying a warning against interference with such equipment, stating for example, "CAUTION DO NOT INTERFERE".

Danger Sign – a sign in Approved form attached to electrical equipment or sections when live, calling attention to the danger of approach to or interference with such equipment or sections, stating, for example " DANGER LIVE EQUIPMENT"

Safety Documents

Limited Work Certificate – A written authority issued by an Authorised Person for specified tasks to be undertaken in an area or location which is under the control of an Authorised Person for electrical safety reasons, and for which a Permit-to-Work or Sanction-for-Test are not appropriate.

Permit-to-Work – A form of declaration signed and issued by an Authorised Person, to a person in charge of work to be carried out on any High Voltage electrical equipment. It makes known to such a person exactly what equipment is dead, isolated from all live circuit conductors, has been discharged, is connected to earth, and is safe to work on

Sanction-for-Test - A form of declaration signed and given by an Authorised Person to a person in charge of testing of High Voltage electrical equipment. It makes known to such person exactly what equipment is to be testing and the condition under which testing is to be carried out.

Safety Lock

A padlock having a single key that differs from all other keys provided for the system, used for locking off the points on the system at which a circuit can be energised.

Supervision

Personal Supervision – supervision by a person having adequate technical knowledge, experience and competence, who is at all times during the course of the work or testing, in the presence of the person(s) being supervised**.**

Immediate Supervision – supervision by a person having adequate technical knowledge, experience and competence, who is continuously available at the location where work or testing is in progress, and who attends the work area as is necessary for the safe performance of the work or testing.

Shall

Where "Shall" is used in these rules with no qualification, this indicates a mandatory requirement with no discretion permitted and no judgement to be made.

Shall where practicable – When Shall is qualified only by "where practicable", a slightly less strict standard is imposed. It means that where it is possible to achieve the aim, in the light of current knowledge and invention, but bearing in mind the hazards associated with the work or testing to be undertaken, then the requirement must be met. There is no allowance to avoid the requirement on the grounds of difficulty, inconvenience or cost

Shall where reasonably practicable - When a statement is qualified by the words "reasonably practicable", a slightly less strict standard is imposed. It means that an assessment must be made considering, on the one hand, the magnitude of the risks of a particular work activity or environment, and on the other hand the cost in terms of the physical difficulty, time, trouble and expense which would be involved in taking steps to eliminate or minimise those risks. The greater the degree of risk, the less weight that can be given to the cost of measures needed to prevent that risk.

Substation

Any premises, or part of premises or enclosure, in which electrical energy is transformed or converted to or from High Voltage, and/or which contains High Voltage switchgear

Switching

The operation of circuit breakers, switchgear or other methods of making (closing) or breaking (opening) circuit conductor(s) and/or the application and removal of Circuit Main Earth connection(s).

Switching Schedule

A written schedule produced by an AP, setting out the sequence of operations to be followed before a Permit-to-Work or a Sanction-for-Test is issued.

System

An arrangement in which all the electrical equipment is, or may be, electrically connected to a common source of electrical energy, including such source and such equipment.

System Locks

A set of suited locks unique to each Substation used to secure the operational status of High Voltage equipment in that Substation. When not in use, the keys to these locks Shall be kept in the Operations Locker.

System Diagram

A permanently available single line circuit diagram showing the current state of the complete High Voltage system. It has facilities for altering the switch and circuit breaker symbols etc., to show whether each such unit is switched to “on” (closed), switched to “off” (open) or switched to “earth”. Low Voltage circuits which can feed back to the High Voltage circuits Shall also be shown.

University – for the purposes of these Rules, the University of Liverpool.

Voltage Ranges

Low Voltage (LV): a potential 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 normally exceeding Low Voltage.

Working Party

Either the persons under the Immediate Supervision of a Competent or Authorised Person (who Shall himself be a member of the working party) or a Competent or Authorised Person when working by himself.

4. Policy

It is the policy of the University to have all electrical Systems and associated equipment for the distribution of electrical energy at High Voltage designed and installed that they may be operated safely when Approved operational procedures are followed correctly. However, when switching for operational purposes, or when work such as maintenance, testing and repair has to be carried out or when, particularly, systems and equipment have to be taken temporarily out of normal operational use, it is necessary for these Rules and related documents and procedures to be applied to ensure, as far as reasonably practicable, the health and safety of all who are liable to be affected by any danger that might arise. These Rules, as read with related documents and procedures, are based on the principle that they should state what should be done to ensure, as far as reasonably practicable, that the specified work or activity may be carried out without danger so far as is reasonably practicable. The dangers that can arise are:-

(a) Inherent dangers from systems and equipment, which are covered by these Rules
(b) General dangers associated with the work as it proceeds, including, in addition to the work process, dangers from access and egress, the place of work and the working environment. These dangers may be of a different kind, and under different control, from the inherent dangers in (a) above and may not be specifically covered by these Rules.

In the implementation of these Rules, related documents and procedures, specified methods of work, and other forms of local instruction. The University Shall allocate responsibility for the achievement of health and safety from the inherent dangers mentioned in paragraph (a) above during the various stages of work or activity.

The University will also issue instructions and allocate responsibility for dealing with the general dangers mentioned in paragraph (b) above.

It is University policy that the persons in charge of the various stages of the work or activity should have the appropriate competence, authority and Shall understand these Rules, related documents and procedures, the methods of work and any local instructions. Such persons Shall understand the dangers that might arise and the precautions to be taken over the whole period of the work or activity. University policy requires that all persons at work are adequately instructed and supervised and are competent to avoid danger, according to the circumstances of the work they are doing, and that the relevant legal requirements, these Rules and other required health and safety precautions are observed at all times.

5. Responsibilities of persons

5.1 General

It is the duty of all persons who may be concerned with the control, operation, and work or testing on or in the near vicinity of equipment to which these Rules apply, to implement the rules and to comply with them and with related Codes of Practise and procedures. Ignorance of the relevant legal requirements, the Safety Rules, Codes of Practise or procedures Shall not be accepted as an excuse for neglect of duty.

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

Any written authorisation given to persons to perform their designated role in implementing these Rules Shall indicate the class of operation and/or work permitted and the section of system to which the authorisation applies.

5.2 Duties

The University has a duty to comply with the requirements of Health and Safety at Work legislation, the Electricity at Work Regulations (1989) and other relevant statutory provisions and the various regulations affecting health and safety including electrical safety.

It is also the duty of all employees and contractor's employees, employed in connection with the University's Systems, to comply with the above legislation as far as is required in relation to their operations or work on the systems.

In particular, it Shall be the duty of every employee whilst at work:

(a) To take reasonable care for the health and safety of themselves and of other persons who may be affected by their acts or omissions at work;
(b) As regards any duty or requirement imposed on their employer, or any other person by or under any of the relevant statutory provisions, to co-operate with them so far as is necessary to enable that duty of requirement to be performed or complied with.

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 at University premises to conduct their work so as to prevent Danger or injury to themselves and/or others. They should also be thoroughly conversant with all regulations governing the work that they may have to undertake. Ignorance of the requirements or rules will not be accepted as an excuse for neglect of duty.

5.2 Injuries or dangerous occurrences

The reporting of injuries or dangerous occurrences resulting from electrical accidents at work comes within the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR), and the University must comply with the requirements of the legislation. Unusual occurrences which do not fall within the RIDDOR requirements Shall be noted in the System Logbook.

An Authorised Person Shall prepare a report on each accident involving injury to persons or damage to equipment. Equipment defects Shall be reported through the appropriate reporting procedure. All reports Shall be submitted to the Authorising Engineer.

5.4 The Engineering Maintenance Manager

The Engineering Maintenance Manager Shall be responsible to ensure, as far as is reasonably practicable, that:

(a) These Rules are in accordance with statutory requirements and that they are kept updated to reflect any significant changes in statute and that they embody current best practice.
(b) All personnel employed by and on behalf of the University, observe and comply with the requirements of these Rules.
(c) HV Systems are designed, operated, maintained, modified, controlled and de-commissioned in a manner that prevents Danger
(d) System documentation is accurate and up to date and that records such as System Diagrams, circuit details, switchgear history, equipment manuals are readily available when needed.
(e) Staff with responsibility for operation and maintenance of HV systems are adequately knowledgeable, trained and appropriately validated for their areas of responsibility – and to appoint relevant personnel through the University's appointment system
(f) A suitably qualified person, independent from the University, is appointed in writing as Authorising Engineer to advise and help administer the implementation of these Rules and associated Codes of Practice.
(g) The Authorising Engineer carries out at least one annual audit of the operation of the HV management system to include these Rules, associated Codes of Practice and safe systems of work.
(h) Any investigations into near misses, incidents or dangerous occurrences related to HV Systems are carried out with appropriate urgency and closure.
(i) Any modifications to HV Systems Shall be controlled in accordance with the University's Control of Modifications Procedures.
(j) Sufficient and suitable persons are appointed, with the assistance of the Authorising Engineer, as Authorised Persons.

5.5 The Authorising Engineer

The Authorising Engineer Shall be responsible for advising on the implementation and administration of these Rules, and Shall monitor and audit the application of these Rules.

The Authorising Engineer Shall be responsible for the validation of training and qualifications of any Authorised Persons wishing to work on the University's HV Systems.

The Authorising Engineer is to recommend to the Engineering Maintenance Manager, persons for appointment or re-appointment as Authorised Persons and Shall maintain a register of all Authorised Persons.

The Authorising Engineer Shall be satisfied that each prospective Authorised Person meets the requirements of these Rules and is to arrange the issue to each Authorised Person a Certificate of

Appointment valid for a period not exceeding three years.

The Authorising Engineer is to define in writing, using drawings and diagrams if considered appropriate, the extent of the System for which each Authorised Person is to be responsible and is to issue a personal copy of these Rules to each Authorised Person.

The Authorising Engineer Shall:-

(a) If necessary, recommend to the Engineering Maintenance Manager the suspension of the appointment of Authorised Persons by withdrawing their Certificate of Appointment.
(b) Report any deficiency in the number of suitably trained and experienced Authorised Persons that significantly impairs the University's ability to provide a safe and effective service.
(c) Audit the performance and record the operational experience of each Authorised Person at twelve monthly intervals.
(d) At intervals not exceeding three years, undertake comprehensive audits of the application of these Rules to all Systems and review each Authorised Person's operational experience.
(e) Ensure, as far as reasonably practicable, that a system is in place to circulate relevant information on Operational Restrictions and Dangerous Occurrences to all Authorised Persons.
(f) Agree in writing any local deviation from these Rules that may be necessary for their application to a particular item of equipment or location before the deviation is applied.
(g) Ensure, as far as reasonably practicable, that any amendments to these Rules are brought to the attention of, and understood by, all Authorised Persons.

5.6 Authorised Persons

An Authorised Person (AP) is to be responsible for the practical implementation and operation of these Rules for the System for which the Authorised Person has been appointed.

The Authorised Person's instructions and decisions on electrical matters are final and Shall be complied with. In the case of a dispute, the Authorised Person Shall stop the work or test and refer the matter to the Engineering Maintenance Manager for adjudication in accordance with Section 6.1 of these Rules.

The Duty Authorised Person Shall have responsibility for the overall co-ordination of all activities carried out on that System and the name of the Duty Authorised Person Shall be prominently displayed adjacent to the System Diagram. More than one Authorised Person may be appointed for a System but only one Authorised Person Shall be Duty Authorised Person at any one time. Each acceptance and relinquishment of the role of Duty Authorised Person Shall be recorded in the System Logbook.

Where there is more than one Authorised Person appointed for a System, the Engineering Maintenance Manager may nominate one to be in overall charge with responsibility for control of records etc.

The duties of the Authorised Person are by agreement with the Engineering Maintenance Manager with the assistance of the Authorising Engineer and may include the following-

(a) To have an adequate knowledge of these Rules and of those regulations listed in Appendix A

that are applicable to the System for which the appointment is sought.

(b) The Control of Systems including the operation of HV switchgear.

(c) To issue, receive, clear and cancel all Safety Documents for the System for which the Authorised Person has been appointed.

(d) To ensure as far as reasonably practicable, that all protective equipment, test equipment and portable earthing equipment is recorded, periodically inspected, calibrated and maintained in accordance with the manufacturer's recommendations and is to be inspected to ensure, as far as reasonably practicable, it is in a satisfactory condition before use.

(e) To inform the Engineering Maintenance Manager of:-

i) Any defects found in electrical equipment.

ii) Any dangerous occurrence or near miss.

iii) Any dangerous practices observed in the course of their duties.

(f) To arrange for, supervise or undertake cable detection or location work for the System for which the Authorised Person is appointed.

(g) When making changes to the System, to ensure so far as reasonably practicable, that all records for the System are completed and kept up to date.

(h) The written appointment of Competent Persons via a Certificate of Appointment.

5.7 Competent Persons

A Competent Person (CP) is to have an adequate knowledge of these Rules and of those regulations and documents listed in Appendix A that are applicable to the System for which the appointment is sought.

A Competent Person authorised by the issue of a Certificate of Appointment will be limited to those duties as specified on the certificate.

A Competent Person may receive and clear Limited Work Certificate and Permit-to-Work documents for the System for which the Competent Person has been appointed.

A Competent Person in receipt of a Safety Document may only undertake or supervise the work specified until the task is complete and the Competent Person has signed Part 3 of the original card page of the Safety Document. Neither the Competent Person, nor any person under the direct control of the Competent Person is to attempt to undertake any other duties.

6. General Provisions

6.1 Objections

When any person receives instructions regarding the operation of, or work upon, the High Voltage System and associated electrical equipment at the managed premises, they Shall report any objections on safety grounds to the carrying out of such instructions to the persons issuing them, who Shall then have the matter investigated and, if necessary, referred to the Authorising Engineer for a decision before proceeding.

6.2 Admittance to Substations

All Substations Shall be kept locked when unattended. No person other than an Authorised Person or a Competent Person Shall enter room containing High Voltage equipment unless accompanied by an Authorised Person or a Competent Person, or being covered by a Safety Document issued by an Authorised Person.

Barriers (including plates on access ladders) cutting off access to enclosures, chambers, cubicles or cells containing live High Voltage conductors Shall normally be kept locked.

(a) No person except an Authorised Person, or person acting under his Immediate Supervision, Shall have access to any such enclosure, chamber, cubicle or cell in which a live conductor is exposed
(b) All spout shutters not required for immediate work or operation Shall, if not otherwise made inaccessible, be locked shut.

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

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, Shall normally be kept locked and the control of keys Shall be in accordance with an Approved procedure.

When any person has to enter any such place or similar confined space in which the above dangers are present or likely to be present, to such an extent as to involve risk of persons being overcome or otherwise endangered, such precautions Shall also include the issue of a Limited Work Certificate in accordance with Section 9.1 “Issue of a Limited Work Certificate”. The arrangements for access and work and the precautions to be taken Shall be in accordance with Approved procedure.

6.4 Requirement for accompaniment

A second person, not directly involved in the work or test, Shall continuously accompany the person carrying out the following:-

(a) High Voltage equipment being proved or confirmed Dead.

(b) Equipment being Earthed, other than by means of a switch or circuit breaker.

(c) The Duty AP is spiking a cable.

(d) Testing being undertaken at HV under a Sanction–for-Test.

(e) An Approved HV potential indicator is in use.

(f) Voltage and phasing tests being undertaken at HV.

(g) Gaining entry to, or working in a High Voltage Enclosure.

(h) Making conductors accessible on equipment cannot be confirmed Dead beforehand

In addition, the AP or CP responsible for the work may require an accompanying person when he considers that additional circumstances merit such attendance.

The AP or CP responsible for the work or test to be attended, is to ensure, as far as reasonably practicable, that the accompanying person understands his intended role. The accompanying person Shall have received Emergency First Aid training and have adequate knowledge, experience and ability to avoid Danger, keep watch, prevent interruption, apply First Aid and summon help.

The accompanying person Shall be familiar with the equipment being worked on or tested and Shall, where reasonably practicable, have been instructed on the action to be taken to disconnect the equipment being worked on or tested from all sources of supply in the event of an accident or emergency.

6.5 Response to a supply failure or emergency

In the event on a supply failure or an emergency situation occurring associated with the High Voltage system, Authorised Persons Shall go firstly to the 11kV switchroom in the 33kV substation. An Authorised Person Shall sign the System Logbook as Duty Authorised Person and display his name adjacent to the System Diagram. Any other Authorised Person attending the site, on seeing this information Shall take no action until he has contacted the Duty Authorised Person.
A failure of supply, from whatever cause, on any part of the High Voltage system, Shall be noted in the System Logbook. During failures of supply, all equipment Shall be regarded as being Live until isolated, identified at the point of work, checked with an Approved voltage indicator and earthed.

6.6 Telephone and radio messages

Every message transmitted using telephones or portable radios that relates to the operation of the High Voltage system Shall be written down and the entire written message read back to the sender to ensure that it has been accurately received. Essential details of each message, including the name of the sender and time it was received, Shall be recorded in the System Logbook.

6.7 Safety posters

In each room containing High Voltage electrical equipment, the following posters Shall be prominently displayed:

(a) A poster showing an Approved method of treatment for electric shock;
(b) If the room contains equipment containing Sulphur Hexafluoride, a notice stating this.

6.8 Vessels containing oil or flammable liquids

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 below have been taken.
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.

6.9 Fire protection equipment

Only CO_2 or dry powder extinguishers should be used in the vicinity of live electrical equipment. After any explosion or fire, or after the discharge of extinguishers in an enclosed space, personnel Shall withdraw from that space and the space must be thoroughly ventilated before re-entry of personnel.

6.10 Equipment containing Sulphur Hexafluoride (SF_6)

Work on any equipment containing SF_6 should be carried out in accordance with the special instructions specified by the manufacturer.

Under normal circumstances SF_6 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 indicators 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 into fresh air even if no equipment failure is apparent and the Duty Authorised Person Shall be informed.

7. Working on and testing High Voltage equipment

7.1 Work in close proximity to High Voltage equipment

When it is necessary to carry out work in an area or location containing High Voltage equipment and the Authorised Person considers that additional guidance and warning of Danger is required over and above verbal guidance and warning, a Limited Work Certificate may be issued by an Authorised Person for a specified task. This task Shall not be one for which a Permit-to-Work or Sanction-for-Test is required.

All such work Shall be under the Personal or Immediate Supervision of the Accountable Person named on the Limited Work Certificate.

7.2 Access for the operation of High Voltage switchgear

The following points apply:

(a) High Voltage switching Shall be carried out by an Authorised Person or by Competent Person acting under his Personal Supervision, except when necessary to isolate in an emergency when a Competent Person will have access to sub-stations where emergency tripping facilities are available. These circuit breakers Shall be fitted with locks preventing unauthorised switching to "On" (re-closure). The Duty Authorised Person Shall be informed of all High Voltage emergency switching.
(b) Locks Shall be applied as necessary to prevent unauthorised operation of switchgear (except emergency tripping as referred to above)
(c) Oil filled circuit breakers Shall, in general, be re-closed a maximum of twice after operating under fault conditions. The equipment Shall be inspected at the first opportunity after operating under fault conditions.
(d) When switchgear shows any sign of defect or malfunction after operating, the operational restrictions procedures Shall be applied.
(e) Making live or dead by visual signal or pre-arranged understanding after an agreed interval of time, is forbidden

7.3 Work on High Voltage equipment

No work Shall be undertaken on High Voltage electrical equipment unless prior to the issue of a Safety Document and the Authorised Person has positively identified to the individual who is to carry out the work, the equipment involved at the point of work.

No person Shall undertake any work or testing on or near any exposed HV conductor unless such parts of the System are:

(a) Dead and proved Dead by an Approved means. Where this is via the use of an Approved HV potential indicator, it Shall be verified as functioning and calibrated prior to, and immediately after use.
(b) Isolated and all practicable steps taken to lock off from all points of supply, including voltage

and auxiliary transformers, common neutral earthing equipment and other sources from which the equipment and conductors could become live, and Caution Signs fitted at all points of isolation.

(c) Connected to earth by Approved means between the point of work and all points of disconnection of HV supply from the System.
(d) Screened where necessary to prevent Danger and Danger Signs attached to adjacent equipment containing other Live conductors.
(e) Identified at the point of work by Approved means.
(f) Released for work by the issue of an appropriate Safety Document which Shall not be issued to a Competent Person unless that person is fully conversant with the precise parts of the System and equipment to be worked upon, the nature and extent of the work to be done and the safety precautions that have been taken.

Further guidance can be obtained in Code of Practice" High Voltage Switching and Earthing" and Code of Practice "Testing High Voltage Equipment".

7.4 Circuit Main Earths

No High Voltage earthing switch Shall be operated or Circuit Main Earth attached or removed except by an Authorised Person

When High Voltage electrical equipment is to be discharged and earthed, the circuit breaker or specially provided earth switch Shall be switched to "on" to make an earth connection. Where a circuit breaker is used, the mechanical and electrical trip mechanisms, including remote trip button circuits, Shall be rendered inoperative. After switching to "on" (closing), the circuit breaker or earth switch Shall be locked in the earth position using an Earth Lock, whilst it is the Circuit Main Earth

7.5 Use of Caution and Danger Signs

Caution and Danger Signs Shall be fixed as follows:

(a) Caution Signs on all switchgear controlling the electrical equipment which has been made dead and on which work is to proceed.
(b) Danger Signs Shall also be attached (where applicable) on or adjacent to live electrical equipment at the limits of the zone in which work may be carried out.
(c) Caution Signs, Danger Signs, barriers and screens Shall be fixed or moved only under the Personal Supervision of an Authorised Person.

7.6 Testing of High Voltage equipment

When any High Voltage equipment is to be subject to a test voltage before being connected to a High Voltage System, a Sanction-for-Test Shall be issued by an Authorised Person. The Authorised Person, although not carrying out the work personally, Shall ensure that such equipment and all equipment which may become Live when the test voltage is applied is adequately guarded.

Barriers Shall be erected to form a test enclosure, with Danger Signs fixed in conspicuous positions at all approaches to the test enclosure during the period the electrical equipment may be subject to High Voltage

All cables Shall be discharged before and after the application of a test voltage.

Temporary conductors used for testing purposes Shall be of adequate size and easily visible and identifiable

For test connection to spout contacts, test bushings as supplied by the switchgear manufacturer Shall be used. Test connections Shall not be applied in a cell or compartment in which there is any exposed metal Live at High Voltage. This does not exclude the use of Approved voltage indicators, or Approved devices for testing and phasing out circuits.

8. Instructions for work on particular items of equipment

8.1 Work on remotely and automatically controlled electrical equipment

Before work is carried out on remotely or automatically controlled equipment such as circuit breakers and isolators, all remote control and automatic features Shall first be rendered inoperative. No work Shall be carried out on the controlling equipment, wiring or relays except by the Authorised Person or Competent Person working under the Personal Supervision of the Authorised Person.

8.2 Work on busbar spouts of multi-panel switchboards

When work is to be carried out on busbar spouts, the following operations Shall be carried out in strict sequence as follows:-

(a) The Authorised Person Shall enter details of necessary safety precautions and switching operations in the System Logbook, and update the System Diagram.
(b) The section of the busbar spouts on which work is to be carried out Shall be isolated from all points of supply from which it can be made Live.
(c) The isolating arrangements Shall be locked so that they cannot be operated, and shutters of Live spouts locked shut. Caution Signs Shall be fixed at all points of isolation.
(d) At a panel on the isolated section of the busbar other than that at which work is to be done, busbars Shall be checked by means of an Approved voltage indicator to verify that they are not Live, the indicator itself being tested immediately before and after verification.
(e) A Circuit Main Earth Shall then be applied to the busbars at this panel. The insertion of the hand or any tool into the contact spouts for this purpose is forbidden.
(f) At the point of work, the busbar spouts Shall be checked by means of an Approved voltage indicator to verify that they are not Live, the indicator itself being tested immediately before and after verification.
(g) An earth connection Shall then be applied to all phases at the point of work.
(h) Where applicable, Danger Signs Shall be attached on or adjacent to the Live electrical equipment at the limits of the zone in which work Shall be carried out.
(i) A Permit-to-Work Shall be issued to cover the work to be done. Where applicable, during the course of the work, the earth connection(s) at the point of work may be removed one phase at a time. Before contact is made with the busbar spouts, they Shall be checked by means of an Approved voltage indicator to verify that they are not Live, the indicator itself being tested immediately before and after verification. Each phase earth connection Shall be replaced before a second phase earth connection is removed.
(j) On completion of the work, the Permit-to-Work Shall be cancelled.

8.3 Work on feeder spouts, voltage transformer spouts or single busbar spouts

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

(a) The Authorised Person Shall enter details of necessary safety precautions and switching operations in the System Logbook, and update the System Diagram.

(b) The spouts on which work is to be carried out Shall be isolated from all points of supply from which they can be made Live.
(c) The isolating arrangements Shall be locked so they cannot be operated, and the shutters of Live spouts Shall be locked shut. Caution Signs Shall be fixed to at all points of isolation.
(d) The spout contacts Shall be checked by means of an Approved voltage indicator to verify that they are not Live, the indicator itself being tested before and after verification.
(e) A Circuit Main Earth Shall be applied at the point of work.
(f) A Permit-to-Work Shall be issued.
(k) Where applicable, during the course of the work, the Circuit Main Earth may be removed. Before contact is made with the spouts, they Shall be checked by means of an Approved voltage indicator to verify that they are not Live, the indicator itself being tested immediately before and after verification. An earth connection Shall then be applied to all phases at the point of work.
(l) To facilitate the work, the earth connection may be removed one phase at a time. Before contact is made with the spouts, they Shall be checked by means of an Approved voltage indicator to verify that they are not Live, the indicator itself being tested immediately before and after verification. Each phase earth connection Shall be replaced before a second earth connection is removed.
(g) On completion of the work the Permit-to-Work Shall be cancelled.

8.4 Work on voltage transformers

Voltage transformers Shall not be removed or replaced if any of the windings are energised. If it is necessary to remove a voltage transformer, the supply to the voltage transformer Shall be isolated. When withdrawable electrical equipment such as voltage transformers have been disconnected from all supplies and withdrawn from the normal live position, the conductors Shall be discharged to earth but need not remain connected to earth. The enclosure Shall be locked off and a Danger Sign posted.

8.5 Work on power transformers

When work is to be carried out on the connections to, or the windings of, a power transformer, the switchgear or fusegear controlling both High Voltage and Low Voltage windings Shall be switched to “off “(opened) and locked in the “off” position. The transformer Shall be earthed with Approved earthing equipment at all points of isolation from High Voltage supplies. Additionally, associated voltage and auxiliary transformers Shall be isolated to prevent the possibility of the transformer being made live by feedback. Before a Permit-to-Work is issued, the Authorised Person Shall, at the point of work, in the presence of the Competent Person, identify and mark the transformer to be worked upon.

Where work is to be carried out on a High Voltage/Low Voltage transformer, and the Low Voltage windings of the transformer are controlled by a switch, isolator, or fusegear, the means of isolation Shall be switched to “off” (opened) and locked in the “off” (opened) position or other physical means Shall be used to ensure isolation during the course of the work.

Caution Signs Shall be fixed at all points of isolation including those at Low Voltage.

8.6 Work on High Voltage cables

Before issuing a Permit-to-Work on High Voltage cables, the Authorised Person in addition to the procedure described in section 7.3 “Work on High Voltage electrical equipment” Shall clearly identify and mark at all points of work the cable to be worked upon. The cable Shall then be spiked at all points of work, preferably with a remotely controlled spiking gun.

No person Shall touch any exposed insulation which covers or supports any conductor on a High Voltage system unless the conductor is made dead and earthed. Further guidance may be obtained in Code of Practice “Work on High Voltage cables.”

8.7 Work on High Voltage generators

When work is carried out on High Voltage generating plant and directly connected equipment, the following additional precautions Shall be taken:

(a) The generator Shall be at rest, isolated and locked off.
(b) The generator High Voltage winding Shall be isolated and earthed initially, through the generator main circuit breaker. Temporary earths Shall only then be applied to the winding in the terminals enclosure.
(c) Where it is energised from a separate supply, the field circuit Shall be isolated and locked off. Where motor driven exciters or batteries are provided, the switch controlling the motor or isolating the battery supply Shall be locked “off” (open).
(d) The LV heater’s fuse links on a High Voltage winding Shall be withdrawn before any work commences within the generator stator casing.
(e) LV instrument or control supplies Shall be isolated at the fuse links.
(f) The prime mover providing the motive power to the generator and any associated valves controlling the flow of fuel or steam Shall be isolated and locked off. In the case of an internal combustion prime mover, the starting battery, compressed air or hydraulic equipment Shall also be made inoperative by locked switch and/or valve isolation and/or depressurising.
(g) Danger or Caution Signs Shall be prominently displayed at all points of isolation referred to above.
(h) To ensure a safe system of work, the Permit-to-Work procedures Shall be applied
(i) When manual barring gear is to be applied to generating plant, a Permit-to-Work must be issued
(j) Generating plant Shall not be allowed to operate with any part of its protective enclosures (mechanical or electrical) removed, unless for special test purposes where it should be the subject of a Sanction-for-Test by an Authorised Person

8.8 Safety precautions and procedures for testing Live equipment

It is a requirement of the Electricity at Work Regulations and these Rules that work on electrical equipment and conductors should only be carried out when they are made dead, isolated from all sources of supply and earthed, and the other safety requirements as set out in these Safety Rules have been satisfied

When testing is to be carried out which necessitates Live working:

(a) Suitable precautions (including the need for suitable protective equipment) Shall be taken to prevent injury
(b) Effective control Shall be provided of any area where there is danger from live equipment conductors
(c) Another person or persons Shall be in accompaniment to ensure, as far as reasonably practicable, that injury is prevented. That person must have adequate knowledge and experience to avoid danger and have been instructed on the action to be taken in the event of an emergency
(d) Only Approved calibrated instruments should be used for electrical, phase identification and rotation or similar measurements
(e) In cases where working arrangements so require, Approved procedures for the control of the work, including the issue of Safety Documents, Shall apply

8.9 Work on electrical equipment which can be made live from a Distribution Network Operator's network.

Except in extreme emergency, any switching which may affect a Distribution Network Operator's network Shall be carried out with the full knowledge and agreement of the Distribution Control Engineer concerned. The switching operation Shall be recorded by the Authorised Person,

Switching to the Distribution Control Engineer's instructions, or with his consent, Shall be carried out without undue delay. All switching, whether to a Distribution Control Engineer's instructions or with his consent, or under conditions of emergency, Shall be reported to the Distribution Control Engineer as soon as possible after each operation.

Where work is to be carried out on electrical equipment which is directly connected to a Distribution Network Operator's High Voltage network, then switching, earthing, deposit of Safety Lock keys in Key Safes and issuing of any Safety Documents Shall be the responsibility of a University Authorised Person working in conjunction with the Distribution Network Operator's staff.

9. Documentation

9.1 Limited Work Certificate

In an area or location that is normally under the control of an AP for electrical safety reasons, a Limited Work Certificate may be issued by an AP (the issuer) for any specified task, other than one for which a Permit-to-Work or Sanction-for-Test is required, when the AP considers that additional guidance and warning of Danger is required over and above verbal guidance and warning.

A Limited Work Certificate Shall be comprised of Part 1- Issue, Part 2- Receipt, Part 3- Clearance and Part 4- Cancellation and Shall have an original card page (which is perforated and removable) and a paper copy page (non-removable) with both pages bearing the same serial number. Pads of numbered documents Shall be used in sequence.

Provided that a risk assessment indicates that it is safe, a Limited Work Certificate 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.

A Limited Work Certificate Shall not be issued for any area for which a Sanction-for-Test remains valid, or where a High Voltage Enclosure has been set up.

Where it is not necessary to achieve isolation at High Voltage to enable work on Low Voltage equipment, then the requirement for Safety Documents as indicated in these Rules does not apply. However, a Limited Work Certificate may be required as per Section 7.1.

Where practicable, all items of Live equipment at the location are to be cordoned off from the working area covered by a Limited Work Certificate for the duration of the task. This should be achieved by placing temporary barriers, comprising as a minimum, “no entry” warning tape or equivalent prominent markers, to define the non-accessible area.

Danger Signs Shall be prominently displayed on all items of Live electrical equipment at and adjacent to the location to which the Limited Work Certificate applies and whilst it remains valid.

During the period the Limited Work Certificate remains valid, the issuer is, where appropriate, to arrange for the area involved to be inspected at the end of each working period or day to ensure, as far as reasonably practical, 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 has not been obstructed.

Issue of a Limited Work Certificate

The following procedures apply to the issue of a Limited Work Certificate:

(a) The AP Shall enter on the Limited Work Certificate, details of the work to be done and the safety precautions applicable
(b) The original of the Limited Work Certificate Shall be issued to the person in charge of the work, who, after readings its contents and signifying to the AP that the instructions etc., are fully understood, Shall acknowledge its receipt by signing the declaration on Part 2 of the Limited Work Certificate.
(c) The recipient of the Limited Work Certificate Shall retain possession of the original page at all times whilst the work detailed on the Limited Work Certificate is being carried out.
(d) Where more than one working party is concerned, a Limited Work Certificate Shall be issued to the Person in Charge of each working party.
(e) A Limited Work Certificate is not to be issued for work in the vicinity of any item of equipment which is already the subject of another Safety Document.

Cancellation of a Limited Work Certificate

When work for which a Limited Work Certificate has been issued is stopped or completed, the person to whom it was issued Shall sign the declaration on Part 3 of the original page and return the Limited Work Certificate to the AP who Shall cancel the document by signing the declaration on Part 4. The original page will then be retained by the issuer and stored in the Operations Locker for a period of three years for future reference.

9.2 Switching Schedules

A Switching Schedule Shall be prepared by an AP, detailing the intended sequence of safety operations to be performed to make the relevant equipment safe for the execution of the work or the test. When a Switching Schedule has been completed it Shall be countersigned by another AP who has a detailed working knowledge of the particular System involved.

The AP Shall satisfy himself of the presence, if any, of any Operational Restrictions on the equipment involved in the switching.

Contents of Switching Schedules

The Switching Schedule Shall be completed by the Duty AP who will be responsible for issuing the Permit-to-Work or Sanction-for-Test and Shall indicate:

(a) The name, signature and location of the originating Duty AP.

(b) The name, signature and location of the countersigning AP.

(c) The date the countersigned schedule is to commence.

(d) The purpose of the purposed work or test.

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

(f) The sequence of operations to be undertaken up to and including the issue and cancellation of a Permit-to-Work or Sanction-for-Test and the System restoration process, including:

(1) The location, including any name and identification code, at which each operation is to be performed.

(2) The identity of each item of switchgear to be operated. This may be that stated on the local label on the equipment or alternatively the generic type, manufacture's name and type reference.

(3) The operation to be performed and the reason for the operation.

(4) Any "Items Required" e.g. keys, locks, Safety Signs, Protective Equipment, handles, document, etc.

(g) Any intended special instructions or safety measures that are to be included on the Permit-to-Work or Sanction-for-Test.

(h) 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 areas, can be implemented in an emergency.

Implementing Switching Schedules

Before commencing the sequence of operations detailed on the countersigned Switching Schedule, the Duty AP Shall 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.

The Duty AP Shall refer to the Switching Schedule while carrying out the sequence of operations detailed on the programme.

The Duty AP Shall note on the Switching Schedule, the date and time of each switching operation for subsequent entry into the System Logbook. The serial number of the Permit or Sanction and Isolation and Earthing Diagram Shall be entered on the Switching Schedule as a cross-reference.

Completion of Switching Schedules

All completed Switching Schedules Shall be retained in the Operations Locker for three years following the date of implementation.

9.3 Isolation and Earthing Diagram

Prior to the issue of any Permit-to-Work, or Sanction-for-Test, an Isolation and Earthing Diagram Shall be completed illustrating the safety arrangements at the points of isolation and the place of work, that have been implemented to make the equipment safe for the execution of the work or test.

An Isolation and Earthing Diagram Shall show:

(a) The name, signature and location of the originating AP.
(b) The name, signature and location of the countersigning AP.
(c) The date the countersigned programme is to commence.
(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) The cables and equipment to be worked on or tested.
(g) The points of Isolation.
(h) The points of Earthing.
(i) The points of work or test.
(j) Any Safety Locks and Safety Signs fitted.
(k) The System 'as is' when ready for issue of the Permit-to-Work or Sanction-for-Test.
(l) The serial number of the associated Permit-to-Work and/or Sanction-for-Test.

Implementing Isolation and Earthing Diagram

The Duty AP Shall note on the Isolation and Earthing Diagram the serial number of the Switching Schedule and the Permit-to-Work or Sanction-for-Test to enable them to be cross-referenced.

The Duty AP Shall show the Isolation and Earthing Diagram to the intended safety document recipient indicating the safety arrangements at the points of isolation and earthing at the point(s) of the work or test. The intended safety document recipient Shall then sign the document to indicate an understanding of the safety arrangements in place.
The Isolation and Earthing Diagram Shall then to be attached to the Permit-to-Work or Sanction-for- Test prior to its issue.

Completion of the work or test.

On completion of the work or test, the Isolation and Earthing Diagram Shall be returned to the Duty SAP who Shall then place it with the relevant Switching Schedule

All Isolation and Earthing Diagrams Shall be retained in the Operations Locker for a period of three years following the date of implementation.

9.4 Permit-to-Work

An electrical Permit-to-Work is to be issued by a person when work is to be carried out by a person requiring access to HV conductors. Such conductors Shall be isolated, made Dead and Earthed for the duration of that work.

A Permit-to-Work Shall be issued by the Duty AP (the issuer) to a CP (the recipient) before any work on defined items of equipment is started, except where the issuer is to undertake the work personally.

A Permit-to-Work Shall be comprised of Part 1- Issue, Part 2- Receipt, Part 3- Clearance and Part 4- Cancellation and Shall have an original card page (which is perforated and removable) and a paper copy page (non-removable) with both pages bearing the same serial number. Pads of numbered documents Shall be used in sequence.

A Permit-to-Work Shall not to be issued for any item of equipment for which an existing Permit-to-Work or Sanction-for-Test, remains valid.

Issue of a Permit-to-Work

The following procedures apply to the issue of a Permit-to-Work:

(a) The AP Shall enter on the Permit-to-Work full details of the precautions which have been taken to make the equipment safe and write on the Permit-to-Work the exact details of the work to be carried out on an item of the equipment.
(b) The original card page of the Permit-to-Work Shall be issued to the Competent Person in charge of the work, who, after reading its contents and signifying to the AP that the instructions are fully understood, Shall acknowledge its receipt by signing the declaration on Part 2 of the Permit-to-Work.
(c) The recipient of the Permit-to-Work Shall retain possession of the top copy at all times whilst the work detailed on the Permit-to-Work is being carried out.
(d) Where more than one working party is concerned, a Permit-to-Work Shall be issued to the Competent Person in charge of each working party and cross reference made on each permit to the fact that other permits are in use at the same time giving details of the serial numbers of the permits involved.
(e) If, during the course of the work, it is found necessary to change the scope of the work, the existing Permit-to-Work Shall be returned to the AP and cancelled; and a new Permit-to-Work issued, clearly detailing the revised work.
(f) A Permit-to-Work Shall not to be issued for the work on any item of equipment which is already the subject of another Safety Document.

Cancellation of a Permit-to-Work

When the work to which a Permit-to-Work has been issued is stopped or completed, the Competent Person to whom it was issued Shall sign the declaration on Part 3 of the original card page and return the Permit-to-Work to the AP. They Shall cancel the permit by signing the declaration on Part 4. The original card page will then be retained in the Operations Locker for a period of three years.

9.5 Sanction-for-Test

A Sanction-for-Test is to be issued by a person when testing is to be carried out by a person requiring access to HV conductors. Such Conductors Shall be isolated, made Dead and Earthed at the commencement of the test.

A Sanction-for-Test Shall be issued by the Duty AP (the issuer) to an AP (the recipient) before the commencement of any testing.

A Sanction-for-Test Shall be comprised of Part 1- Issue, Part 2- Receipt, Part 3- Clearance and Part 4- Cancellation and Shall have an original card page (which is perforated and removable) and a paper copy page (non-removable) with both pages bearing the same serial number. Pads of numbered documents Shall be used in sequence.

A Sanction-for-Test Shall not be issued for any item of equipment for which an existing Sanction-for-Test or Permit-to-Work remains valid.

Issue of a Sanction-for-Test

The following procedures apply to the issue of a Sanction-for-Test:

(a) The issuing AP Shall enter on the Sanction-for-Test full details of the precautions which have been taken to make the equipment safe and write on the Sanction-for-Test the exact details of the test to be carried out.
(b) The original card page of the Sanction-for-Test Shall be issued to the AP in charge of the test who, after readings its contents and signifying to the AP that the instructions etc., are fully understood, Shall acknowledge its receipt by signing the declaration on Part 3 of the Sanction-for-Test.
(c) The recipient of the Sanction-for-Test Shall retain possession of the original card page at all times whilst the test detailed on the Sanction-for-Test is being carried out.
(d) If, during the course of the test, it is found necessary to change the scope, the existing Sanction-for-Test Shall be returned to the issuing AP and cancelled and a new Sanction-for-Test issued, clearly detailing the revised test.
(e) A Sanction-for-Test is not to be issued for work on any item of equipment which is already the subject of another Safety Document.

Cancellation of a Sanction-for-Test

When the test for which a Sanction-for-Test has been issued is stopped or completed, the AP to whom it was issued Shall sign the declaration on Part 3 of the original card page and return the Sanction-for-Test to the issuing AP who Shall cancel the document by signing the declaration on Part 4. The original card page will then be retained in the Operations Locker for a period of three years.

9.6 Special instruction to be followed when normal Safety Document clearance/cancellation cannot be enacted

These Rules lay down specific procedures which Shall be followed when a Safety Document is required to be cleared and cancelled. However, it is recognised that there will be occasions when these procedures cannot be followed. The main danger associated with not following the normal cancellation procedure is restoring electrical equipment to normal operation whilst persons are still working on such equipment

The special procedure for clearance and cancellation Shall only be implemented after all reasonably practicable steps have been taken to clear and cancel the Safety Document in the normal manner.

The AP Shall enter in the System Logbook, full details of implementation of the following procedures and actions taken to prevent danger.
The procedures that Shall be used are as follows:

(a) When a Safety Document is lost.

(i) The recipient of the Safety Document Shall sign a Safety Document Abnormal Clearance Certificate stating that he considers the Safety Document cleared and if he finds the Safety Document, he Shall return it to the Authorised Person
(ii) An Authorised Person Shall arrange for details of the lost Safety Document to be displayed in the 11kV switchroom at the 33kV substation for a period of twelve months.

(b) When a Safety Lock key is lost:

(i) The loss Shall be reported without delay to the Engineering Maintenance Manager who Shall arrange for the immediate clearance and cancellation of the Safety Document ensuring that the clearance section is endorsed "Safety Lock Key Number ….. lost" and the details recorded in the System Logbook.
(ii) If it is desirable to continue with the work, with the agreement of the Engineering Maintenance Manager Person, the spare key Shall be obtained from the secure 24-hour manned location and a new Safety Document issued.
(iii) The Authorised Person Shall arrange for the details of the lost keys to be displayed in the 11kV switchroom at the 33kV substation for a period of twelve months.

(c) When a recipient of a Safety Document is unavoidably absent, the Authorised Person cancelling the Permit-to-Work Shall:

(i) Obtain Safety Document and key(s) from safe custody.
(ii) Ascertain whether all the work covered by the Safety Document is complete and whether all gear, tools, additional earths and loose materials have been removed and guards and access doors replaced.
(iii) Ensure that all persons that have worked under the Safety Document are withdrawn from the equipment and informed that the Safety Document is about to be cleared.
(iv) Ascertain whether the equipment is in a suitable state to be returned to service
(v) Complete the clearance section of the Safety Document and endorse it. "In the absence of the recipient, I am responsible for clearing this Safety Document."
(vi) Carry out the normal cancellation procedure and record all relevant information.
(vii) After cancellation of the Safety Document, take whatever steps are necessary to contact the recipient either before or immediately upon his return to site, and inform him that his Safety Document is no longer in force. If the recipient does not return to site, the AP must personally inform every other member of the working party that the Safety Document is cancelled and arrange for the details of the cancellation to be displayed in the 11kV switchroom at the 33kV substation for a period of twelve months.
(viii) Issue a new Safety Document if there is work and/or testing still to be completed.

10. Use of an Approved HV Contractor

Additional Definitions

Senior Authorised Person (SAP) – a person employed by the Approved Contractor and authorised to issue specified Safety Documents in specified locations.

Transfer of Control Certificate - a form of declaration signed and issued by an SAP, transferring the responsibilities for the control of Danger to be avoided, for the whole or part of a System from the University to the Approved Contractor.

Introduction

When work is carried out on the High Voltage System, it is necessary to achieve safety from the System and then to issue appropriate Safety Documents. As the University does not employ suitably trained and authorised staff to carry out the majority of work or testing on the High Voltage system, it is necessary to employ an Approved Contractor(s).

The Authorising Engineer in conjunction with the Engineering Maintenance Manager Shall ensure, as far as reasonably practicable, that the electrical safety rules of the Approved Contractor are at least of a standard equal to these Rules. The Approved Contractor's electrical safety rules normally allow their Competent Persons to receive Safety Documents only from their Senior Authorised Persons and not directly from University Authorised Persons. They require that their Senior Authorised Person together with the University's Authorised Person achieve safety from the System and then following an exchange of documentation, the Senior Authorised Person issues an appropriate Safety Document to their own staff.

Procedure

(a) All planning and preparation for the work Shall be agreed between a University Authorised Person and a Senior Authorised Person.
(b) Plans Shall be provided by both parties and a schedule of switching Shall be jointly agreed.
(c) All switching in order to achieve safety from the System Shall be carried out by a University Authorised Person and a Senior Authorised Person. Unique safety locks Shall be applied at all points of isolation.
(d) The Approved procedure for the application of Safety Locks Shall be either:
    (i) The use of multiple hasp devices such that both parties each can apply their own lock, or
    (ii) The storage of all Safety Lock keys in a Key Safe with at least two keys and one to be held by each party

(e) A Transfer of Control Certificate Shall be issued by the University Authorised Person to a Senior Authorised Person to confirm the precautions which have been taken and which will remain in place during the course of the work.
(f) Upon completion of the work, the Transfer of Control Certificate Shall be cancelled.
(g) Co-ordinated switching will then take place to restore the System to normal.

Appendix A Associated Regulations and Documents

These Rules are based on and comply, where applicable, with the following regulations and documents: -

1. Health and Safety at Work etc. Act 1974.
2. Management of Health and Safety at Work Regulations 1999.
3. Code of Practice for Management of Health and Safety at Work Regulations 1999.
4. Electricity (Safety, Quality and Continuity) Regulations 2002.
5. Electricity at Work Regulations 1989.
6. Memorandum of Guidance on the Electricity at Work Regulations 1989.
7. Electricity at Work: - Safe Working Practices. Health and Safety series booklet HS (G) 85 issued by the Health and Safety Executive.
8. Inspection and Testing guidance Note 3, issued by the IET
9. The Personal Protective Equipment Regulations 1992 (EC Directive).
10. Manual Handling Operations Regulations 1992.
11. Provision and Use of Work Equipment Regulations 1998.
12. Health and Safety (First-Aid) Regulations 1981 Code of Practice and Guidance.
13. Workplace (Health, Safety and Welfare) Regulations 1992.

Appendix B TREATMENT FOR ELECTRIC SHOCK

IMMEDIATE AND SPEEDY ACTION IS VITAL

The following methods should be learnt from a qualified instructor and practiced regularly.

1. FREE FROM CONTACT BUT DO NOT PLACE YOURSELF OR OTHERS IN DANGER.

- Switch off the supply immediately or send someone to do so.
- Do not attempt to remove a person from contact with High Voltage unless suitable articles insulated from the System voltage are used for this purpose.
- When attempting to free a person from contact with Low Voltage use rubber gloves, boots, or mats, or insulated stick, but if these are not available use a loop of rope, cap or coat to drag the person free.
- Whatever is used should be dry and non-conducting.

2. AFTER RELEASE

- Do not waste time moving the person.
- Lay the casualty down on something dry, if possible, and check for response.
- If the casualty appears to be unconscious, shake the shoulders and shout "Wake Up".
- If there is no response, IMMEDIATELY SHOUT FOR HELP and proceed as follows.

3. OPEN THE AIRWAY

- Turn the casualty onto their back.
- Tilt the head and lift the chin to open the airway (Figure 1).
- Carefully remove any obvious debris from inside the mouth.

FIGURE 1: CLEAR AND OPEN AIRWAY

4. CHECK BREATHING AND PULSE

- Keeping the airway open, check to see if the breathing is normal and take no more than 10 seconds to do this.
- Listen for breaths.
- Feel for breaths on your cheek (Figure 2).
- Check for the pulse by placing your fingers to one side of the voice box and pressing gently downwards
- If the casualty is breathing normally, place them in the recovery position (Figure 6).
- If the casualty is not breathing normally ask someone to call for an ambulance or if you are on your own, use your mobile phone. Only leave the casualty if there is no other way of summoning support.

FIGURE 2: CHECK BREATHING & PULSE

5. CHEST COMPRESSIONS AND BREATHS

- Kneel at the side of the casualty and prepare to start chest compressions at once.
- Place the heel of one hand in the centre of the casualty's chest (Figure 3), then place the heel of your other hand on top and interlock your fingers Figure 4).

FIGURE 3: COMPRESSION POINT

- Position yourself vertically above the casualty's chest with your arms straight.
- Press down the breastbone 5-6cm then release without losing contact between your hands and the chest. Avoid applying pressure over the casualty's ribs, the bottom end of the breastbone or the upper abdomen.
- Compression and release should take an equal amount of time.
- Perform Do 30 chest compressions at a rate of about 100-120 per minute.
- Now combine chest compressions with breaths
- Open the airway again using head tilt and chin lift (Figure 5)
- Nip the soft part of the casualty's nose closed. Allow the mouth to open but maintain chin lift
- Take a normal breath and seal your lips around the casualty's mouth, making sure you have a good seal.

FIGURE 4: HAND CLASP

- Blow steadily into the casualty's mouth whilst watching for the chest to rise taking about 1 second to make the chest rise.

- Keeping the airway open, remove your mouth. Take a normal breath of fresh air and watch for the casualty's chest to fall as air comes out.

FIGURE 5: BREATHS

- Re-seal your mouth and give another breath – 2 in total. Giving both breaths should not take more than 5 seconds.
- Return your hands without delay to the centre of the chest and give another 30 chest compressions and then 2 more breaths.
- Continue repeating cycles of 30 chest compressions and 2 breaths.
- Only stop and recheck the casualty if they show signs of regaining consciousness AND start to breathe normally – otherwise do not interrupt resuscitation.

If there is more than one rescuer present, they should take over from each other every 2 minutes to avoid fatigue. Ensure the minimum delay during changeover and do not interrupt chest compressions.

If the initial breath in each sequence does not make the chest rise, give another 30 chest compressions. Then, before the next attempt.

- Check the casualty's mouth and remove any visible obstruction.
- Recheck that there is adequate head tilt and chin lift
- Do not attempt more than 2 breaths each time before returning to chest compressions

Continue resuscitation until

- Qualified help arrives and takes over OR
- You become exhausted OR
- The casualty shows signs of regaining consciousness such as coughing open their eyes or moving purposefully AND starts to breathe normally.

6. OTHER INJURIES

After breathing, priority should be given to controlling bleeding. This is achieved by firm pressure on the wound.

- Cover with a clean dressing and bandage firmly in place.
- If bleeding continues add further dressings on top of the first and increase the pressure by bandaging firmly in place. Never disturb original dressings as some clotting will have taken place.

Burns should be covered with a clean, sterile dressing to exclude air. The dressing should be bandaged lightly in position. Unless it is dangerous to leave the casualty at the site of the accident expert assistance should be sought before other injuries are treated. If it is necessary to move the casualty, do so with the utmost gentleness carefully supporting any injured parts.

7. RECOVERY POSITION

Unconscious casualties who are breathing and have a pulse are to be turned into the recovery position
(Figure 6).

FIGURE 6: RECOVERY POSITION

8. FIRST AID APPLIANCES

The first aid appliances provided Shall be used only for the purpose intended. A person Shall be appointed to be responsible for ensuring that supplies are always available.