Wave Hub

Electrical Safety Guidance

for the

High Voltage [33/11kV] System

as installed at

The Wave Hub Limited Hayle Towans Substation.

Document Title	Date	Revision No	Issued by	Approved by
Wave Hub Limited-OMS-ESG-002	06/11/2015	4	Rob McConnell	Claire Gibson

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Executive summary.

Status

This Electrical Safety Guidance for Wave Hub Limited's HV Systems is the current document for this purpose

General

This document gives operational guidance on electrical safety requirements for high voltage systems in Wave Hub Limited's premises.

Aim of this guidance

Guidance is intended to assist in meeting the requirements of the Electricity at Work Regulations 1989, which detail the precautions to be taken against risk of death or personal injury from electricity in work activities.

Who shall read this guidance?

This document will be of interest and practical help to those involved in the design, purchase, construction, operation and maintenance of Wave Hub Limited's high voltage electrical systems and equipment.

Structure

This main guidance document provides information and statutory guidance for those responsible for meeting the requirements of the Electricity at Work Regulations 1989.

Wave Hub Limited's policy section outlines the overall responsibility of managers of Wave Hub Limited's premises and details their legal and mandatory obligations in setting up and operating reliable high voltage electrical safety procedures.

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Section 1 – Scope.

1.1. General

This Electrical Safety Guidance applies to all Wave Hub Limited's facilities containing a high voltage system.

Guidance is intended to assist Duty Holders (see Chapter 2 for definitions) 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, Directors and those responsible for electrical services as "Duty Holders" are accountable for ensuring control; they are also responsible for the safe design, installation, operation and maintenance of the electrical systems.

As an employer, the Management of Wave Hub Limited has a legal responsibility to ensure that relevant regulations are complied with. Statutory instruments referred to within this document shall be deemed to include any revisions or amendments which have occurred since the date of the original statute.

The reliance on electrical supplies is essential for the operation of Wave Hub Limited. The unplanned loss of connection to an Energy Converter, referred to as a Device would be unacceptable, as the Devices would be unable to function without electrical connection.

This document not only has procedural guidance on the correct isolation of electrical equipment but also includes guidance on ensuring the security of supplies / connection.

The roles of the Senior Appointed Person (HV) and Authorised Person (HV) are twofold: first, they shall ensure that the electrical systems and equipment are fit for use; second, they shall ensure the safety of personnel who are using, or who are near, such equipment.

To ensure systems are fit for use, the Senior Appointed Person (HV), shall be consulted before major alterations or the procurement of major plant (which could adversely affect the existing installation) are made.

1.2. 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 shall be performed.

1.3. Procedures

High voltage systems associated with Wave Hub Limited's operations are potentially complex. 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 shall only be considered when, in the opinion of the Senior Appointed Person (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 the high voltage installation and with any emergencies that arise.

The consequences, in terms of Wave Hub Limited operations, of undertaking electrical maintenance or switching operations must be fully considered following appropriate consultation with Wave Hub Limited's Management.

1.4. Standards

This document is primarily 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.

It is also important that operating and maintenance manuals (including "as-installed" drawings and switchgear and transformer (S&T) schedules) for the high voltage system must be available to those involved in its operation and servicing. In order to maintain their value, these documents must be regularly updated to include details of all modifications and extensions to plant and equipment as and when they occur.

1.5. Duties

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 the managed premises to conduct their work so as to prevent danger or injury to themselves and/or others. They shall also be thoroughly conversant with all regulations governing the work that they may have to undertake.

1.6. Security of information

The Electricity at Work Regulations 1989 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, Wave Hub Limited's Management shall consider its policy for the retention of information and contemplate how it will maintain, if at all, back-up copies of documents.

1.7. Application of this guidance

The safety guidance (HV) as detailed in this document shall be applied to:

a]. high voltage systems up to and including 36 kV;

b]. the high voltage switchgear cables up to the first isolation point on the low voltage system;

c]. associated electrical equipment under the ownership or control of Wave Hub Limited under whose authority they have been issued.

Where operation of low voltage switchgear is associated with high voltage work, the requirement for safety documents as indicated in this Electrical Safety Guidance does not apply, and reference shall be made to Wave Hub Limited's Electrical Safety Guidance for LV Systems, [Wave Hub Limited-OMS-ESG-001].

This guidance shall be considered as representing best practice for all persons (whether or not directly employed by Wave Hub Limited) working on, working near, testing or operating electrical equipment and systems for which Wave Hub Limited is in control of electrical danger, unless the Senior Appointed Person (HV), has deemed in writing that other guidance is equal and equivalent.

This guidance is designed to provide a safe framework within which work or testing can be carried out with safety on permanently connected electrical equipment (equipment which has been isolated via a switch or disconnector is considered to be permanently connected).

In case of an apparent conflict between this guidance and a statutory requirement, the latter shall be followed, and the Senior Appointed Person (HV), is to advise the Designated Person.

If it is necessary to depart from any requirement of this guidance, the Senior Appointed Person (HV) is to agree such departure in writing with the Designated Person before it is implemented.

Where control of electrical danger is divided between Wave Hub Limited and others, Chapter 4 of this guidance shall be followed.

Further advice on the application of this guidance can be obtained from the Senior Appointed Person (HV).

1.8. Other safety guidance, related documents and procedures

Where Wave Hub Limited employees are required to work near electrical systems and associated electrical equipment not owned or controlled by Wave Hub Limited, this document (HV) and related procedures, within the Wave Hub Limited OMS, shall be used as a guide to safe working practice.

1.9. Information and instruction

Arrangements shall be made by Wave Hub Limited to ensure:

a]. that all employees concerned are adequately informed and instructed as to the systems and electrical equipment which are affected by a particular operation or work (whether or not they are owned or operated by Wave Hub Limited) and which legal requirements, safety guidance, related documents and procedures shall apply;

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.

1.10. Issue of this safety guidance (HV)

A copy of this guidance and, as appropriate, related documents and procedures shall be issued to certain Wave Hub Limited employees and other persons as determined by the Senior Appointed Person (HV).

Such employees and other persons shall sign a receipt for a copy of this guidance, 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 guidance.

1.11. Variation of safety guidance (HV)

In exceptional or special circumstances, this guidance may be varied to such an extent as is necessary and approved by the Senior Appointed Person (HV). Such variation shall always be in writing and shall ensure that safety requirements are satisfied in some other way.

1.12. Objections

When any person receives instructions regarding the operation of, or work on, the high voltage system and associated electrical equipment at Wave Hub Limited 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 a more senior level for a decision before proceeding.

1.13. Definition of "shall"

Where "shall" is used in this guidance with no qualification, this indicates a recommendation of that which is mandatory and required.

1.14. Definition of "should"

Where "should" is used in this guidance with no qualification, this indicates a recommendation of that which is advised but not required.

1.15. Definition of "reasonably practicable"

Where a statement is qualified by the words "reasonably practicable", a slightly less strict standard is imposed. It means that an assessment shall 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.

1.16. Associated regulations and documents

Statutory

Approved Code of Practice for Management of Health and Safety at Work Regulations 1999.

BS 7671:2008. Requirements for electrical installations. IEE Wiring Regulations. Seventeeth edition.

Construction (Design and Management) Regulations 2015.

Electricity at Work Regulations 1989.

Electricity Safety, Quality and Continuity Regulations 2002.

Health and Safety (Safety Signs and Signals) Regulations 1996.

Health and Safety at Work etc Act 1974

Health and Safety (First-aid) Regulations 1981.

Management of Health and Safety at Work Regulations 1999.

Manual Handling Operations Regulations 1992.

Personal Protective Equipment Regulations 2002.

Provision and Use of Work Equipment Regulations 1998.

Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995.

Workplace (Health, Safety and Welfare) Regulations 1992.

Guidance

The Institution of Electrical Engineers':

– 'Code of practice for in-service inspection and testing of electrical equipment'. – 'Guidance Note 3 – Inspection and testing'.

The Health & Safety Executive's:

– 'Electricity at work: safe working practices HSG85'.

– 'Keeping electrical switchgear safe HSG230' 2nd Edition 2015.

– 'Memorandum of guidance on the Electricity at Work Regulations 1989 HSR25'.

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Section 2 – Definitions

With regard to this safety guidance (HV), the following definitions apply.

2.1 Personnel

Designated Person

The Designated Person is an individual appointed by Wave Hub Limited, (a board member or a person with responsibilities to the board) who has overall authority and responsibility for the high voltage electricity system within the premises and who has a duty under the Health and Safety at Work etc Act 1974 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 shall not be the Senior Appointed Person (HV).

Duty Holder

A Duty Holder is a person on whom the Electricity at Work Regulations 1989 impose a duty in connection with safety.

Management

Management is defined as the owner, occupier, employer, general manager, director or other person in Wave Hub Limited's organisation, who is accountable for the premises and who is responsible for issuing or implementing a general policy statement under the Health and Safety at Work etc Act 1974.

Senior Appointed Person (HV)

A Senior Appointed Person (HV) is appointed in writing by the Designated Person to take responsibility for the effective management of this safety guidance (HV). The person appointed shall possess the necessary degree of independence from local management to take action within this guidance.

Authorised Person (HV)

An Authorised Person (HV) is appointed in writing by Wave Hub Limited on the recommendation of the Senior Appointed Person (HV), in accordance with this safety guidance (HV) and is responsible for the implementation and operation of this guidance with regard to work on, or the testing of, defined electrical equipment.

Duty Authorised Person (HV)

An Authorised Person (HV) who has current responsibility for the system or installation as recorded in the Site Logbook, whose name is displayed at the mimic diagram and who personally holds or carries the Authorised Person's (HV) key.

Competent Person (HV)

A Competent Person (HV) is approved and appointed in writing by the Duty Authorised Person (HV), for defined work, possessing the necessary technical knowledge, skill and experience relevant to the nature of the work to be undertaken, who is able to prevent danger or, where appropriate, injury and who is able to accept a safety document from the Duty Authorised Person (HV).

Accompanying Safety Person (HV)

An Accompanying Safety Person is a person not involved in the work or test who has received 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 shall be familiar with the system or installation being worked on or tested and is to have been instructed on the action to be taken to safely rescue a person in the event of an accident.

2.2 Safety Documents

Permit-to-work

A written authority issued by the Duty Authorised Person for work to be undertaken on electrical equipment.

Sanction-for-test

A written authority issued by the Duty Authorised Person for testing to be undertaken on electrical equipment.

Limitation-of-access

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

2.3 Safety Signs

Caution sign

This is a temporary, non-metallic sign bearing the words “caution – persons working on equipment” and “do not touch” which shall be used at a point-of-isolation.

Danger sign

This sign is a temporary, non-metallic sign bearing the words “danger live equipment” and “do not touch” which shall be used where there is adjacent live equipment at the place of work.

Warning sign

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, shall be displayed below the words “danger of death” in black letters and in the same letter size.

2.4 Voltage Range

The following ranges of voltage are defined as follows:

a]. extra low voltage: a potential not exceeding 50 V ac or 120 V ripple-free dc whether between conductors or to earth;

b]. low voltage (LV): a potential not exceeding 1000 V ac or 1500 V dc between conductors, or 600V ac or 900V dc between a conductor and earth;

c]. high voltage (HV): a potential normally exceeding low voltage.

2.5 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 3). (“Independent” does not necessarily mean external to the organisation.)

Authorised Person’s (HV) logbook:

A personal logbook to record all switching carried out on the site’s HV system(s) prior to and after becoming an Authorised Person. This logbook will also contain details of any training relevant to the HV system undertaken by the Authorised Person.

Circuit main earth:

A safety earthing connection of an approved type, secured where practicable by a Safety Lock, applied by an Authorised Person and its position recorded before the issue of a safety document.

Conductor:

A conductor of electrical energy.

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 source of electrical energy which may be dangerous to any person, whether or not an accident has occurred.

Dead:

A conductor that is neither “live” nor “charged”.

Duty Authorised Persons Control Keys:

A key that controls access to the substation key cabinet.

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.

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.

High voltage enclosure:

A location within which a live high voltage conductor is, or can be, exposed without the use of a tool or key.

Injury:

Death or personal injury from electric shock, electric 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 this 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 Duty Authorised Person (HV) has control.

Live:

Implies connection to a source of electricity.

Live functional testing:

The testing of electrical equipment while live which does not involve live working.

Live working:

The connection/disconnection of electrical equipment while live.

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 guidance. This cabinet shall not be used to store anything not associated with this guidance.

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.

Operational Procedure Manual:

The electronic file saved on the Wave Hub file server and a ring-binder containing information relating to the control and operation of the high voltage system.

Operational restriction:

A written safety instruction, issued via the Senior Appointed Person (HV), modifying or prohibiting the normal operating procedures associated with a particular make and type of equipment.

Personal supervision:

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

Practice improvement notice:

A notice issued by the auditor 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, temporary safety signs etc.

Prove dead:

Demonstrate with the use of approved test equipment designed for the purpose that no electrical potential liable to cause danger is present.

Risk assessment:

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

Safety key cabinet:

A box having two locks, each of which is to have only one key: one being labelled “Safety keycabinet”. It shall be so arranged that both locks must be released before access can be gained to the contents of the box.

Safety locks:

An individually numbered padlock having a single key that differs from all other keys provided for the system or installation, used for prevention of the manual operation of equipment, securing the means of isolation and to prevent the removal of circuit main earths.

Safety programme:

A written programme issued by the Duty Authorised Person, setting out the sequence of operations to be followed before a permit-to-work or a sanction-for-test is issued.

Single line drawing:

A single line drawing of the whole site system showing all HV and major LV equipment in its normal state of operation (that is, switched on-off etc).

Site Logbook:

A book in which all matters relating to the electrical system shall be recorded.

Spiking gun:

An item of safety equipment used to confirm that a cable is dead.

Sub-station Key Cabinet:

A single locked box that is used for the control of the keys for the substation equipment.

Sulphur hexafluoride (SF6):

A gas that is used in electrical power equipment. It is colourless, odourless, non-flammable and chemically stable. SF6 is a very good electrical insulator and can effectively extinguish arcs, which makes high and medium voltage apparatus filled with SF6 highly popular.

Suspension notice:

A notice issued by the auditor 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 auditor's system improvement notice being issued.

Substation:

Any premises, or part thereof, which contains 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 the substation into which every entry to the building is recorded and the reason for entry noted.

System:

An electrical system in which all the equipment is, or may be, connected to a common source of electrical energy, including the source and its associated equipment.

Section 3 – Wave Hub Limited Management Policy.

3.1 Statutory Requirements.

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 1989 imposes 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 1974.

To satisfy these requirements, Wave Hub Limited Management shall have:

a]. A clearly defined electrical safety policy and programme for the operation and maintenance of their high voltage system(s) and equipment;

b]. Means by which the policy and programme can be managed, implemented, monitored and reviewed

3.2 Additional Requirements.

In addition to ensuring that all statutory requirements relating to electrical safety are observed, Wave Hub Limited shall have:

a]. A structure, appropriate to the complexity of the work, for implementing the policy – including an outline description of individual responsibilities;

c]. Procedures for ensuring the effective administration of the policy;

d] A system of monitoring to ensure that the policy is being effectively pursued within the managed premises;

e]. A programme of training to ensure the awareness of all staff on the use of electricity and general electrical safety;

f]. Appropriate training for relevant professional and technical staff;

g]. A procedure for dealing with any emergencies that may arise.

3.3 Designated Person.

The Wave Hub Limited Board of Directors shall formally nominate in writing a Designated Person with responsibility for the high voltage electrical safety policy.

The electrical safety policy shall demonstrate the commitment of Wave Hub Limited's management to self-regulation and reflect the uniqueness and special needs of the managed premises for which it is written by:

a]. Recognising the importance of the subject;

b]. Ensuring that responsibilities both legal and managerial are clearly defined and understood throughout the organisation;

c]. 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 Wave Hub Limited's design, installation, operation and maintenance of systems and equipment in respect of premises owned or occupied by them;

d]. Monitoring and reviewing at regular intervals the effectiveness of the policy and progress concerning its implementation;

e]. Ensuring that clear and concise written records are kept of all activities involved in the implementation of the policy.

3.4 Senior Appointed Person.

Within Wave Hub Limited's management structure, an electrical engineer shall be formally appointed as a Senior Appointed Person (HV), with the responsibility for 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 shall preferably be independent of the organisation.

Wave Hub Limited management are responsible for the appointment and also have a duty to monitor the effectiveness of the Senior Appointed Person (HV), in fulfilling this role. This monitoring requirement is particularly important if the Senior Appointed Person (HV) is either self-employed or employed by an organisation outside Wave Hub Limited structure. Appendix 3 contains an audit procedure and forms.

3.5 Operation and Maintenance.

The operation and maintenance of high voltage equipment in accordance with clearly defined rules and procedures shall be entrusted only to persons who are technically competent and appropriately trained. These will be appointed in writing as "Authorised Persons (HV)" or "Competent Persons (HV)".

3.6 System Operation.

It is strongly recommended that Wave Hub Limited management should aim to become independent in respect of management of the operation of their high voltage installations. This shall be achieved by recruiting and training suitable staff for the purpose. Alternatively, where this is not considered justified, it will be necessary to make arrangements using an independent organisation (that is, a local distribution network operator or other suitable Contractor). In all instances, it is essential that Authorised Persons (HV) are appointed to deal with switching.

3.7 Control of Systems.

The extent to which control of systems and/or equipment is delegated to an independent organisation should take into account the inherent risks involved to Device Developers and/or sensitive equipment and the complexity of the installation.

Accordingly, it is recommended that a level of control, commensurate with the risk, shall be maintained by Wave Hub Limited's management personnel.

3.8 Duties.

It shall be emphasised that Regulation 3 of the Electricity at Work Regulations 1989 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 Wave Hub Limited's management to escape responsibility.

3.9 Registration and Control.

Wave Hub Limited's management shall establish and maintain a system of equipment registration and control. The system shall ensure that all HV electrical equipment and associated buildings for which they have a responsibility, is not only suitable for its purpose but is also maintained in an electrically safe and reliable condition.

3.10 Acceptance Procedure.

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

Section 4 – Appointment, Roles and Duties of Personnel.

4.1 General

Anybody who works on – and is concerned with the control, operation or testing of – equipment to which this safety guidance (HV) applies has the responsibility to ensure that they comply with, and implement, the principles outlined in this guidance together with any relevant codes or procedures.

Ignorance of the relevant legal requirements, codes and procedures, and the guidance given in this Electrical Safety Guidance may not be accepted as an excuse for neglect of duty.

The responsibilities placed on 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 this safety guidance (HV) shall indicate the class of operation and/or work permitted and the section of system to which the authorisation applies.

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 – 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 restore equipment to service;

b]. Making safe or restoring equipment – including:

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

(ii) after completion of work – cancelling safety documents, and taking action to restore equipment to service;

c]. Work – which includes receipt of a safety document, execution of the required work to its completion, or termination and clearance of the safety document.

It is strongly recommended that the personnel assigned to these roles and duties are only appointed to undertake the duties associated with a single role.

4.2 Roles and Duties of the Designated Person (HV)

The Wave Hub Limited Board of Directors shall appoint a person as Designated Person. The role in relation to this Electrical Safety Guidance is described below.

a]. Appoint in writing an Senior Appointed Person (HV) for all systems and installations for which Wave Hub Limited has responsibility;

b]. Audit the Senior Appointed Person (HV) annually to ensure the Senior Appointed Person (HV)'s duties have been carried out in accordance with this Electrical Safety Guidance;

c]. Agree any local variations from this guidance.

4.3 Role and Duties of the Senior Appointed Person (HV),

The "Senior Appointed Person (HV)" will be responsible for implementing, administering and monitoring the application of this guidance. The Senior Appointed Person (HV)'s 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 Wave Hub Limited has responsibility;

b]. Define the exact extent of the systems and installations for which each Authorised Person (HV), is responsible;

c]. If necessary, recommend the suspension or cancellation of the appointment of an Authorised Person (HV), and withdraw 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 Senior Appointed Person (HV), as to their competence and ability.

The Senior Appointed Person (HV), also:

- issues to each Authorised Person (HV), on appointment, a certificate valid for a period not exceeding three years;
- reports to Wave Hub Limited any deficiency in the number of suitably trained and experienced Authorised Persons (HV) where this significantly impairs Wave Hub Limited's ability to provide a safe and efficient service;
- reviews each Authorised Person (HV) operational experience at intervals of not more than three years by examining the relevant operating records of the system(s), and recommends refresher training as necessary;
- audits the performance and records the operational experience of each Authorised Person (HV), every 12 months;
- at intervals not exceeding three years, undertakes comprehensive audits, in accordance with the application of this guidance, to all systems and installations;
- on receipt of an "operational restriction" related to high voltage systems and/or equipment, ensures that all Authorised Persons (HV) are made aware of it and receive copies;
- notifies the Wave Hub Limited management of any known operational restriction issued by a distribution network operator or equipment manufacturer etc, or one which arises locally;
- initiates and coordinates the investigations of reported injuries and dangerous occurrences involving electrical systems and installations within the Senior Appointed Person's (HV) sphere of responsibility.

They shall:

- sanction any interpretation of this guidance, any local house rules and any deviation that may be necessary for their application;
- ensure that any amendments to this guidance are brought formally to the attention of, and are understood by, all appropriate personnel;
- notify Wave Hub Limited of any known defect reports or operational restrictions issued by a distribution network operator, manufacturer or supplier of electrical equipment which is applicable to equipment within the areas for which the Senior Appointed Person (HV), is responsible;
- ensure that a system is in place to circulate relevant information on operating restrictions and dangerous occurrences to all Authorised Persons (HV);
- investigate all dangerous occurrences involving electrical equipment, systems and installations for which the Senior Appointed Person (HV) is responsible;
- agree in writing any local deviation from this guidance that may be necessary for their application to a particular item of equipment or location;
- ensure that any amendments to this guidance are brought to the attention of, and understood by all Authorised Persons (HV).

At random intervals not exceeding 12 months, the Senior Appointed Person (HV) is to review the competency of all Authorised Persons (HV). These reviews shall pay particular attention to operating records and the issue and cancellation of permits.

He/she shall formally advise on any training or retraining considered necessary, including when it shall be received. These reviews shall include a meeting with the Authorised Person (HV) and a brief inspection of the systems or installations to which their appointment refers.

At intervals not exceeding three years, the Senior Appointed Person (HV) is to undertake comprehensive audits of the safe systems of work and safety procedures recommended by this guidance.

A written report of the audit shall be compiled, listing satisfactory items seen and any deficiencies found, and recommendations made. This shall be issued to a Duty Authorised Person (HV) for action as necessary. A copy of the report with a summary of the findings shall be issued to the Designated Person.

The Duty Authorised Person (HV) is to acknowledge receipt of the audit report, make any comments considered necessary and compile an action plan in consultation with the Senior Appointed Person (HV). The Senior Appointed Person (HV) shall review the progress on the action plan at the next audit.

4.4 Roles and duties of the Authorised Persons (HV)

The Authorised Person (HV), AP shall be solely responsible for:

- the practical implementation and operation of this guidance;
- and the systems and installations for which Wave Hub Limited is in control of danger and for which the Authorised Person (HV), has been appointed.

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

More than one Authorised Person (HV) may be appointed for a system or installation but, at any one time, only one Authorised Person (HV) shall be on duty. Each transfer of responsibility between Authorised Persons (HV) shall be recorded in the Sub Station logbook.

The name of the Duty Authorised Person (HV), on duty shall be readily available and shall be displayed near the working key.

Where there is more than one Authorised Person (HV), appointed for a system or installation, the Senior Appointed Person (HV) shall be advised of any Authorised Person (HV), who is nominated as being in overall charge with responsibility for control of records etc.

The duties of Authorised Persons (HV) may be summarised as follows:

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

b]. ensure that all records concerning high voltage systems are kept up-to-date;

c]. record all high voltage switching operations;

d]. ensure that test equipment is maintained in good condition;

e]. cooperate with the Senior Appointed Person (HV), in matters of policy concerning high voltage systems;

f]. report in writing any dangerous and/or unusual occurrences to the Senior Appointed Person (HV).

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

h]. define the duties of appointed Competent Persons (HV) on the "certificate of appointment";

j]. ensure that the necessary safety posters are displayed in substations at all times;

k]. issue and cancel safety documents;

m]. routinely inspect and test substation earthing;

n]. routinely inspect and test transformers and switchgear;

p]. routinely inspect and test high voltage protection systems including batteries.

The Authorised Person (HV) shall inform the Senior Appointed Person (HV) of:

a]. any defects found in electrical equipment;

b]. any dangerous occurrence;

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

The Authorised Person (HV) also:

- arranges for, supervises or undertakes cable detection or location work within the geographical area of the Authorised Person (HV)'s appointment;
- appoints Competent Persons (HV) for defined work within the HV switchrooms and maintains a register of Competent Persons (HV) appointments including dates of appointment, the date the appointment is due to expire, details of training and training dates. This register shall be kept in the Operational Procedure Manual with copies of all current Competent Person's (HV) certificates;
- ensures that all records for the system for which the Authorised Person (HV) is appointed are completed and kept up-to-date.

Authorised Persons (HV) are to monitor the performance of all Competent Persons (HV) in carrying out their duties under this safety guidance.

Monitoring shall be carried out continuously and is to 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;

Authorised Persons (HV) are to take action to rectify and report in writing to the Senior Appointed Person (HV) on any deficiencies found. A copy of this report shall be placed in the Operational Procedure Manual.

4.5 Role and Duties of the Competent Person (HV)

Competent Persons (HV) shall comply with this safety guidance (HV) when carrying out work, whether instructions are issued orally or in writing.

Competent Persons (HV) shall 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 shall:

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

b]. Read the contents and confirm to the person issuing the safety document 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 Wave Hub Limited 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 shall be reported immediately by the Competent Person (HV) to an Authorised Person (HV), AP.

Competent Persons (HV) shall 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.

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 shall 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 shall do so only after all persons working under the safety document have been withdrawn from, and warned not to work on, the equipment concerned. Where appropriate, they shall ensure that all tools, gear and loose material have been removed, guards and access doors replaced and the workplace left tidy.

4.6 Role and Duties of the Accompanying Safety Person (HV)

The Accompanying Safety Person (HV) is a person, not directly involved in the work or test, who shall 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.

The Accompanying Safety Person (HV) shall have received training in emergency first-aid in accordance with this guidance.

The Authorised Person (HV), or the Competent Person, as appropriate, who will be responsible for the work or test to be attended is to 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.

The Accompanying Safety Person (HV) shall be in attendance when the Duty Authorised Person (HV), considers it necessary, and in the following circumstances:

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.

4.7 Appointment of a Senior Appointed Person (HV),

A Senior Appointed Person (HV) shall be appointed in writing by Wave Hub Limited. Model letters of appointment are given in Appendix 2.

A Senior Appointed Person (HV) shall be appointed or re-appointed for defined systems and installations for no longer than five years.

A person should be nominated, and appointed by the Wave Hub Limited Senior Appointed Person (HV) to provide absence cover or deputise for the Wave Hub Limited Senior Appointed Person (HV). Any person appointed, as far as is reasonably practicable, should meet the criteria set out in this guidance and be acceptable to Wave Hub Limited.

4.8 Appointment and re-appointment of an Authorised Person (HV), AP,

An Authorised Person (HV) shall be appointed (or re-appointed) by Wave Hub Limited or on the recommendation of the Senior Appointed Person (HV) for defined systems and installations, for periods not exceeding three years. Appointment and re-appointment shall be by the issue, and acceptance, of a letter of

appointment signed personally by the Senior Appointed Person (HV). Letters of appointment (or reappointment) and acceptance of the appointment shall be in the form illustrated in Appendix 2.

4.9 Review of an Authorised Person (HV), AP,'s appointment

Each Authorised Person (HV) appointment shall be reviewed by the Senior Appointed Person (HV) at intervals not exceeding three years and prior to re-appointment.

4.10 Refresher Training for an Authorised Person (HV), AP,

All Authorised Persons (HV) shall successfully complete an Authorised Persons (HV) refresher training course at intervals not exceeding three years.

All Authorised Persons (HV) shall successfully complete an emergency first-aid training course in accordance with this guidance at intervals not exceeding three years.

4.11 Suspension of an Authorised Person (HV)'s duties

The appointment of an Authorised Person (HV) may be suspended or cancelled by the Senior Appointed Person (HV), who shall take the following actions:

a]. 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;

b]. Arrange a meeting with the Authorised Person (HV), to discuss the suspension or cancellation and any action necessary to maintain the availability of an Authorised Person (HV);

c]. Retrieve the original certificate of appointment;

d]. In the case of cancellation, the Senior Appointed Person (HV), is to destroy the original certificate and overwrite all other copies with the word "cancelled" followed by the date and his signature.

The Senior Appointed Person (HV) shall take the necessary action to ensure alternative cover is provided.

4.12 Appointment of a Competent Person (HV)

Appointment of a Competent Person (HV) will be by the issue of a safety document.

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

a]. Be competent to undertake work on, and testing of, the types of system 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 guidance, any agreed local variations, and 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.

Alternatively a competent Person can be appointed on the recommendation of the Senior Appointed Person (HV) for defined systems and installations, for periods not exceeding three years. Appointment and re-appointment shall be by the issue, and acceptance, of a letter of appointment signed personally by the Senior Appointed Person (HV). Letters of appointment (or reappointment) and acceptance of the appointment shall be in the form illustrated in Appendix 2.

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

4.13 Appointment of a Competent Person (HV) via a certificate of appointment

A Competent Person (HV) shall be formally appointed in writing by an Authorised Person (HV), for duties which shall be clearly defined on the "certificate of appointment". Appointment will be by the issue and acceptance of the certificate, signed by an Authorised Person (HV).

Details of the recommended procedure, pro forma and certificates are given in Appendix 2.

A copy of the certificate shall be placed in the Operational Procedure Manual.

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

A copy of the appointment record and review details shall be placed in the Operational Procedure Manual.

4.14 Suspension of a Competent Person (HV)'s Duties

The appointment of a Competent Person (HV) may be suspended or cancelled by an Authorised Person (HV), or the Senior Appointed Person (HV) who shall take the following action:

a]. Retrieve from the Competent Person (HV) the certificate of appointment, substation key(s) for high voltage systems, and any other related items issued under the appointment procedure;

b]. Destroy the original certificate and overwrite all other copies of the certificate with the word "cancelled". This must be followed by the date of cancellation and the signature of the Authorised Person (HV), or Senior Appointed Person (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 re-appointment, 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.

Section 5 – Demarcation of Responsibility Between Wave Hub Limited and Others.

5.1. General.

Whenever there is a division of responsibilities between Wave Hub Limited and others, the Duty Authorised Person (HV), appointed by Wave Hub Limited shall issue instructions to other parties, as necessary, to prevent danger.

Where a Specialist Contractor has been appointed under contract or other arrangement by Wave Hub Limited, they shall be required to comply with:

a]. The requirements of this Electrical Safety Guidance;

b]. Any instructions issued by Wave Hub Limited's Authorised Person (HV), in accordance with their electrical safety guidance for high voltage systems.

c]. The Specialist Contractor's Operational Safety Rules and Procedures.

Where there is a demarcation of responsibilities between Wave Hub Limited and others, the Duty Authorised Person (HV), is, on matters relevant to Authorised Persons (HV) duties, to liaise with the other party (or parties) as necessary to avoid danger.

Each demarcation of responsibilities shall be recorded in writing and precisely described on a diagram. The point of demarcation must be at a cable termination and shall be at the outgoing terminals of a switch or circuit breaker.

Each proposed demarcation of responsibilities shall be approved by the Senior Appointed Person (HV), before it is finally agreed with the other party (or parties) involved.

A copy of the diagram shall be prominently displayed at the Substation Control Room and Switchroom under joint control.

One copy of the agreement, including the diagram, shall be sent to the Senior Appointed Person (HV), and another shall be placed in the Operational Procedure Manual.

Where another organisation transfers control of electrical danger to Wave Hub Limited for the duration of a contract, the Authorised Person (HV), appointed by Wave Hub Limited to be in control of the electrical danger is to request from the other organisation, details in writing of any known hazards that are, or may be, present. A copy of these details shall be placed in the Operational Procedure Manual and another copy shall be given to Wave Hub Limited 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 1974.

5.2. Where Wave Hub Limited has Control of the Danger for Part of Another Organisation's System or Installation

The Duty Authorised Person (HV) is to liaise with the other organisation's Duty Holder to agree the point of demarcation and the points of contact for both parties. Once the Senior Appointed Person (HV) has approved this, the formal agreement shall be drawn up and signed by both parties.

5.3. Where Wave Hub Limited Does Not Have Control of the Danger for a System or Installation

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

5.4. Where Contractors are to Undertake Installation or other Work on an Existing System or Installation for which Wave Hub Limited has Control of the Danger

Before any installation or other work is undertaken by Contractors on an existing system or installation for which Wave Hub Limited has control of the danger, it is recommended that the person responsible for that installation work is to liaise directly with the Wave Hub Limited Duty Authorised Person (HV) to ensure that the

work is undertaken in accordance with this guidance and that Contractors' method statements agree and are included in the safety programme.

5.5. For New Work before the System or Installation Is Accepted from the Contractor

During the construction period of the contract, the Contractor(s) will have control of the electrical danger and is to comply with all relevant statutory regulations. The Contractor(s) is not required to comply with this guidance unless they are imposed by the conditions of contract.

Where it is known that Wave Hub Limited will eventually accept control of the electrical danger, it is recommended that the Senior Appointed Person (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 Wave Hub Limited for day-to-day operation and maintenance.

The Authorised Person (HV) shall 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.

Where the Contractor's Duty Holder is responsible for part of a system or installation, the exact extent of the Contractor's responsibility shall be agreed in writing.

Note

Electrical test certificates and the appropriate handover certificates for the new installations shall be formally accepted from the Contractor by Wave Hub Limited before the installation is connected to a permanent supply for which Wave Hub Limited has responsibility.

5.6. Where a Distribution Network Operator (DNO) Appoints a Wave Hub Limited Authorised Person to Operate DNO Equipment

A Distribution Network Operator (DNO) may appoint nominated Authorised Persons (HV) to operate their equipment under defined conditions and in accordance with defined procedures. In such cases, the Authorised Persons (HV) shall be nominated by Wave Hub Limited and the Senior Appointed Person (HV) for appointment by the DNO.

Each nominated Authorised Person (HV) is to obtain from the DNO's appointing officer a written agreement defining the responsibilities to be accepted and the regulations and procedures to be followed.

Each nominated Authorised Person (HV) is to acknowledge, in writing, receipt of the agreement from the DNO, and acceptance of the responsibilities after consultation with the Senior Appointed Person (HV).

Copies of the agreement and acknowledgement shall be sent to the Senior Appointed Person (HV), and placed in the Operational Procedure Manual.

A copy of any relevant regulations of the DNO shall be available in each nominated Authorised Person's (HV) office and at any other location required by the DNO.

Any action taken by a nominated Authorised Person (HV), on behalf of the DNO is to comply with the DNO's instructions and shall be recorded in any documentation required by the DNO, as well as the Site Logbook.

Authorised Persons (HV) appointed by the DNO shall provide advance warning to the DNO and the Senior Appointed Person (HV), before relinquishing such an appointment.

6 – General Precautions.

6.1 Security and Admittance to Substations

All access doors and gates to the substation, switchroom and the enclosure containing high voltage electrical equipment must be kept securely locked when unattended.

Each Duty Authorised Person (HV) shall be issued with keys and, where considered appropriate, a certificated Competent Person (HV) may also be issued with keys.

The Wave Hub Limited Duty Managers shall be issued with keys, as a Competent Person, to be used in the event of an out of hours call out to the substation, or a call out to the substation in the absence of the Duty Authorised Person (HV), and are to follow the procedure described within Wave Hub Limited-OMS-EOP-001.

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 have receipt of a permit-to-work, sanction-for-test or limitation-of-access issued by an Authorised Person (HV).

6.2 Lock and Key System

Locks for the system fall into three categories as described below:

a]. Access locks –

b]. System locks -.

c]. Safety locks -

Access Locks.

Access locks shall be fitted to all gates and doors to the substation and enclosing compound, each lock shall have an individual key, or in the case of a combination padlock a unique number combination.

Keys and combination numbers to access locks shall be issued to the Wave Hub Limited Duty Authorised Person (HV), and the Wave Hub Limited Duty Managers.

Keys and combination numbers to access locks shall be issued to the Authorised Persons (HV), AP, and certificated Competent Persons to undertake work within the substation, following the issue of a permit-to-work, sanction-for-test or limitation-of-access issued by the Wave Hub Limited Duty Authorised Person (HV).

System Locks

System locks shall be padlocks that are “keyed alike”, i.e. each padlock is keyed the same - one key will open all padlocks, and all system locks shall have the same serial number that is unique from all other locks used on the system.

System locks are to be used for all non-operational parts of the system, such as switchgear gear cubicle doors etc.

The keys to the system locks are to be fitted with a key tag numbered uniquely for system locks so that all system locks have the same key tag number.

Safety Locks

Safety locks shall be padlocks that are “keyed differently”, i.e. each padlock is keyed the uniquely - one key will open one padlock only, and all safety locks shall have a different serial number that is unique from all other locks used on the system.

Safety locks are to be used on all operational parts of the system, i.e. disconnectors, earthing switches etc and at the substation Safety Key Boxes.

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 are applied.

Before a sanction-for-test is issued, safety locks must be applied at all points-of-isolation, and at all points where additional earths are applied.

The keys to the safety locks are to be fitted with a key tag numbered uniquely for each safety locks so that each safety lock has a different key tag number.

The following points apply:

a]. The Duty Authorised Person (HV), shall be issued with a personal key to enable them to gain access to the substation and also the key to the lock fitted to the Switchroom Safety Key Cabinets;

b]. A set of spare, duplicate, keys" shall be kept in a locked key cabinet within the Wave Hub Limited Office labelled "Electrical Distribution – Duplicate Keys".

c]. The Wave Hub Limited Senior Authorised Person (HV) and the Wave Hub Limited Designated Person shall have the key for the Wave Hub Limited office duplicate key cabinet.

d]. Should the spare keys be required, the person concerned shall enter their name on a log sheet to be kept in this key-box and give the reason for requiring the key;

e]. All other duplicate keys to operational locks associated with the high voltage system shall be kept in the Wave Hub Limited office duplicate key cabinet when not in use.

f]. The key cabinet shall 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.

6.3 Key Schedule.

A Schedule of Keys shall be kept in the Operational Procedure Manual and in the substation, adjacent to the single line diagram, and shall record the serial number of the lock and key an its function, together with its key tag number.

6.4 Switchroom Key Cabinet.

Except for any keys in use, the keys for the system and safety locks shall be kept in a closed and securely locked key cabinet installed within the switchroom.

The key cabinet shall be contain the keys to the locks associated with the switchgear, transformer, shunt reactors power factor correction equipment and other associated equipment.

The switchroom key cabinet key labelled "Authorised Persons Key Box" shall be held either:

a]. By the Duty Authorised Person (HV), while operating the system or during maintenance, or while permits or sanctions-for-test are being issued and cancelled; or

b]. The Senior Authorised Person.

The switchroom key cabinet is to be accessible only by use of the Authorised Persons Key Box key..

a]. Only the keys associated with only one permit-to-work or one sanction-for-test shall be removed from the key cabinet at any one time, in accordance with the permit-to-work or sanction-for-test.

b] Safety locks shall be applied in in accordance with the safety programme and the keys returned to key cabinet and the cabinet locked prior to the issue of a permit-to-work or sanction-for-test.

c]. After the safety locks have been applied and the keys to the safety locks have been placed in the key cabinet, and before a permit-to-work or sanction-for-test is issued, , the Duty Authorised Person (HV), shall lock the cabinet. The permit or sanction is then issued, the Duty Authorised Person (HV) is to retain the control key until the work is completed.

d]. When the work is completed and the permit-to-work or sanction-for-test is cancelled the Duty Authorised Person (HV) shall open the key cabinet to allow the re-instatement of the system to take place in accordance with the safety programme.

e]. Following re-instatement of the system the safety locks will be in their "normal" position and the keys shall be placed in the key cabinet which shall be locked using the lock operated by the Duty Authorised Persons Control Key.

6.5 Approved Contractor's Key Cabinet.

A key cabinet with a suitable for the fitting of dual locks shall be installed in the Switch Room. A duplicate of the Duty Authorised Persons Control Key shall be kept locked in this box for use by the Approved Contractor. No other keys shall be kept in this box.

This key cabinet shall be fitted with two locks. The Wave Hub Duty Manager shall be given a key for one of the locks, and the second lock shall be supplied and fitted by the Approved Contractor, who shall retain the key for their lock.

The Wave Hub Duty Manager shall only be permitted to release the lock in the event of the Duty Authorised Person being unavailable and an emergency call out has been made to the Approved Contractor.

No other person shall receive a key. The lock shall be changed whenever it is suspected that the key system has been compromised.

6.6 Lockable Document Cabinet

All documents specified in this guidance shall be kept in a lockable document cabinet situated in the Substation Control Room. The lockable document cabinet shall be kept locked when not in use, and the key kept with the Wave Hub Limited Duty Authorised Person Control Keys.

6.7 Mimic Diagram

Either a glass-covered, plastic laminated or an electronic mimic diagram shall be provided for the high voltage distribution system. A mimic diagram may also include, or be provided for, other electrical systems or installations.

The mimic diagram shall be permanently installed in the same room as the switchroom key cabinet.

No unauthorised adjustment of the diagram shall be allowed.

Note

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

The mimic diagram shall at all times reflect the current operational state of the system it represents, and any adjustments made shall be recorded in the Substation Logbook.

6.8 Operation of High Voltage Switchgear

The following points apply:

a]. High voltage switching shall be carried out by the Duty Authorised Person (HV), or by persons acting under his/her personal supervision, except when necessary to isolate in an emergency when a Competent Person (HV) will have 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. These circuit breakers will be fitted with locks preventing unauthorised reclosure. The Senior Authorised Person (HV) 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]. When switchgear shows any sign of defect or malfunction after operating, its conditions hall be reported immediately to the Senior Appointed Person (HV) and it shall be examined before further operation;

e]. No high voltage earthing switch shall be operated or circuit main earth connection attached or removed except by an Authorised Person (HV);

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

6.9 Action in an Emergency

First, the Duty Authorised Persons (HV) shall go to the mimic diagram. The first Authorised Person on site shall display the "work on high voltage system in progress" and the "Authorised Person on site" notices on the substation notice board.

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

6.10 High Voltage Enclosures

No person other than the Duty Authorised Person (HV), using a high voltage potential indicator designed for the purpose, shall 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.

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

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

A high voltage enclosure may only be entered by:

a]. The Duty Authorised Person (HV), accompanied by an Accompanying Safety Person (HV);

b]. An Authorised Person (HV), or a Competent Person (HV) acting on the verbal instructions of, and personally supervised by, the Duty Authorised Person (HV),

c]. An Authorised Person (HV), or a Competent Person (HV) in receipt of a sanction-for-test, accompanied by an Accompanying Safety Person (HV), when a high voltage enclosure is created as part of the test procedure;

d]. 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 enclosure is created as part of the test procedure.

6.11 Dangerous Occurrences

Any dangerous occurrence shall be reported to the Duty Authorised Person (HV), by Authorised Persons (HV), or Competent Persons (HV) as soon as reasonably practicable.

The Duty Authorised Person (HV), is, without delay or as soon as practicable, to send a preliminary report of the dangerous occurrence to the Senior Appointed Person (HV).

Any notifications and reports required to satisfy statutory or other Wave Hub Limited requirements shall be issued.

The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR) requires certain dangerous occurrences and accidents to be reported to the Health & Safety Executive.

The Senior Appointed Person (HV) is to investigate each dangerous occurrence and issue a report to the Designated Person. The report shall be sufficiently detailed to enable the sequence of events leading to the occurrence to be determined. Where reasonably practicable, the report is to include photographs taken before any items of equipment involved in the dangerous occurrence are disturbed.

To alleviate potential problems or criticism which may arise at any enquiry into a dangerous occurrence or incident, Wave Hub Limited shall consider:

a]. The questionable conflict of interests and impartiality of any investigation or subsequent report where it is carried out by those directly involved;

b]. The reliability of evidence involving self judgement.

6.12 Operational Restrictions

An operational restriction is a specific written instruction issued via the Senior Appointed Person (HV), modifying the normal operating procedures associated with a particular type of equipment.

Any known operational restriction imposed or advised by a DNO or appointed Wave Hub Limited Contractor must be notified without delay to the Senior Appointed Person (HV).

On receipt of an operational restriction, the Duty Authorised Person (HV), shall:

a]. Acknowledge the receipt to the Senior Appointed Person (HV), indicating whether the equipment is included in the local system(s) or installations;

b]. Record the receipt in the substation logbook and the action taken;

c]. Place a copy signed by each Authorised Person (HV), in the Operational Procedure Manual.

Where the equipment to which the operational restriction refers forms part of the local systems and installations, the Duty Authorised Person (HV), is to:

a]. Place a copy of the operational restriction, signed by each Authorised Person (HV), in the operating and maintenance manual;

b]. Arrange for any inspection and remedial work required;

c]. Where the mimic diagram depicts the equipment referred to in the restriction, mark each item on the mimic to indicate the existence of an operating restriction;

d]. Where considered necessary, fix warning signs on each item of equipment involved and report the satisfactory completion of any remedial works to the Senior Appointed Person (HV).

6.13 Circuit Main Earths

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

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

b]. Where (a) is not practicable, the high voltage electrical equipment shall be tested to ensure that it is dead and shall 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.

The precise location of each circuit main earth shall be recorded on the permit-to-work or sanction-for-test.

6.14 Earthing leads and Connections

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

They shall 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 his recommended supplier for specific use with his equipment”.)

Earthing leads and associated clamps must never be improvised. They shall be properly stored, maintained and recorded.

6.15 Procedure for the Use of Earthing Leads

The following procedure shall be observed when using earthing leads:

a]. Verify 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 shall be connected to the earth system before being secured to phase conductors. They shall be secured to the phases only by means of a pole or other approved equipment. Care must be taken to ensure that good contact is made;

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

d]. Earthing leads shall 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 shall be disconnected from phase conductors first and the earth system last;

6.16 Earthing Equipment

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

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

Portable earthing equipment shall be inspected by a Duty Authorised Person (HV), the every 12 months, and the inspection recorded.

6.17 Location of Underground Cables

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.

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

Training in the use of cable location and tracing devices shall normally be given by the manufacturers of the equipment, but alternatively it may be given by a Competent Person (HV) who has been trained and certified by the manufacturers or an approved training provider.

6.18 Fire Protection Equipment

Portable extinguishers

Only carbon dioxide (CO_2) or dry-powder extinguishers may be used near live electrical equipment, and a safety clearance of at least 300 mm shall be maintained. After the discharge of portable extinguishers in an enclosed space, personnel must withdraw from that space.

After any explosion or fire, or after the discharge of extinguishers in an enclosed space, the space must be thoroughly ventilated before entry of personnel, unless suitable breathing apparatus is worn.

6.19 Coolant and Arc-Extinguishing Media

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

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.

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

The requirements of the Control of Substances Hazardous to Health (COSHH) Regulations 2002 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

It shall be noted that, 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 approved Code of Practice on the COSHH Regulations shall be referred to for guidance.

6.20 Vessels Containing Oil or Flammable Liquids

The following points apply:

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

6.21 Protective Equipment

Appropriate protective equipment shall be provided by Wave Hub Limited or its Contractors. It shall be readily available at all times to those who need it and have training in its use. It shall be worn or used whenever necessary to avoid danger and injury, and as required by this guidance.

Only protective equipment suitable for the purpose shall be provided by Wave Hub Limited 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 shall be recorded on the permit-to-work or sanction-for-test.

Protective equipment shall be inspected by the user for visible defects before and after use. Any suspect item is not to be used; suspect items shall be reported to the Duty Authorised Person (HV), who is to consider its withdrawal and its replacement.

Unless more frequent intervals are specified, a Duty Authorised Person (HV), is to inspect each item of safety equipment provided by Wave Hub Limited at least once a year for defects and wear, and is to take remedial action where necessary. These inspections shall be recorded in the logbook.

6.22 Test Equipment

The Duty Authorised Person (HV) is to arrange for the necessary test equipment to be available when required. This will generally be provided and used by an appointed Contractor.

Test equipment shall be inspected by the user for visible defects on each occasion before and after use.

Unless more frequent intervals are specified, the Authorised Person (HV) is to inspect each item of test equipment provided at least once a year for defects and is to take remedial action where necessary. These inspections shall be recorded in the substation logbook, or in the case of Contractor's equipment, copies of the inspection records shall be placed in the Operation and Procedure Manual with the Sanction for Test applicable to the test being carried out.

Test equipment shall be maintained and, where appropriate, recalibrated in accordance with the manufacturer's instructions.

7 – Safety Precautions and Procedures for Work on High Voltage Equipment.

7.1 General

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

Equipment that is considered by an Authorised Person (HV), to be in a dangerous condition shall be isolated elsewhere and action taken to prevent it from being reconnected to the electricity supply.

All working on, or testing of, high voltage equipment connected to a system shall be authorised by a permit-to-work or a sanction-for-test following the procedures set out in Tables 1 and 2 at paragraph 7.12.

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, he/she shall be appointed before that work or testing can begin.

Voltage test indicators shall 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 shall be prevented, wherever practicable, by the application of safety locks.

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

7.2 Identification and Spiking of HV Cables

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.

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.

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

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),

7.3 Precaution Prior to Live Voltage and Phasing Checks

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

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

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 verbal instructions from the Duty Authorised Person (HV), a permit-to-work and sanction-for-test is required, and the Duty Authorised Person (HV) and any assistant shall be accompanied by an Accompanying Safety Person (HV).

7.4 Testing at High Voltage

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

The areas containing exposed live conductors, test equipment and any high voltage test connection shall be regarded as high voltage enclosures.

7.5 High Voltage Test Enclosures

Unauthorised access to a high voltage test enclosure shall 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) shall be present throughout the duration of the tests, and the area shall be continually watched while testing is in progress.

7.6 Work on Remotely and Automatically Controlled Electrical Equipment

Before work is carried out on remotely or automatically controlled equipment such as circuit breakers, isolators, tap-changing gear etc, all remote-control and automatic features shall first be rendered inoperative.

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).

7.7 Electrical Equipment which can be made Live from a DNO's Supply System

Except in an extreme emergency, any switching which may affect a DNO's network shall be carried out with the full knowledge and agreement of the DNO's distribution control engineer concerned. The switching operation shall be recorded by the Duty Authorised Person (HV).

Switching to the distribution control engineer's instructions, or with his/her 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 DNO's high voltage network, then switching, earthing, the depositing of safety keys in the key cabinets, and the issuing of any permit-to-work or sanction-for-test shall be the responsibility of an Authorised Person (HV) appointed by the distribution network operation.

7.8 Work on Multi-Panel Switchboards

When work is to be carried out on multi-panel switchboards, the following operations shall be carried out in strict sequence:

a]. The Authorised Person (HV), shall 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 multi-panel switchboard 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 shall be locked so that they cannot be operated. Caution signs shall be fixed to the isolating points;

d]. Where applicable, danger signs shall 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 section of the multi-panel switchboard on which work is to be carried out shall be checked by means of an approved voltage indicator to verify that it is dead, the indicator itself being tested immediately before and after use. The checking with the voltage indicator shall be done on the panel to which the circuit main earths are to be applied. This test shall also be made on the panel on which the work is carried out;

f]. Circuit main earths shall be applied at a panel on the isolated section of the switchgear 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 switchgear for this purpose is not an acceptable practice;

g]. An earth connection shall also be applied to all phases at the point-of-work;

h]. The permit-to-work shall be issued to cover the work to be done. During the course of the work, where applicable, 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;

j]. On completion of the work, the permit-to-work shall be cancelled.

7.9 Work on Feeder Circuit Breakers.

When work is to be carried out on feeder circuit breakers the following operations shall be carried out in strict sequence:

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

b]. The circuit breaker 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 shall be locked so they cannot be operated. Caution signs shall be fixed to all isolating points;

d]. Where applicable, danger signs shall 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 circuit breaker shall be checked by means of an approved voltage indicator to verify that it are dead, the indicator itself being tested before and after use;

f]. The circuit breaker shall 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 shall be used. The insertion of hands or any tools into the equipment for this purpose is not an acceptable practice;

g]. A permit-to-work shall 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;

j]. On completion of the work, the permit-to-work shall be cancelled.

7.10 Work on Distribution Transformers and Shunt Reactors

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

a]. The Authorised Person (HV) shall 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 shall be switched off, and a safety lock and caution sign fitted;

c]. The low voltage windings of the transformer switch or isolator shall be switched off, and a safety lock and caution sign fitted, or other physical means shall be used to prevent the switch being energised during the course of work;

d]. Where applicable, danger signs shall 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 shall be proved dead at the points-of-isolation if practicable;

f]. An earth shall 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 shall be fitted and safety 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)shall, 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 shall then be issued to the Competent Person (HV);

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

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.

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

Before a permit-to-work or a sanction-for-test is issued, the Duty Authorised Person (HV) shall 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) shall identify such items to the Competent Person (HV) and apply temporary marking to them.

Before issuing a permit-to-work or sanction-for-test, the Authorised Person (HV) shall 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) shall 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.

Authorised Persons (HV) undertaking tasks requiring permits-to-work or sanctions-for-test shall 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).

7.12 Summary

Tables 1–2 summarise the procedures to be carried out for work/tests undertaken on high voltage equipment.

Wave Hub

Procedures to be carried out by an Authorised Person (HV), to enable work on high voltage equipment.

Steps	Procedure
1 Prepare a safety programme	(i) Prepare a safety programme plus an isolation and earthing diagram in duplicate, and obtain countersignatures from another Authorised Person (HV) (ii) Before any work can begin, advise any WEC Developers connected to the system of the nature of the work. (iii) Sign on as the Duty Authorised Person (HV) and place notices at the mimic diagram.
2 Isolate and fix signs	(i) Isolate from all sources of supply. (ii) Prevent unauthorised connection by fixing safety locks and caution signs at points-of isolation. (iii) 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..
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.
5 Issue the permit-to-work	(i) The Competent Person (HV) is to be shown the safety arrangements at all the point/s of isolation and at the locations of the work, and is to initial the isolation and earthing diagram. (ii) Mark the point-of-work. (iii) Issue the permit-to-work, isolation and earthing diagram, and lock the substation key cabinet. (iv) Adjust mimic diagram and complete the Site Logbook.
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, is to return the original of the permit-to-work, the isolation and earthing diagram to the Duty Authorised Person (HV), and complete part 3 of the permit retained in the pad. and then release the lock to the switchroom key cabinet.
7 Check the equipment	If the work has been completed, check to ensure it is safe to energise. If the work has been stopped, check the equipment has been made safe.
8 Cancel the permit-to-work	(i) Cancel the permit-to-work by signing part 4 and by destroying the permit in the presence of the Competent Person (HV). (ii) File the isolation and earthing diagram in the Operational Procedure Manual. (iii) Release the lock to the switchroom key cabinet..
9 Restore to operational state	(i) If the equipment requires testing, follow the procedure in Table 2. (ii) Remove safety locks and earths applied in step 4. (iii) Remove safety locks and signs applied in step 2. (iv) Restore equipment to an operational state re-applying the safety locks as required and lock the switchroom key cabinet. (v) Adjust mimic and complete Site Logbook

Wave Hub

Procedures to be carried out by an Authorised Person (HV), to enable testing on high voltage equipment.

Steps	Procedure
1 Prepare a safety programme	(i) Prepare a safety programme plus an isolation and earthing diagram in duplicate, and obtain countersignatures from another Authorised Person (HV), AP. (ii) Before any test can begin, advise any WEC Developers connected to the system of the nature of the work. (iii) Sign on as the Duty Authorised Person (HV) and place notices in mimic.
2 Isolate and fix signs	(i) Isolate from all sources of supply. (ii) Prevent unauthorised connection by fixing safety locks and caution signs at points-of isolation. (iii) Fix danger signs on live equipment adjacent to the point of the test. (iv) If a high voltage 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 the transformer..
4 Earth	(i) Earth conductors at all points-of-isolation. (ii) Fix safety locks to earths to enable their removal when required. (iii) Identify with certainty or spike underground cables at the point of test and at the distant end.
5 Issue the sanction-for-test	(i) The Competent Person (HV) is to be shown the safety arrangements at all the point/s of isolation and at the locations of the test, and is to initial the isolation and earthing diagram. (ii) Issue the sanction-for-test, isolation and earthing diagram, and the key to the safety key cabinet to the Competent Person (HV). (iii) Retain safety lock keys, and remove and replace earths as requested.
6 Undertake the test	The Competent Person (HV) is to undertake or directly supervise the test. On satisfactory completion of the test, or when the test is stopped and made safe, the conductors shall be discharged and any earths restored. The Competent Person (HV) shall return the original of the sanction-for-test and the key to the safety key box to the Duty Authorised Person (HV) , and complete part 3 of the sanction retained in the pad.
7 Check the equipment	If the test has been completed, check to ensure it is safe to energise. If the test has been stopped, check the equipment has been made safe.
8 Cancel the sanction-for-test	(i) Cancel the sanction-for-test by signing part 4 and by destroying the sanction in the presence of the Competent Person (HV). (ii) File the isolation and earthing diagram in the Operational Procedure Manual. (iii) Return the keys to key safe.
9 Restore to operational state	(i) Remove safety locks and earths applied in step 4. (ii) Remove safety locks and signs applied in step 2. (iii) Restore equipment to an operational state and lock the switchroom key cabinet. (iv) Adjust mimic and complete Site Logbook

8 – Operating Records.

8.1 General

Operating records are to be kept by the Duty Authorised Persons (HV) as listed in the following sections. These records are to be accurate and kept up-to-date.

8.2 Siubstation Logbook

A bound hard-covered book (not loose-leaf) and titled “Substation Logbook” shall be prepared for the Wave Hub Limited HV System.

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

The logbook will be retained by, and all entries will be made by, the Duty Authorised Person (HV).

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

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

b]. The weekly and monthly Authorised Person (HV), substation inspections;

c]. The acceptance and relinquishing of responsibility between Authorised Persons (HV);

d]. The removal, return and the transfer of the Duty Authorised Person (HV), AP,’s control keys from the Senior Authorised Person (HV)’s key cabinet.

e]. Each individual operation of high voltage switchgear and the reason;

f]. A summary of the operation of an automatic switching sequence;

g]. Adjustment of the mimic diagram to indicate the present state of the system or installation;

h]. The issue and return of any key for high voltage equipment, that is, switchgear, substations, transformers etc;

j]. The issue, cancellation, loss or withdrawal of a permit-to-work, sanction-for-test, or limitation-of-access;

k]. The receipt, termination and remedial action associated with an operational restriction;

l]. The withdrawal or replacement of the Duty Authorised Person (HV)’s duplicate key and of any other duplicate keys.

m]. The annual inspection of protective equipment, test equipment and the six-monthly inspection of portable earthing equipment.

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

8.3 Operational Procedure Manual

For the Wave Hub Limited Systems for which Authorised Persons (HV) have been appointed, a ring-binder file entitled “Operational Procedure Manual” is to be prepared.

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

The manual is to contain, in separate sections, a copy of each of the following:

a]. Copies of the Offer and Acceptance Forms of the Wave Hub Limited personnel associated with the HV system, together with the relevant training certificates

b]. Copies of any Electrical Operating Procedures, EOPs issued as part of the Wave Hub Limited Operational management System, OMS that are relevant to the HV System.

c]. Blank copies of any Forms issued as part of the Wave Hub Limited Operational management System, OMS that are relevant to the HV System.

d]. Copies of all schematic diagrams of the HV System.

e]. 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;

f]. Operational restriction received;

g]. Inspection report and details of any remedial work undertaken in connection with an operational restriction;

h]. Cancelled operational restriction;

j] Demarcation agreement with other organisations;

k]. Demarcation agreement with Contractors;

l]. Any operational agreements with a DNO;

m]. The original copy of every approved and completed safety programme, including any completed and subsequently not used;

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;

p]. A copy of audits carried out in accordance with this guidance.

Each document added to a section of the manual is to be filed in date order.

Documents in the manual are to be retained for a period of three years after the date of their cancellation or termination.

The Operational Procedure Manual is also to contain a reference copy of the current edition of the Electrical Safety Guidance HV.

8.4 Operating and Maintenance Manuals

For the Wave Hub Limited Systems for which Authorised Persons (HV) have been appointed, one or more files entitled "Operating and maintenance manual" is to be prepared.

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

The ring-binder is to contain:

a]. Manufacturers' maintenance and operating instructions for each type of high voltage distribution switchgear installed in the system or installation, with test certificates and relevant records;

b]. A copy of any current operational restriction applicable to any equipment installed in the system or installation;

c]. A copy of the current "as-installed" drawings of the system(s).

8.5 Maintenance Records

Maintenance records are of value in establishing the frequency of maintenance. Therefore, careful note shall be taken of relevant items each time maintenance is performed.

Maintenance records shall be initiated when the equipment is installed and shall contain at least the following information:

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

b]. Location of the manufacturer's manual and list of recommended spares;

c]. Date of last maintenance operation and note of the operation counter reading at that time, or an estimate of the number of operations;

d]. Type of maintenance carried out;

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

f]. Details of relay settings;

g]. Details of the maximum system fault levels and any changes to them;

h]. Any special safety requirements.

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

8.6 Isolation and Earthing Diagram

Before any permit-to-work or sanction-for-test is issued, an isolation and earthing diagram shall be prepared. This shall illustrate the safety arrangements that have been implemented at the points-of-isolation and the place of work to make the equipment safe for the execution of the work or test.

An isolation and earthing diagram will have an original and a duplicate of each page. Each page of a diagram will bear a unique serial number referenced to the proposed work to be carried out.

An isolation and earthing diagramshall show:

a]. The name, signature and location of the originating Authorised Person (HV);

b]. The name, signature and location of the countersigning Authorised Person (HV);

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;

j]. The points-of-work or test;

k]. Any safety locks and signs fitted.

8.7 Implementing the Isolation and Earthing Diagram

Before commencing the sequence of operations detailed on the countersigned isolation and earthing diagram, the duplicate is to be placed in the Operational Procedure Manual.

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

The Duty Authorised Person (HV), is to 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) will sign the document to indicate an understanding of the safety arrangements in place.

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

8.8 Completion of the Work or Test

On completion, the original isolation and earthing diagram will replace the duplicate in the Operational Procedure Manual.

All original copies of completed isolation and earthing diagrams are to be retained in the Operational Procedure Manual for three years following the date of implementation.

If the Competent Person (HV) has lost the original of the isolation and earthing diagram, the loss is to be recorded in the Site Logbook by the Duty Authorised Person (HV) the Competent Person (HV) is to countersign the duplicate to confirm the loss of the original.

8.9 Safety Programmes

General

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, is to be prepared.

A safety programme will have an original and a duplicate of each page, and each page of a programme will bear a unique number referenced to the proposed work to be carried out.

Contents of Safety Programmes

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

a]. The name, signature and location of the originating Authorised Person (HV);

b]. The name, signature and location of the countersigning Authorised Person (HV), if required;

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 sequence of operations to be undertaken up to and including the issue of a permit-to-work or sanction-for-test;

g]. The location, including any name and identification code, at which each operation is to be performed;

h]. The identity of each item of switchgear to be operated (this shall be what is stated on the local label on the equipment 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]. Confirmation, where applicable, that prior notification has been given to persons and/or WEC Developers who will be affected by the proposed operations and that contingency plans, where required, can be implemented in an emergency.

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

Implementing Safety Programmes

Before commencing the sequence of operations detailed on the countersigned safety programme, the Duty Authorised Person (HV), is to confirm that the person(s) responsible for the day-to-day operation 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.

Before commencing the sequence of operations detailed on the countersigned safety programme, the duplicate is to be placed in the Operational Procedure Manual.

The Duty Authorised Person (HV) is to refer to the original of the safety programme while carrying out the sequence of operations detailed on the programme.

The Duty Authorised Person (HV) is to note on the original copy of the safety programme the date and time of each switching operation for subsequent entry into the logbook.

The serial number of the isolation and earthing diagram and permit or sanction shall be entered on the safety programme as a cross-reference.

Completion of Safety Programmes

On completion of the sequence of operations detailed on the safety programme, a summary is to be entered in the substation logbook. This summary shall include the safety programme serial number, start and finish times, and reason.

On completion, the duplicate safety programme shall be removed and replaced by the original copy of the safety programme. This is to be retained in the Operational Procedure Manual.

All original copies of completed safety programmes are to be retained in the Operational Procedure Manual for three years following the date of implementation.

8.10 Permits-To-Work

General

A permit-to-work will have an original and a duplicate page for part 1 and a single page for parts 2, 3 and 4, and will bear a unique serial number referenced to the proposed work to be carried out.

Issue and acceptance of Permits-to-Work

A permit-to-work is not to be issued for any item of equipment for which an existing 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 indicated that it is safe to do so.

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

Duty Authorised Persons (HV) undertaking tasks requiring a permit-to-work are to issue a permit to themselves. The document shall be countersigned by another site-certified Authorised Person (HV), AP. The Authorised Person (HV) then becomes the Competent Person (HV).

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

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

a]. Physically identify, by marking, to the Competent Person (HV) the equipment to be worked on;

b]. Show the Competent Person (HV) the isolation and earthing diagram which illustrates the safety arrangements at the points-of-isolation and at the point-of-work. Then the Competent Person (HV) will sign to confirm his/her understanding;

c]. Explain in detail to the Competent Person (HV) 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.

Alternatively, the Duty Authorised Person (HV) is to 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.

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, is to 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 before allowing the Competent Person (HV) to assume control of the work.

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 – is to sign to accept any special instructions or safety measures noted in part 1 of the permit and is to complete and sign part 2. The signature on part 2 renders the original of part 1 of the permit valid for the defined work, which is then issued to the Competent Person (HV).

The Authorised Person (HV) retains the duplicate of part 1 with parts 2, 3 and 4 in the being retained by the Duty Authorised Person (HV).

After accepting the permit-to-work, the Competent Person (HV) becomes responsible for personally supervising or undertaking the defined work.

The Competent Person (HV) is not to leave the location of the work or to undertake other work or tests while

During any temporary absence of the Competent Person (HV) from the location of the work, the work is to 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

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) is to complete and sign part 3 of the permit, and return the original of part 1 to the Authorised Person (HV).

Where the work has been stopped, 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.

The Duty Authorised Person (HV) is to check that the work has been satisfactorily completed and that the equipment is safe.

The Duty Authorised Person (HV) is then to cancel the permit by destroying the original part 1 and completing and signing part 4 of the permit.

The isolation and earthing diagram shall be retained for filing. The duplicate page of parts 1 and the completed page of parts 2, 3 and 4 are to be retained.

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

The Competent Person (HV) is to countersign part 4 to confirm the loss of the original. The loss of a permit is to be reported to the Senior Appointed Person (HV).

Completed permit forms are to be retained in the lockable document cabinet for three years after the date of cancellation of the last permit issued.

8.11 Sanctions-for-Test

General

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

A sanction-for-test will have an original and a duplicate page for part 1 and a single page for parts 2, 3 and 4, and each page will bear a unique serial number referenced to the proposed work to be carried out.

A sanction-for-test is not to be issued for any item of equipment 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.

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

Duty Authorised Persons (HV) undertaking tasks requiring a sanction-for-test are to issue a sanction to themselves. The document shall be countersigned by another site-certified Authorised Person (HV), AP. The Authorised Person (HV) then becomes the Competent Person (HV).

Issue and acceptance of sanctions-for-test

Sanctions-for-test are to be issued at the location of the work to be undertaken. The issue and cancellation of every sanction is to be recorded in the logbook.

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

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 isolation and earthing diagram which illustrates the safety arrangements at the points-of-isolation and at the point-of-work. Then the Competent Person (HV) will sign to confirm his/her understanding;

c]. Explain in detail to the Competent Person (HV) 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;

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

Exceptionally, for high voltage equipment where it is not practical to confirm the equipment dead before issuing a sanction-for-test, the Duty Authorised Person (HV), having issued the sanction, is to 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.

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 – is to sign to accept any special instructions or safety measures noted in part 1 of the sanction and is to complete and sign part 2. The signature on part 2 renders the original of part 1 of the sanction valid for the defined test, which is then issued to the Competent Person (HV).

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

After accepting the sanction-for-test, the Competent Person (HV) becomes responsible for personally supervising or undertaking the defined test.

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

During any temporary absence of the Competent Person (HV) from the location of the test, the test is to 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

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) is to complete and sign part 3 of the sanction, and return the original of part 1 to the Authorised Person (HV).

Where the test has been stopped, 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.

The Duty Authorised Person (HV) is to check that the test has been satisfactorily completed and that the equipment is safe.

The Duty Authorised Person (HV) is then to cancel the sanction-for-test by destroying the original part 1 and completing and signing part 4 of the sanction.

The isolation and earthing diagram shall be retained for filing. The duplicate page of part 1 and the completed page of parts 2, 3 and 4 are to be retained.

If the Competent Person (HV) has lost the original of part 1 of the sanction, the loss is to be recorded by the Duty Authorised Person (HV), in part 4 of the sanction, and in the logbook.

The Competent Person (HV) is to countersign part 4 to confirm the loss of the original. The loss of a sanction-for-test is to be reported to the Senior Appointed Person (HV).

Completed sanction-for-test forms are to be retained in the lockable document cabinet for three years after the date of cancellation of the last sanction-for-test issued.

8.12 Limitation-of-Access

General

In an area or location that is normally under the control of the Duty 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.

A limitation-of-access will 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 will bear a unique serial number referenced to the proposed work to be carried out.

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.

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

Danger signs are to 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.

During the period the limitation-of-access remains valid, the Duty Authorised Person (HV), is to 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.

Issue and Acceptance of Limitations-of-Access

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.

On accepting the limitation-of-access, that person becomes the Competent Person (HV) and is responsible for undertaking or supervising the work for which the access is required.

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

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

Before offering a limitation-of-access to the prospective Competent Person (HV), the Authorised Person (HV) is to:

a]. Accompany the prospective Competent Person (HV) to the location where the work is to be undertaken;

b]. Confirm with the prospective Competent Person (HV) in detail the exact extent of the work activities to be undertaken, including the scope and limits;

c]. Show the prospective Competent Person (HV) the area in which the work is to be undertaken;

d]. Indicate to the prospective Competent Person (HV) all items of live electrical equipment in or adjacent to the working area that are to be identified by danger signs;

e]. Draw to the attention of the prospective Competent Person (HV) 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).

Before accepting a limitation-of-access, the prospective Competent Person (HV) – having understood the scope, extent and limits of the work to be undertaken, and being prepared to undertake it – is to sign to accept any special instructions or safety measures noted in part 1 and is to complete and sign part 2. The signature on part 2 renders the original of part 1 of the limitation-of-access valid for the defined work and is issued to the person. The Duty Authorised Person (HV) retains the duplicate pages of part 1 with parts 2, 3 and 4 of the limitation-of-access.

The acceptance of the limitation-of-access makes the person responsible for personally undertaking or supervising the defined work. The Competent Person (HV) is not to leave the location of the work or to undertake any other activities while the work is in progress. During any temporary absence of the Competent Person (HV) from the location of the work, the work is to be suspended and adequate safety precautions taken until the work is resumed on the return of the Competent Person (HV).

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

Cancellation of a Limitation-of-Access

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

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

The Duty Authorised Person (HV), is then to cancel the limitation-of-access by destroying the original of part 1 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 are to be retained.

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

If the Competent Person (HV) has lost the original of part 1 of the limitation-of-access, the loss is to be recorded by the Authorised Person (HV), in part 4 of the limitation-of-access and in the logbook.

The Competent Person (HV) is to countersign part 4 to confirm the loss of the original. The loss of a limitation-of-access is to be reported to the Senior Appointed Person (HV).

Completed limitation-of-access forms are to be retained in the lockable document cabinet for three years after the date of cancellation of the last limitation-of-access issued.

Wave Hub

Section 9 - Display of Permanent Posters and Safety Signs

9.1 Display of Posters

In a 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]. The location of the substation copy of Electrical Safety Guidance for HV Systems;

c]. A single line drawing of the high voltage system up to and including final circuit distribution boards under the control of the Authorised Person (HV);

Where Wave Hub Limited has control of the danger, the Authorised Person (HV) is to carry out an assessment to determine the requirement and location for the display of information in connection with this guidance. Information shall be displayed permanently in suitable and prominent positions. The areas to be considered for the display of information in connection with these rules shall include the HV switchroom and the Substation Control Room.

Other information and posters to be displayed may include:

- the Electricity at Work Regulations 1989;
- a poster showing an approved method of
- treatment for electric shock;
- other relevant health and safety information.

9.2 Design Specification

All sign shall be to the sizes indicated in Appendix 5.

The safety signs shown in Figures 1 and 2 shall be designed to the proportions given in the Electricity Safety, Quality and Continuity Regulations 2002.

Figure 1 Safety Sign (a)

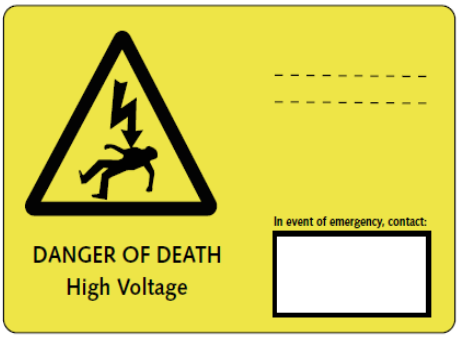


Figure 2 Safety Sign (b)

The design and colours of the signs shall be to BS 5499-5:2002. Colours shall be to BS 5252:1976 as follows:

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

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

Non-corrosive materials are to be used when fixing permanent safety signs. Permanent signs shall not be fixed with adhesives.

All temporary signs shall be provided with two 5 mm diameter holes for a suspension cord. The holes shall 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.

Temporary safety signs shall be suspended from non-conducting cords, and fixed and removed only by an Authorised Person.

Permanent safety signs are to be securely and permanently fixed in accordance with the clauses in this section.

9.3 Display of Permanent Safety Signs

A warning sign and a notice identifying the installation shall be displayed in a prominent position, at every angle of approach, outside the substation to comply with table 11C of the Electricity Safety, Quality and Continuity Regulations 2002, which requires duty-holders to erect three types of notice at substations:

(i) one or more “danger of death” safety signs complying with Schedule 1 of the Regulations;

(ii) a property notice giving the unique identification number or location of the substation and an emergency telephone number. Each property notice must carry the name of the substation’s current owner or operator.

(iii) where necessary, other signs commensurate with the risk of interference, for example “keep out” signs.

The quantity, size and position of signs shall be appropriate to the risk of danger from interference at each location.

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

9.4 Display of Temporary Safety Signs

Caution signs (see Figure 3) are to 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.

Danger signs (see Figure 4) are to 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.

Danger signs are to 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.

Where work or testing is to be undertaken on any part of a multi-cubicle switchboard, danger signs shall be prominently displayed on the cubicles or compartments adjacent to the part being worked on or tested. If the board has rear access, danger signs shall be similarly displayed at both the front and rear of the board. Reliance is not to be placed on the switchboard labelling when identifying parts at the rear of the board. Any discrepancies found are to be reported.

Danger signs are to 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.

Figure 3 Caution Sign (actual size: 200 x 100 x 1.5 mm White Plastic)

Figure 4 Danger Sign (actual size: 200 x 100 x 1.5 mm White Plastic)

Section - 10 Protective, Test and Earthing Equipment.

10.1 General

This guidance recommends that protective equipment be readily available at all times and is to be worn or used whenever necessary to avoid danger.

This protective equipment shall be provided by Contractors as required, and is to comply with and be used in accordance with the guidance given below;

Reliance shall not be placed on any single item of protective equipment.

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 the following items:

a]. insulated hand-tools;

b]. insulated rubber boots;

c]. insulated rubber gloves;

d]. insulating rubber mats;

e]. face shields (visors);

f]. insulating materials for temporary screening;

g]. safety-belts and harnesses;

h]. cable-spiking equipment;

j]. cable-tracing equipment.

The user of any item of protective equipment is to be responsible for carrying out a visual inspection before and after use. If an item is found to be defective or unsafe it is to be reported to the Authorised Person (HV), as soon as possible.

All protective, test and earthing equipment must be stored, inspected, tested and, where appropriate, recalibrated in accordance with manufacturers' recommendations.

All protective, test and earthing equipment is to be inspected by an Authorised Person at intervals recommended by the manufacturer but not exceeding 12 months and the results entered into the logbook. Any item of protective equipment found to be defective is to be destroyed and replaced.

10.2 Protective equipment

Competent Persons and Authorised Persons shall use appropriate protective equipment when the circumstances require it. Items of protective equipment held or used within a site shall comply with any relevant British Standards and shall be so kite-marked. British Standards are not available for some of the items of protective equipment recommended. Protective equipment covered by a British Standard

The following items of equipment are covered by the British Standards indicated:

- insulated screwdrivers – BS 2559-3:1973;
- insulated pliers – BS 3087-1:1991;
- rubber gloves for electrical purposes –
- BS 697:1986 and BS EN 60903:2003;
- rubber mats for electrical purposes –
- BS 921:1976;
- face shields and visors – BS EN 166:2002,
- BS EN 167:2002 and BS EN 168:2002;
- safety-belts and harnesses – BS EN 354:2002;
- BS EN 355:2002; BS EN 361:2002; BS EN 362:2004; BS EN 363:2002; BS EN 364:1993 and BS EN 365:2004.

Face shields and visors shall provide protection against electrical flash, impact and molten metal particles.

They shall 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.

Many different types of safety-belt and harness are available, each intended for a particular purpose. Safety-belts and harnesses manufactured to the relevant British Standard, and of the correct type, shall be available to persons working in insecure locations, for example within cable pits.

Protective Equipment not Covered by a British Standard

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.

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 shall be suitable for the purpose. The material is to be cut and fixed, as necessary, to suit the particular task.

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.

10.3 Voltage test indicators

Authorised Persons and Competent Persons must prove equipment is dead by using a voltage test indicator.

As there is no British Standard for a voltage test indicator in non-hazardous areas, it shall comply with the recommendations of the Health and Safety Executive's 'GS38: electrical test equipment for use by electricians'. Test indicators for use on 230/415 V systems shall be suitable for use up to 500 V and shall indicate a live supply down to 50 V.

In non-hazardous areas, test indicators shall be proved before and after use from a known supply.

10.4 High Voltage Test Equipment

High voltage potential indicators and proving units shall comply with the Electricity Association's Engineering Recommendation 'G9/6 – Voltage testing devices'. Extension rods, end adaptors, and other fittings shall be available to suit the equipment on which work is to be undertaken.

10.5 Cable-Locating Devices

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.

Cable-locating devices shall, as a minimum, be rugged and weatherproof to National Electrical Manufacturers Association standard NEMA 3S (see 'Definitions' in Chapter 2), comply with the Electromagnetic Compatibility Regulations 2005, and be produced by BS EN ISO 9001:2000-accredited manufacturers.

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 shall be selected.

No person shall 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 that the training has been successfully completed.

Normally, the manufacturers of the equipment shall give training, but alternatively a person who has been trained and certified by the manufacturers may give it.

10.6 Earthing Equipment

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.

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.

10.7 Substation Earthing

All earthing conductors and connections shall be inspected and tested 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.

10.8 Recommendations for the Inspection, Test and Recalibration of Protective and Test Equipment

Insulated hand tools shall be supplied with a certificate stating that the tools have been electrically tested.

Rubber gloves shall 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 shall be provided solely for storing the gloves.

Before use, each glove shall be examined inside and out by the user. Each finger of each glove is to be stretched by hand to ascertain that its mechanical strength is adequate. If either of the gloves is damaged or defective, the pair is to be destroyed and replaced.

After each use, the gloves are to be inspected by the Authorised Person for surface defects or materials embedded in the surface. If any glove appears defective, the pair is to be destroyed and replaced.

Gloves that are used frequently are to be tested at intervals not exceeding six months. Gloves that are used infrequently are to be retested after each use, or at intervals not exceeding 12 months, whichever is the more frequent.

Gloves are to be retested by the manufacturer or locally on equipment described in, and in accordance with, the procedures set out in BS 697:1986.

Face shields are to be examined by the user before and after use.

Belts and harnesses are to 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 is also to be kept free from contact with sharp implements, corrosive substances and other possible causes of damage.

Where necessary, test equipment is to be inspected and recalibrated at the intervals recommended by the manufacturer.

The schedule shall 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 shall be determined by consulting the manufacturer's handbook and by past experience.

10.9 Fire Extinguisher Installation and Equipment

Extinguishers shall be visually inspected monthly for damage and shall be serviced to BS5306-3:2009 once a year. Water, foam and powder extinguishers shall be discharged and refilled every five years

After an extinguisher has been used, even if only partially, it shall be recharged according to the manufacturer's instructions.

Annual maintenance shall be carried out by a company registered by the British Approvals for Fire Equipment (BAFE).

Appendix 1 – Safety Documentation (Model Forms)

Appendix 1.1 Isolation and earthing diagram.

See following Wave Hub Limited Form, Wave Hub Limited-OMS-FORM-E014.

Wave Hub

Isolation and Earthing Diagram.

Number	**FORM-E014**
Location	**Wave Hub Hayle Towans Substation**

Switching Schedule Number		**Date**	
Permit-to-Work / Sanction-for-Test Number		**Date**	
Issue			
Issued by	Authorised Person		
Countersigned by	Authorised Person		

Purpose of proposed work / test .
Describe the work / test to be undertaken

Equipment which the proposed sequence of operations will make safe to work on /test.
Detail the equipment

Drawing Reference	
The following diagram illustrates the safety arrangements that have been implemented at the points-of-isolation and the place of work to make the equipment safe for the execution of the work or test, in accordance with section 8.7 of ESG-002 – Electrical Safety Guidance (HV).	
Diagram Number	

The diagram referred to above shall be attached to this document.

The Duty Authorised Person (HV), has shown the isolation and earthing diagram referred to above to the Competent Person (HV), signed below indicating the safety arrangements at the points-of-isolation and earthing at the point(s) of the work or test	
Competent Person	

This isolation and earthing diagram is to be attached to the permit-to-work or sanction-for-test before being issued.

Appendix 1.2 Switching schedule.

See following Wave Hub Limited Form, Wave Hub Limited-OMS-FORM-E015.

Wave Hub

HV Switching Schedule.

Number	**FORM-E015**
Location	**Wave Hub Hayle Towans Substation**

Switching Schedule Number		**Planned Date**	
Sheet Number		**Total Number of Sheets**	
Issue			
Issued by			Duty Authorised Person
Countersigned by			Authorised Person

Purpose of proposed work / test .
Describe the work / test to be undertaken

Equipment which the proposed sequence of operations will make safe to work on /test.
Detail the equipment

Item No	**Control Engineer**	**Switched By**	**Plant Location**	**Operation**	**Key Number**	**Time of Operation**			**Comment**
						Instruct	Action	Confirm	

Document Title	Date	Revision No	Issued by	Approved by
Wave Hub Limited-OMS-ESG-002	06/11/2015	4	Rob McConnell	Claire Gibson

Appendix 1.3 Permit-to-work.

See following Wave Hub Limited Form, Wave Hub Limited-OMS-FORM-E007.

Wave Hub

Permit to Work – HV Systems.

[Complete precisely and legibly in BLOCK CAPITALS]

Wave Hub – Hayle Towans Substation	**Serial No**	**EHV-PTW / XXX**

Front Page – A copy of this page is to be made by the Duty Authorised Person [HV] issuing this Permit to Work, and shall be kept with the substation Logbook until such time as the work described is complete. The original shall be retained by the person issued with the Permit to Work, until the work described is Complete and the Permit to Work is Cancelled.

Part 1: Issue	
Issued to	
Employed By	
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 and should be treated as live.

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	

Signed	Time:	Date:

Wave Hub

Back Page

Part 2: Receipt	
I accept responsibility for carrying out the work on the electrical equipment as detailed on the 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 the arrangements on the isolation and earthing diagram.	
Signed	Print Name
Time	Date

Working Party Briefing Log

- I have received and understood a briefing by the recipient of this Safety Document [named above].
- I with adhere to any conditions, instructions or limits relating to the work.
- On leaving the working party I understand that I cannot re-join until I have received and logged another briefing on this schedule.

Name	**Signed**	**Joining Working Party**		**Leaving Working Party**	
		Date	**Time**	**Date**	**Time**

If further members of the working party are to be added, a continuation sheet is to be used and attached to this document as required.

Wave Hub – Hayle Towans Substation	Serial No EHV-PTW / XXX
Part 3: Clearance	
The work for which this Permit to Work was issued is now completed / suspended and all persons under my charge have been withdrawn and warned that it is no longer safe to carry out any further 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

Part 4: Cancellation	
This Permit to Work is cancelled. The original has been returned to me.	
Signed	Print Name
Time	Date

When the work described on this Permit to Work is Complete and the Permit Cancelled, the Original Permit to Work shall be handed back to the Duty Authorised Person [HV], who shall file both the original and the copy of the front page of the Permit to Work in the Electrical Operational Procedure Manual.

Appendix 1.4 Limitation-of-access.

See following Wave Hub Limited Form, Wave Hub Limited-OMS-FORM-E008.

HV Limitation of Access.

[Complete precisely and legibly in BLOCK CAPITALS]

Wave Hub – Hayle Towans Substation	**Serial No**	**WH-LOA / XXX**

Front Copy – Original.

This form must not be used for work on electrical equipment for which an HV Electrical Permit to Work or HV Sanction for Test is required.

On completion of the work, the holder must surrender the Limitation of Access as directed for cancellation, after which no work shall be done.

Part 1: Issue	
Issued to	
Employed By	
Being a Competent Person permission is given to carry out the work described below:	

Location	
Work	

No other work shall be carried out

Risk Assessment Reference	
Method statement Reference	
Reference Manual	

Safety Precautions Applicable	
A]. Plant and Apparatus	
B]. Environment	
C]. Access / General	

Remarks	

Signed	Time:	Date:

Wave Hub

Back Copy

Part 2: Receipt	
I accept responsibility for carrying out the work in accordance with this Limitation of Access and no other work will be done by me or persons under my charge at the location referred to in Part 1 of this document	
Signed	Print Name
Time	Date

Working Party Briefing Log

- I have received and understood a briefing by the recipient of this Safety Document [named above].
- I with adhere to any conditions, instructions or limits relating to the work.
- On leaving the working party I understand that I cannot re-join until I have received and logged another briefing on this schedule.

Name	**Signed**	**Joining Working Party**		**Leaving Working Party**	
		Date	**Time**	**Date**	**Time**

If further members of the working party are to be added, a continuation sheet is to be used and attached to this document as required..

Wave Hub

Part 3: Clearance	
The work for which this Limitation of Access was issued is now completed / suspended and all persons under my charge have been withdrawn and warned that it is no longer permitted to carry out any further work.	
Signed	Print Name
Time	Date

Part 4: Cancellation	
This Limitation of Access is cancelled. The original has been returned to me.	
Signed	Print Name
Time	Date

When the work described on this Permit to Work is Complete and the Permit Cancelled, the Original Permit to Work shall be handed back to the Duty Authorised Person [HV], who shall file both the original and the copy of the front page of the Permit to Work in the Electrical Operational Procedure Manual.

Appendix 1.5 Sanction-for-test.

See following Wave Hub Limited Form, Wave Hub Limited-OMS-FORM-E009.

HV Sanction for Test.

[Complete precisely and legibly in BLOCK CAPITALS]

Wave Hub – Hayle Towans Substation	**Serial No**	**WH-SFT / XXX**

Front Copy – Original.

Part 1: Issue	
Issued to	
Employed By	
The following high voltage equipment has been made safe in accordance with the Wave Hub Electrical Safety Guidance for HV Systems for the testing described on this Sanction for Test.	

All other electrical equipment is dangerous to work on and should be treated as live.

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	

Signed	Time:	Date:

Wave Hub

Back - Copy

Part 2: Receipt	
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 the arrangements on the isolation and earthing diagram.	
Signed	Print Name
Time	Date

Test Party Briefing Log

- I have received and understood a briefing by the recipient of this Safety Document [named above].
- I with adhere to any conditions, instructions or limits relating to the work.
- On leaving the test party I understand that I cannot re-join until I have received and logged another briefing on this schedule.

Name	**Signed**	**Joining Test Party**		**Leaving Test Party**	
		Date	**Time**	**Date**	**Time**

If further members of the test party are to be added, a continuation sheet is to be used and attached to this document as required..

Part 3: Clearance	
The work for which this Sanction for Test was issued is now completed / suspended and all persons under my charge have been withdrawn and warned that it is no longer safe to carry out any further 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

Part 4: Cancellation	
This Sanction for Test is cancelled. The original has been returned to me.	
Signed	Print Name
Time	Date

When the work described on this Sanction for Test is complete and cancelled the original and copy will be filed in the Electrical Operational Procedure Manual.

Appendix 2 – Model Procedures and Forms

Appendix 2.1 Appointment Procedure for a Senior Appointed Person (HV),

It is the responsibility of the Designated Person to ensure that any person appointed as Senior Appointed Person is suitably qualified and adequately experienced to satisfy the requirements of this Electrical Safety Guidance, which has been compiled to enable Wave Hub Limited to meet its statutory obligation – to comply with the requirements of the Electricity at Work Regulations 1989 for work on electrical equipment.

Before a Senior Appointed Person is appointed, the Designated Person shall be satisfied that the prospective Senior Appointed Person meets all the criteria set out in Section 4.7 of this guidance.

The appointment of a Senior Appointed Person (HV) is to be by completion of the following form by the Designated Person and the prospective Senior Appointed Person (HV).

Model Form for Appointing a Senior Appointed Person (HV)

See following Wave Hub Limited Form, Wave Hub Limited-OMS-FORM-E002.

Wave Hub

Offer of Appointment as Senior Appointed Person, [HV] for Wave Hub Limited Hayle Towans Substation and Associated Systems.

As Designated Person for the Wave Hub Limited HV System and being satisfied that you are suitably qualified and meet the requirements of paragraph 4.7, and the qualification requirements of Appendix 9 of Wave Hub Limited's Electrical Safety Guidance for HV Systems, Wave Hub Limited-OMS-ESP-002, I offer you the appointment of Senior Appointed Person for the system named above to undertake the duties set out in paragraph 4.7 of Wave Hub Limited's Electrical Safety Guidance for HV System, Wave Hub Limited-OMS-ESP-002 until further notice. However this appointment will be reviewed and reconfirmed at three-yearly intervals.		
Signed	Position: Wave Hub Limited General Manager.	Date:

Acceptance of Appointment as Senior Appointed Person, [HV].

I confirm that, to the best of my knowledge, I satisfy the requirements for appointment as a Senior Appointed Person as indicated in paragraph 4.7 of Wave Hub Limited's Electrical Safety Guidance for HV Systems, Wave Hub Limited-OMS-ESP-002. I accept the responsibilities of the Senior Appointed Person for the system named above and will, to the best of my ability, carry out the Senior Appointed Person's duties set out in paragraph 4.7 of Wave Hub Limited's Electrical Safety Guidance for HV System, Wave Hub Limited-OMS-ESP-002. I note that I am required to attend a Senior Appointed Person training course within three months of this appointment and subsequently a refresher course at intervals not exceeding three years. I note that I am required to attend an emergency first aid training course within three months of this appointment and subsequently a refresher course at intervals not exceeding three years.		
Signed	Position: Wave Hub Limited Electrical Engineer	Date:

A copy of this Offer and Acceptance shall be kept within the Electrical Operational Procedure Manual

Appendix 2.2 Appointment procedure for an Authorised Person (HV).

It is the responsibility of the Senior Appointed Person (HV) to ensure that any person appointed as an Authorised Person is suitably qualified and adequately experienced to satisfy the requirements of this Electrical Safety Guidance, which has been compiled to enable Wave Hub Limited to meet its statutory obligation – to comply with the requirements of the Electricity at Work Regulations 1989 for work on electrical equipment.

Before an Authorised Person is appointed, the Senior Appointed Person shall be satisfied that the prospective Authorised Person meets all the criteria set out in Section 4.8 of this guidance.

The appointment of an Authorised Person (HV) is to be by completion of the following form by the Senior Appointed Person (HV).

Model Form for Appointing Authorised Person (HV)

See following Wave Hub Limited Form, Wave Hub Limited-OMS-FORM-E003.

Wave Hub

Offer of Appointment as an Authorised Person, [HV].

As Senior Authorised Person for the Wave Hub Limited HV System and being satisfied that you are suitably qualified and meet the requirements of paragraph 4.8, and the qualification requirements of Appendix 9 of Wave Hub Limited's Electrical Safety Guidance for HV System, Wave Hub Limited-OMS-ESP-002, I offer you the appointment of Authorised Person for the system named above to undertake the duties set out in paragraphs 4.8 of Wave Hub Limited's Electrical Safety Guidance for HV System, Wave Hub Limited-OMS-ESP-002 until further notice. However this appointment will be reviewed and reconfirmed at three-yearly intervals.		
Signed	Position: Senior Appointed Person.	Date:

Acceptance of Appointment an Authorised Person, [HV].

I confirm that, to the best of my knowledge, I satisfy the requirements for appointment as an Authorised Person indicated in paragraph 4.8 of Wave Hub Limited's Electrical Safety Guidance for HV System, Wave Hub Limited-OMS-ESP-002. I accept the responsibilities of an Authorised Person and will, to the best of my ability, carry out the Authorised Person's duties set out in paragraphs 4.8 of Wave Hub Limited's Electrical Safety Guidance for HV System, Wave Hub Limited-OMS-ESP-002. I note that I am required to attend an Authorised Person training course within three months of this appointment and subsequently a refresher course at intervals not exceeding three years. I note that I am required to attend an emergency first aid training course within three months of this appointment and subsequently a refresher course at intervals not exceeding three years.		
Signed	Position: Wave Hub Limited Electrical Engineer	Date:

A copy of this Offer and Acceptance shall be kept within the Electrical Operational Procedure Manual

Appendix 2.3 Appointment procedure for an Competent Person (HV)

It is the responsibility of the Senior Appointed Person (HV) to ensure that any person appointed as a Competent Person is suitably qualified and adequately experienced to satisfy the requirements of this Electrical Safety Guidance, which has been compiled to enable Wave Hub Limited to meet its statutory obligation – to comply with the requirements of the Electricity at Work Regulations 1989 for work on electrical equipment.

Before a Competent Person is appointed, the Senior Appointed Person shall be satisfied that the prospective Authorised Person meets all the criteria set out in Section 4.12 – 4.13 of this guidance.

The appointment of a Competent Person (HV) is to be by completion of the following form by the Senior Appointed Person (HV).

Model Form for Appointing Competent Person (HV)

See following Wave Hub Limited Form, Wave Hub Limited-OMS-FORM-E004.

Offer of Appointment as a Competent Person, [HV] for Wave Hub Limited Hayle Towans Substation and Associated Systems.

As Senior Authorised Person for the Wave Hub Limited HV System and being satisfied that you are suitably qualified and meet the requirements of paragraphs 4.12–4.13, of Wave Hub Limited's Electrical Safety Guidance for HV Systems, Wave Hub Limited-OMS-ESP-002, I offer you the appointment of Competent Person for the system named above as described below until further notice. However this appointment will be reviewed and reconfirmed at three-yearly intervals.		
Signed Robert McConnell	Position: Wave Hub Limited Electrical Engineer.	Date:

Duties covered by this appointment:

A copy of any EOP referenced above should be attached to this document.

Acceptance of Appointment as a Competent Person, [HV].

I confirm that, to the best of my knowledge, I satisfy the requirements for appointment as a Competent Person indicated in paragraphs 4.12–4.13 of Wave Hub Limited's Electrical Safety Guidance for HV System, Wave Hub Limited-OMS-ESP-002. I accept the responsibilities of a Competent Person and will, to the best of my ability, carry out the Competent Person's duties covered by this appointment.		
Signed	Position: Wave Hub Limited	Date:

A copy of this Offer and Acceptance shall be kept within the Electrical Operational Procedure Manual

Wave Hub

Appendix 3 – Audit of safe system of work and safety procedures

Appendix 3.1 General

This section details the audit and monitoring procedures to be carried out by the Designated Person, Senior Appointed Persons and Authorised Persons.

Appendix 3.2 Validation audits by the Designated Person

The Designated Person is to arrange for a validation audit to be carried out one year after introduction of these procedures and then at intervals not exceeding five years.

Appendix 3.3 Compliance audits by Senior Appointed Persons

The Senior Appointed Person is to carry out a compliance audit of the Wave Hub Limited HV System at a maximum interval of 12-months.

Appendix 3.4 Compliance audits

The Senior Appointed Person is to review the action plan and progress of any outstanding recommendations from the previous audit.

The Senior Appointed Person is to examine the current and known future workload and is to assess whether sufficient Authorised Persons are appointed. The Senior Appointed Person is also to examine the register of appointed Competent Persons to ensure that sufficient persons are appointed.

Appendix 3.5 Authorised person and documentation audit

The Senior Appointed Person is to interview each Authorised Person to ascertain the quantity and quality of any safety documentation raised since the last audit. The Senior Appointed Person is to carry out a full audit trail of at least one job carried out by each Authorised Person. This audit is to cover the job from start to completion.

In the case of low activity, the Senior Appointed Person is to look at all documents produced and to assess the Authorised Person against a hypothetical scenario.

The Senior Appointed Person is to examine the job list to ensure that safety documentation has been used for all jobs requiring it.

The Senior Appointed Person is to examine a representative sample of the documentation raised by each Authorised Person.

The Senior Appointed Person is also to examine a representative sample of the support documentation (from the lockable document cabinet) for suitability.

The Senior Appointed Person is to examine the training records and ensure that each person has maintained their qualification for the application of this Electrical Safety Guidance, including emergency first-aid.

Appendix 3.6 Safety equipment

The Senior Appointed Person is to 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; and
- the Authorised Persons, and other users, have been trained to use it safely.

Appendix 3.7 Mimic diagram and system keys

This inspection is to include the locks and keys, the mimic diagram, key cabinets, and the duplicate keys in the duplicate key cabinet. The mimic is to show the current state of the HV system, the status of switchgear and the name of the Duty Authorised Person.

Appendix 3.8 Substations and other installations

The Senior Appointed Person is to ensure that all installations are inspected on an annual basis.

Appendix 3.9 Non-compliances

Where non-compliance is found, the Senior Appointed Person is to 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 auditor's practice improvement notice;
- for non-compliances on work-in-progress that may adversely affect safety, suspend the work, investigate the reason and raise an auditor's suspension notice.

Appendix 3.10 Audit report

The Senior Appointed Person is to agree the factual findings with the Authorised Person and other Authorised Persons before preparing the report. The report is to include compliant items, any non-compliant findings and a table of recommendations. The report is to be issued within 28 days of completion of the site visit.

Copies of the report are to be distributed to the Designated Person and Authorised Persons.

Appendix 3.11 Action plan

The Senior Appointed Person in consultation with the Authorised Person is to prepare an action plan to implement any recommendations from the report. The action plan is to be prepared within 28 days of receipt of the audit report and is to 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 Senior Appointed Person is to copy the action plan to the Designated Person.

Appendix 3.12 Compliance monitoring by Authorised Persons

Authorised Persons are to monitor work-in-progress regularly and are to keep a record of the findings and any remedial action initiated or required.

Copies of the Authorised Persons' reports are to be made available to the Senior Appointed Person.

Appendix 3.13 Auditing aids

The following generic checklists can be used as a guide for auditing the safe system of work for electrical distribution systems. Photographs may be included in the report where appropriate.

Wave Hub

Senior Appointed Person's audit checklist

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 in HTM 06-03?		
3	Is the Authorised Person due for training in emergency first-aid?		
4	Is the Authorised Person due for training in use of cable tracing equipment?		
5	Is the Authorised Person carrying out AP duties on a regular basis?		
6	Is the Authorised Person carrying out monitoring of work-in-progress?		
7	Are sufficient Authorised Persons appointed?		

Audit trail

Job number _____ Originating Authorised Person_____

8	Does the safety programme follow the procedures in Table 1 or 2?		
9	Is the safety programme clear, legible and unambiguous?		
10	Was the safety programme countersigned by an appropriate person?		
11	Does the Authorised Person have sufficient items of safety equipment to carry out the actions on the Safety programme?		
12	Is the isolation and earthing diagram clear, legible and unambiguous?		
13	Is the permit-to-work clear, legible and unambiguous?		
14	Was the permit-to-work issued to a Competent Person?		
15	Was the permit-to-work cancelled correctly?		
16	Is the Sanction-for-test clear, legible and unambiguous?		
17	Was the Sanction-for-test issued to a Competent Person?		
18	Was the Sanction-for-test cancelled correctly?		
19	Were the site records updated on completion of the work?		

Documentation

		Y/N	Action
20	Are the documents kept in the lockable documents cabinet?		
21	Does the Authorised Person have access to a controlled copy of HTM 06-03?		
22	Are the single line network diagrams of the electrical distribution correct and up-todate?		
23	Is the switchgear and transformer schedule correct and up-to-date?		
24	Has the protection grading chart been checked?		
25	Are the “as-laid” cable route drawings correct and up-to-date?		
26	Are the “as-fitted” drawings correct and up-to-date?		
27	Are copies of operation and maintenance manuals held for all equipment?		
28	Are all events recorded in the logbook?		
29	Are operational restrictions recorded in the logbook?		
30	Is all of the distribution system included in the planned maintenance programme?		
31	Is the register of Competent Persons up-to-date?		

Safety Equipment

32	Does the Authorised Person have sufficient safety locks, safety key boxes and multihasps for the likely number of concurrent jobs?		
33	Does the Authorised Person have sufficient caution and danger signs for the likely number of concurrent jobs?		
34	Are the potential indicator and proving unit satisfactory?		
35	Is the earthing equipment inspected at annual intervals?		
36	Is the other protective equipment inspected at annual intervals?		

Mimic diagram and system keys.

37	Does the mimic accurately reflect the current state of the system?		
38	Is the name of the Duty Authorised Person shown on the mimic diagram?		
39	Are the working keys held on marked key plates?		
40	Are the arrangements for the “break glass” key box satisfactory?		
41	Is a warning flag displayed on the mimic diagram for any operational restriction?		

Wave Hub

Substations

Substation Externals		Y/N	Action
42	Is there a safety sign (P1) displayed at the entrance?		
43	Is the sign legible?		
44	Is the name of the substation exactly the same as the switchgear schedule?		
45	Is the sign securely fixed?		
46	Is the correct contact telephone number shown?		

Substation security.

47	Is the door secure/sound?		
48	Is there an emergency escape door?		
49	If so, is it accessible and can it be opened from the inside?		
50	Is there a clear escape route outside the substation?		
51	Is there a 24-hour telephone point inside?		
52	Are any non-AP items stored in the substation?		
53	If so, are the access arrangements correctly controlled?		

Substation structure.

54	Is the substation dry and clean?		
55	Are duct covers fully in place?		
56	Are there any signs of rain ingress?		
57	Are there any visible defects in the structure?		
58	Are there any signs of rodents in the substation?		
59	Is the working space and lighting adequate?		
60	Is emergency lighting installed?		
61	If so, is it included in the planned maintenance programme?		

Substation posters and labels.

62	Are posters displayed as required?		
63	Is each item of switchgear clearly labelled?		
64	Do the labels agree exactly with the switchgear schedule?		
65	Are labels displayed at the rear of the switchgear?		

HV switchgear

		Y/N	Action
66	Is the switchgear operating mechanism locked?		
67	Does the switchgear condition agree with the maintenance record?		
68	Is there excessive noise or heat from the switchgear?		
69	Are there any signs of leakage from visible compound-filled cable terminations?		
70	Is the condition of the tripping battery installation satisfactory?		
71	Are there any operational restrictions in place?		
72	If so, are warning notices displayed?		

HV switchgear

73	Is any rubbish or fire hazardous materials stored outside the substation?		
74	Is a suitable fire extinguisher provided in the substation?		
75	Has it been inspected?		
76	Is there a “gas flooding” system installed?		
77	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 SAP

Appendix 4 – Mimic diagram, keys locker and Substation document cabinet

Appendix 4.1 Mimic diagram

The mimic diagram shall be:

(i) provided at the main high voltage substation/switchroom designated for the system;

(ii) 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 (that is, generators, UPS systems etc);

(iii) fully illustrated with switch, circuit breaker, transformer, generator, and UPS etc symbols complying with the requirements of BS EN 60617.

Note

This standard is now represented by the IEC database available from their website. See also Appendix 7 for typical symbols.

(iv) an accurate representation of the system referred to in (ii) with all switching devices shown in their relative positions;

(v) drawn to show all equipment and switching devices, clearly and correctly labelled;

(vi) totally enclosed within a perspex or glass cover.

Appendix 4.2 Keys

Complete sets of keys for each substation shall be housed within the sub station key cabinets and shall be labelled to correspond with the nomenclature used on the mimic diagram.

Appendix 4.3 Document cabinet.

Where it is not practicable to keep in the mimic diagram cabinet all the documents specified in this Appendix, these documents may be kept in a lockable cabinet within the substation Control Room.

.

Appendix 5 – The Electricity Safety, Quality and Continuity Regulations 2002.

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.

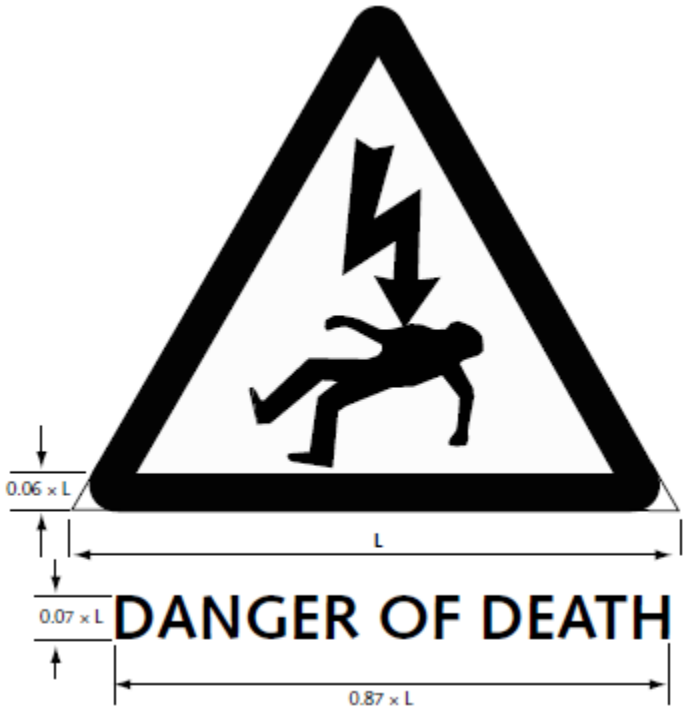
2. The triangle, symbol and text shall be shown in black on a yellow background.

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.



Appendix 6 – Typical single line diagram and switchgear and transformer schedules for a high voltage system.

Appendix 6.1 Single Line Diagram

Refer to Wave Hub Limited Single Line Diagram Drawing Number Wave Hub Limited-OMS-DHV-E001

Appendix 6.2 Equipment Schedule

Refer to Wave Hub Limited Operational Procedure Manual for HV Switchgear

Appendix 6.3 Grading Charts

Refer to Wave Hub Limited Operational Procedure Manual for HV Switchgear

Appendix 7 – Standard symbols for isolation and earthing diagram.

Appendix 7.1 Standard Symbols

Figure A7.1 Standard Symbols

Currently under review – to be added.

Appendix 7.2 Switchgear

The terminology used to describe a piece of switchgear on a system shall state:

a]. **where** the switchgear is located;

b]. **what typ**e of switchgear is going to be operated;

c]. **to where** does the switchgear connect.

(See Figure A2)

Figure A7.2 Switchgear network diagram

Network Diagram to be added

Where		What	To Where
A			
B			
C			

Appendix 7.3 Operation

The operation of the switchgear shall be recorded as follows:

Circuit breakers

Switch to on
Switch to off
Switch to earth

Wave Hub

Appendix 8 – Qualifications and training requirements

Appendix 8.1 Qualifications of a Senior Appointed Person

To be eligible for appointment, a prospective Senior Appointed Person shall:

a]. be a senior electrical engineer with practical and relevant technical engineering experience of the types of system and equipment relative to their appointment;

b]. have satisfactorily completed an approved Authorised Person initial training course in the last three years or within three months of a first time nomination;

c]. have satisfactorily completed an approved Senior Appointed Person training course in the last three years or within six months of a first-time nomination;

d]. be familiar with the different types of equipment, installation and system 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]. preferably be independent from the organisation – this 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 Wave Hub Limited's tasks involved and knowledge of Electrical Safety Guidance for high voltage systems prior to appointment;

h]. have adequate knowledge of, and within the last three years have successfully completed a training course on, emergency first-aid.

Appendix 8.2 Qualifications of Authorised Persons (HV)

Prospective Authorised Persons shall be nominated by Wave Hub Limited Management and assessed by the Senior Appointed Person. The appointment is to be for defined systems and installations and will be registered on a certificate of appointment signed by the Senior Appointed Person.

To be eligible for appointment as an Authorised Person, the prospective Authorised Person shall:

a]. be over 23 years of age;

b]. be electrically qualified within the following range:

(i) degree;

(ii) HND/HNC;

(iii) OND/ONC;

(iv) BTech 4 or 3;

(v) C&G;

(vi) NVQ at level III or above;

c]. have an adequate knowledge of this guidance and of those regulations that are applicable to the systems and installations for which the appointment is sought;

d]. be technically competent and qualified to safely operate, and make safe to work on or test, the equipment, systems or installations for which appointment is sought;

e]. be familiar with the equipment, systems or installations for which appointment is sought;

f]. have successfully completed an Authorised Persons (HV) training course approved by the Senior Appointed Person;

g]. before being appointed, be able to demonstrate competency and suitability for the role through a formal interview carried out by the Senior Appointed Person;

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

Appendix 8.3 Refresher training

This guidance requires that a Senior Appointed Person shall attend an appropriate Authorised Persons' training course at intervals not exceeding three years.

This guidance requies that an Authorised Person shall attend an appropriate training course for Authorised Persons at intervals not exceeding three years.

Refresher training courses shall cover the same subject areas as the corresponding initial training courses. For Authorised Persons, the courses shall be biased towards the practical aspects of the duties. Refresher training courses are generally expected to have a duration of about half that of the corresponding initial training course.

Re-attendance on an initial training course as a means of refresher training may be appropriate, for instance, where Authorised Persons have had little or no practical experience in recent years, or where over-familiarity with Authorised Person duties may have led to departures from standard safety procedures.

Senior Appointed Persons, and normally every Authorised Person shall attend training every three years. However, the Senior Appointed Person may consider extending this period up to a maximum of five years. In support of this decision, copies of the reasons and the approval given are to be held on file by the Senior Appointed Person. Under no circumstances can the training period be extended beyond five years.

Appendix 8.4 Familiarisation training

At the end of the familiarisation period for the systems, installations and equipment for which the appointment is sought, the prospective Authorised Person shall be able to demonstrate:

a]. a good working knowledge of the procedures associated with the operation of this guidance, 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 cabinets 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 generating equipment;
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 the local facilities managers, Authorised Persons of other disciplines, electricity supply authorities, and Contractors having operation, repair or maintenance contracts.

Appendix 8.5 On-site training

On-site training is to 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 is to keep a record of each event attended in the Authorised Person's logbook detailing the actions taken both personally and by the Authorised Person. This logbook shall be produced at the interview with the Senior Appointed Person or a qualified nominated representative.

Appendix 8.6 Approved courses

Management have a general duty to ensure that their employees receive training necessary to allow them to safely perform their duties.

Appropriate training courses are formal courses of instruction appropriate to the duties expected to be performed by a prospective or practising Senior Appointed Person, Authorised Persons or Competent Persons, which have been approved for the purpose by Wave Hub Limited.

Such courses are to be designed to impart an adequate level of knowledge of this guidance and of other matters necessary for the application of safe systems of work. In addition, they are to include practical experience of applying safe working procedures on a range of typical high voltage equipment arranged to provide simulated circuits.

Students shall 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 Senior Appointed Person. The students shall also be informed directly of the results of the assessments.

Suitable 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 Senior Appointed Person has given approval.

Appendix 8.7 Initial training course for an Senior Appointed Person (HV),

Approved training courses for a Senior Appointed Person are to provide the necessary training and background information to prepare candidates to safely discharge the duties of a Senior Appointed Person in accordance with this guidance.

The basic training is to ensure that:

a]. Wave Hub Limited policy towards electrical safety is applied universally across the areas of Wave Hub Limited's responsibility;
b]. Authorised Persons are correctly selected and appointed, and their application of the Electrical Safety Guidance for high voltage systems' is properly audited;
c]. the roles and duties of an Senior Appointed Person with regard to the selection of Authorised Persons are looked at in detail;
d]. the procedures to be adopted when work is undertaken are carried out in a controlled environment.

The course shall have a duration of about three days, and the scope is to include:

a]. an introduction to the safe systems of work;
b]. the roles and responsibilities of persons for this system;
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]. focal point duties, including accident investigation.

Appendix 8.8 Training course profile for Authorised Person (HV), initial training

Approved training courses for high voltage ring and radial distribution systems are to provide the necessary basic training and background information to prepare students to safely discharge the duties, in accordance with Electrical Safety Guidance for high voltage systems', as an Authorised Person in respect of the defined distribution systems.

The basic training is to provide:

a]. an adequate knowledge of the reasoning and content of the Model Distribution Safety Rules.
b]. a thorough knowledge of, and practical experience in, the duties and responsibilities of an Authorised Person (Electrical);
c]. an introduction to the theory, application, operation and maintenance of components of typical high voltage ring and radial distribution systems.

The background information is to provide an understanding of the principles involved in the design, operation and maintenance of typical high voltage distribution systems and their associated protective devices.

The course shall last about five days, and the scope is to include:

a]. statutory requirements relating to electrical safety;
b]. Electrical safety guidance for high voltage systems;
c]. role and duties of the Authorised Person;
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.

Appendix 8.9 Training course profile for Authorised Person refresher training

For Authorised Persons (HV), approved refresher training courses are biased towards high voltage distribution systems.

The basic training shall provide:

a]. an update of the student's knowledge of the reasoning and content of Electrical Safety Guidance for High Voltage Systems;
b]. a reinforcement of the student's knowledge of, and practical experience in, the duties and responsibilities of an Authorised Person (Electrical).

The course last about three days, and the scope is to include the more practical application of:

a]. statutory requirements relating to electrical safety;
b]. Electrical Safety Guidance;
c]. Authorised Person (Electrical) 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.

Appendix 8.10 Emergency first-aid training and equipment

Training in emergency first-aid is to 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 1981.

Training courses are to be of at least four hours' contact time, and shall 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.

This training is to be repeated, as a minimum, every three years.

Copies of certificates issued to Authorised Persons are to be held by the Senior Appointed Person.

Copies of the certificates issued by first-aid trainers for Competent Persons and Accompanying Safety Persons are to be held in the Operational Procedure Manual.

A current list of first-aiders for the appropriate locations, including, where appropriate, their telephone numbers, is to be held in the Operational Procedure Manual.

Appendix 8.11 Contractors' staff

All Contractors' staff working on or testing electrical installations, systems and equipment for which Wave Hub Limited has control of the electrical danger are to receive, as a minimum, the emergency first-aid training indicated above.

Copies of the certificates issued by first-aid trainers for Contractors' Competent Persons and Accompanying Safety Persons are to be held in the Operational Procedure Manual.

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