

CAERPHILLY COUNTY BOROUGH COUNCIL

ELECTRICAL SAFETY POLICY

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A greener place Man gwyrdach



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This publication is available in Welsh, other languages or formats on request.

Mae'r cyhoeddiad hwn ar gael yn Gymraeg ac mewn ieithiodd neu fformatau eriall ar gais.

NOTE

Wherever the designation “manager” is used throughout this policy, it is taken to mean Head of Service, Head Teacher, Line Manager, Supervisor and the Officer in charge or anyone who has responsibilities for employees in the course of their work.

1. INTRODUCTION

- 1.1 This document sets out the policy, and outlines the protective and preventative measures to be implemented by Caerphilly County Borough Council (the Authority), to ensure safety while inspecting, testing and working on electricity.
- 1.2 The Electricity at Work Regulations 1989 (EAW Regulations) apply to all places of work within the Council. The Memorandum of guidance on the Electricity at Work Regulations 1989 has been referenced within this policy to assist the Council meet the requirements of the Regulations. Other legislation and industry standards which have been referenced within this policy include:-
- Health and Safety Management Regulations 1999
 - HSG 85, Electricity at Work Safe Working Practices
 - BS7671: 2008 Requirements for electrical installations IET Wiring Regulations.
Seventh Edition.
 - Dangerous Substances and Explosive Atmospheres Regulations 2002.
Approved Codes of Practice and Guidance
 - HSG230, Keeping Electrical switchgear safe
 - GS6 2013 Avoiding danger from overhead power lines
 - Construction Design and Management Regulations 2015

2. POLICY STATEMENT

- 2.1 The Council, as duty holder, will ensure that all work on electrical services undertaken by employees and contractors is undertaken in a safe manner in line with legal requirements and industry standards. Fixed electrical installations will be maintained in a safe condition and inspected and tested at appropriate frequencies, to the required standards. All electrical works to fixed installations will be carried out in accordance with BS. 7671 2008, including all current amendments.

3. SCOPE

- 3.1 This policy applies to all electrical work undertaken within the Council by employees or contractors. Relevant sections of the policy address testing and inspection of fixed electrical installations of Council owned premises and domestic dwellings which form part of the Council premises and inspection of street lighting. Electrical Inspection/testing and maintenance for leased premises will be undertaken in line with the terms of individual lease agreements.
- 3.2 This policy has been agreed with the Trade Unions and applies to all relevant employees.

3.3 This policy will be reviewed at least every 3 years to ensure it is in line with current legislation and guidance and remains fit for purpose.

3.4 The effective date of the policy is August 2017.

4. DEFINITIONS

4.1 For the purpose of this policy, the following definitions are to be used and applied throughout the policy:-

- **charged:** the item has acquired a charge either because it is live or because it has become charged by other means such as by static or induction charging, or has retained or regained a charge due to capacitance effects even though it may be disconnected from the rest of the system;
- **dead:** not electrically 'live' or 'charged';
- **designated competent person (also known in some industries as 'authorised person' and 'senior authorised person')**: a competent person appointed by the employer, preferably in writing, to undertake certain specific responsibilities and duties, which may include the issue and/or receipt of safety documents such as permits-to-work. The person must be competent by way of training, qualifications and/or experience and knowledge of the system to be worked on;
- **disconnected:** equipment (or a part of an electrical system) that is not connected to any source of electrical energy;
- **equipment:** electrical equipment including anything used, intended to be used or installed for use, to generate, provide, transmit, transform, rectify, convert, conduct, distribute, control, store, measure or use electrical energy (as defined in the EAW Regulations);
- **high voltage:** a voltage in excess of 1000 V ac or 1500 V dc. Voltages below these values are 'low voltage';
- **isolated:** equipment (or part of an electrical system) which is disconnected and separated by a safe distance (the isolating gap) from all sources of electrical energy in such a way that the disconnection is secure ie., it cannot be re-energised accidentally or inadvertently;
- **live:** equipment that is at a voltage by being connected to a source of electricity. Live parts that are uninsulated and exposed so that they can be touched either directly or indirectly by a conducting object are hazardous if the voltage exceeds 50 V ac or 120 V dc in dry conditions – see BSI publication PD 6519³ – and/or if the fault energy level is high;
- **live work:** work on or near conductors that are accessible and 'live' or 'charged'. Live work includes live testing, such as using a test instrument to measure voltage on a live power distribution or control system.
- **NICEIC** – National Inspection Council for Electrical Installation Contracting.
- **SSIP** - Safe Systems in Procurement.
- **ECA** – Electrical Contractors Association

- **C&G** – City and Guilds
- **PAT** – Portable Appliance Testing
- **RAMIS** – Risk Assessment Management Information System
- **KPI** – Key Performance Indicators
- **Code 1 (C1)** – Danger present. Risk of injury. Immediate remedial action required.
- **Code 2 (C2)** – Potentially dangerous – urgent remedial action required.
- **Code 3 (C3)** – Improvement recommended.
- **Further Investigation (FI)** – Any defects requiring further investigation.

5. LEGISLATION

- 5.1. This policy, along with its supporting procedures, is designed to ensure the Authority meets its legal obligations under the following legislation and technical standards:-

Health and Safety Management Regulations 1999
HSG 85, Electricity at Work Safe Working Practices
BS7671: 2008 Requirements for electrical installations IET Wiring Regulations, Seventeenth Edition.
Dangerous Substances and Explosive Atmospheres Regulations 2002.
Approved Codes of Practice and Guidance
HSG230, Keeping Electrical switchgear safe
GS6 2013 Avoiding danger from overhead power lines
Construction Design and Management Regulations 2015

6. RESPONSIBILITIES

6.1 The Chief Executive Officer will:

- 6.1.1 Seek assurance from Directors and Responsible Officers, that this policy is being applied and that appropriate arrangements are in place to ensure ongoing compliance with this policy within Caerphilly County Borough Council. Receive and scrutinise compliance statistics for electrical Safety and ensure that arrangements are regularly reviewed.

6.2 Corporate Management Team and Heads of Service will:

- 6.2.1 Receive and scrutinise compliance statistics in relation to electrical testing and review proactive and reactive reports in relation to compliance with this policy.
- 6.2.2 Ensure that appropriate resources are made available for the safe management of electrical safety.

6.3 Relevant Heads of Service Will:

- 6.3.1 Take overall responsibility for electrical safety within their service areas in terms of electrical work undertaken by employees, contractors and the safety of electrical installations within Council premises or assets under Council control.
- 6.3.2 Ensure appropriate technical resources are in place, both internal and external to support the organisation to effectively implement the policy and meet legal requirements to ensure ongoing safe work on electrical installations and safety of fixed electrical systems.

6.4. Statutory Maintenance Board will:

- 6.4.1 Be chaired by an appointed Director and made up of Technical Officers and Senior Officers representing relevant Service Areas.
- 6.4.2 Meet at least quarterly to monitor statutory compliance including electrical safety of fixed installations.
- 6.4.3 Review compliance statistics and contractor performance and advise and monitor where improvements are required.
- 6.4.4 Report to Corporate Management Team as required.

6.5 Communities Health and Safety Board will:-

- 6.5.1 Be chaired by the Director for Communities and made up of Heads of Service from relevant service areas.
- 6.5.2 The Board will, as part of its strategic monitoring role, review arrangements for work on or near live electrical equipment undertaken by employees or contractors as well as review fixed wiring inspections and testing of Highways and Housing Assets.

6.6 Managers/Supervisors will :-

- 6.6.1 Managers/Supervisors responsible for staff undertaking work on or near to electrical equipment will ensure that work is undertaken in line with the requirements of this policy.
- 6.6.2 Managers/Supervisors will ensure that everyone knows how to work safely and without risk to their health, and that all employees/contractors follow safety rules and control measures identified in risk assessments:
 - be involved in planning the work and in the risk assessment process, coordinating the work where more than one group is involved, and discussing the necessary precautions and emergency procedures with employees;

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- clearly define roles and responsibilities of the supervisors and employees, including those of any contractors who may be employed;
- ensure that supervisors are competent to supervise the work and the level of supervision is appropriate to the danger and the competence of those carrying out the work.
- identify those people who are competent and have knowledge and experience of the electrical system to be worked on. Anyone who does not have this will need a greater level of supervision, or will need to be given adequate training to make sure that they have the correct skills, knowledge and risk awareness for the task. Managers/Supervisors must not let unauthorised, unqualified or untrained people work on electrical systems.

6.7 Building Managers will:-

- 6.7.1 Ensure, through regular inspection, that any electrical faults or damage to electrical accessories are reported immediately to Facilities Management for rectification.
- 6.7.2 Ensure that all electrical portable appliances within the premises are tested at the required frequencies in line with Corporate H&S guidance.
- 6.7.3 Report any concerns with regards to the work undertaken by electrical contractors to Facilities Management.

6.8. The Corporate Health and Safety Manager will:

- 6.8.1 Assist with monitoring compliance with the policy.
- 6.8.2 Direct appropriate investigations of any incidents/accidents involving electricity, liaising with relevant officers as appropriate.
- 6.8.3 Report as required to Corporate Management Team on performance against the requirements of the policy.

7.0 COMPETENCY OF EMPLOYEES WORKING ON OR NEAR TO ELECTRICAL EQUIPMENT.

- 7.1 Social Housing Services require in-house electricians to be competent to the following:
 - City & Guilds Advanced Craft Certificate or an NVQ Level 3 qualification.
 - Inspection and Testing (City & Guilds 2395). (All to BS 7671)

7.2 Highways Public Lighting, require the following staff competencies.

Senior Engineer

Engineering Council Incorporated Engineer (IEng)
Member of the Institution of Lighting Professionals (MILP)
BTEC Higher National Certificate in Electrical Engineering
C&G 2380 Level 3 Certificate in the Requirements for Electrical Installations
BS7671
C&G 2391 Level 3 Certificate in Inspection, Testing & Certification of
Electrical Installations
Western Power Distribution Authorised person Category LVPL4 public lighting
G39 Working in the vicinity of DNO/IDNO equipment

Technician

Engineering Council Engineering Technician (EngTech)
Associate Member of the Institution of Lighting Professionals (AMILP)
C&G 2380 Level 3 Certificate in the Requirements for Electrical Installations
BS7671
C&G 2391 Level 3 Certificate in Inspection, Testing & Certification of
Electrical Installations
Western Power Distribution Authorised person Category LVPL4 public lighting
G39 Working in the vicinity of DNO/IDNO equipment

8.0. SELECTION OF ELECTRICAL CONTRACTORS AND TESTING PERSONNEL:

- 8.1 All Contractors are selected in accordance with CCBC standing orders for contracts/frameworks.
- 8.2 Contractors must be able to evidence accreditation to an SSIP scheme and electrical contractors must also be members of NICEIC or ECA and utilise competent approved electricians to carry out inspection and testing.
- 8.3 For work on Corporate premises contractors personnel must have completed a recognised updating of the 17th Edition of the Wiring Regulations Course to C&G 2382 (C&G 2382-20 or 2381-10) standard or equivalent and either an Electrical Testing Course to C&G 2391 (C&G 2392) standard or C&G 240 to undertake the testing.
- 8.3 Social Housing require competency to 17th Edition of the Wiring Regulations course to 2391 or 2392 (Inspection, Testing and Certification).
- 8.4 Highways, Public Lighting require competency to the following requirements:-
 - Electrical Association Engineering Recommendation G39
 - I.E.E. Regulations BS7671 2008 incorporating 3:2015.
 - The Institution of Lighting Engineers, Code of Practice for Electrical Safety in Public Lighting Operations.

- The Electricity at Work Regulations 1989
- Health and Safety Commission 1994.
- NDO Company Directive Standard Technique OC20G/1
- Construction (Design and Management) Regulations 2015

The Contractor's Operational staff shall possess a Certificate of Competency issued by DNO for Public Lighting Attendants to work on public lighting furniture adjacent to DNO overhead lines. All electricians shall be qualified, to a minimum, of City and Guilds 2330 Part 1, Part 2 and Part 3 (Electrical Installation).

The Contractor's Supervisory staff shall be competent to co-ordinate all the Service requirements set out in the Contract, and be suitably qualified to possess knowledge of all the operations likely to be carried out, the methods and techniques employed, any potential hazards involved and the methods of preventing accidents. In general a person with a complete understanding of all the categories of the Conditions and Requirements for the Planning, Installation, Repair and Maintenance of Street Lighting Installations Issued by DNO and Engineering Recommendation G39/1-1992.

9. SELECTION AND USE OF EQUIPMENT

9.1 Equipment installed in Council premises will be properly designed, constructed, installed and maintained so that it does not present a risk of electric shock, burns, fire or explosion when properly used,

9.2 The main standard for low-voltage electrical installations is BS 7671

Requirements for electrical installations. It describes how systems and equipment can be designed, constructed and installed so that they can be used safely. The standard covers installations that operate at low voltage (up to 1000 V ac). The Council aim to meet the requirements of this standard as this is likely to achieve compliance with the relevant parts of the EAW Regulations.

9.3 Equipment which operates at low voltages may not present a risk of harmful electric shock, but even at extra-low voltages, an arc can occur, burns can result from overheated conductors, or an explosive atmosphere can be ignited.

9.4 Employees and contractors must select equipment that is suitable for the environment in which the work is to be undertaken, for example, excessively damp or humid conditions will increase the risk of injury because of reduced effectiveness of insulation, which may undermine the effectiveness of devices used for isolation, or increase the severity should an electric shock occur. Equipment that has corroded may not function as intended.

9.5 Certified explosion-protected equipment must be used in areas where there is a potentially explosive atmosphere, please refer to the site Fire Risk Assessment and the specific DSEAR Assessment (Dangerous Substances and Explosive Atmospheres Regulations 2002) which should be located on

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RAMIS. Premises which present this type of risk include those with fuel and solid fuel storage. For further advice on this issue please contact Health and Safety.

- 9.6 Employees and contractors must assess the situation before work is carried out on or near electrical equipment. Working on electrical equipment may result in removal of components and parts that provide protection for people against electric shock when the equipment is in normal use.

The Council will ensure so far as is reasonably practicable that the safety of those maintaining and testing the electrical equipment by careful design and selection of electrical equipment, such as:

- switch disconnectors should have a locking-off facility or other means of securing them in the OFF position;
- circuits and equipment should be installed so that all sections of the system can be isolated as necessary;
- switch disconnectors should be suitably located and arranged so that circuits and equipment can be isolated without disconnecting other circuits that are required to continue in service;
- devices used for isolating circuits being clearly marked to show their relationship to the equipment they control.

- 9.7 Where possible, employees and contractors should avoid live working during commissioning and fault-finding; eg by using suitably designed equipment with in-built test facilities and diagnostic aids. There should be adequate space, access and lighting to work safely. Temporary systems and equipment should be designed, constructed, installed and maintained to avoid danger.

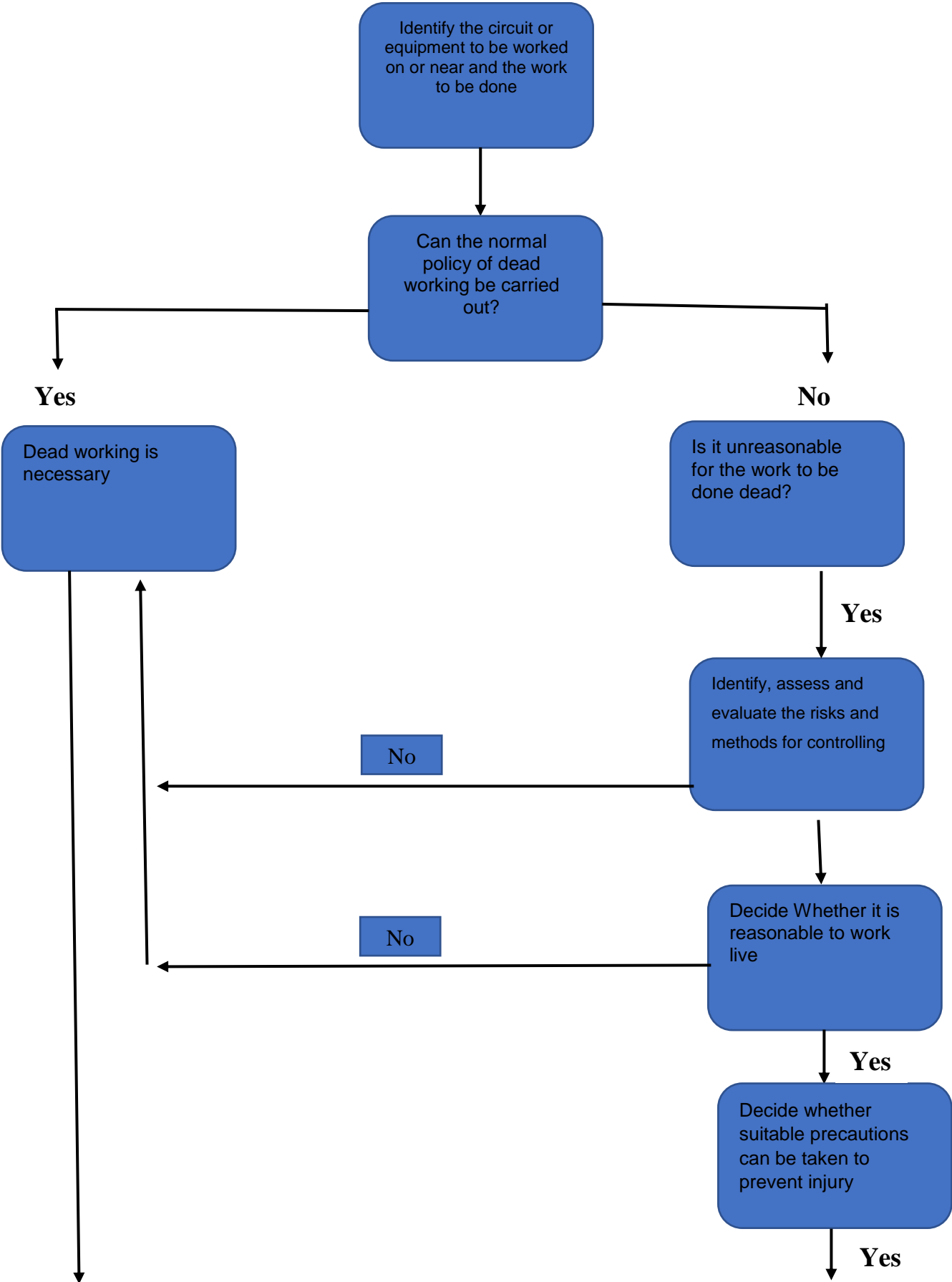
10. DECIDING WHETHER TO WORK DEAD OR LIVE

- 10.1 Work on or near live exposed conductors should rarely be permitted. Work should be planned to allow all jobs to be carried out where possible with the equipment dead. Three conditions must be met for live working to be permitted where danger may arise. **If just one of these conditions cannot be met, live working must not be permitted and dead working is essential.** The assessment procedure (figure 1) illustrates this. The conditions are:

- it is unreasonable in all the circumstances for the conductor to be dead; and
- it is reasonable in all the circumstances for the person to be at work on or near that conductor while it is live; and
- suitable precautions (including, where necessary, the provision of personal protective equipment) have been taken to prevent injury.

- 10.2 There are some circumstances where it is unreasonable to make equipment dead because of the difficulties it would cause. For example:
- it may be difficult, if not impossible, to commission a complex control cabinet without having it energised at some time with parts live (but not exposed so that they may be easily touched);
 - it may not be technically feasible to monitor the operation and performance of a control system or to trace a malfunction of such equipment with it dead, ie fault-finding;
- 10.3 Where it has been determined that it is unreasonable for the work to be done dead, a specific risk assessment must be undertaken. The risk assessment must cover the work on or near the specific equipment and it must be carried out by someone with comprehensive knowledge and experience of the type of work and the means of controlling the risks

Figure 1. Deciding Whether to Work Dead or Live



11. DEAD WORKING TO WORK LIVE?

LIVE WORKING PERMITTED

The Council's policy on electrical work is that it should only be undertaken when power is isolated. If live working is required, this should be following a detailed risk assessment and only then approved by a Manager/Supervisor or in the case of contract work approved, by a CCBC contract Manager. A decision to work live will not be taken lightly. Although the cost and operational factors would be a consideration, these should be evaluated against the risks involved before making a decision, bearing in mind that the risks associated with working live can be very serious. The Council share the view of the HSE in this matter, in that minor inconveniences arising from working dead will very rarely outweigh the risks associated with live work.

12. CAN SUITABLE PRECAUTIONS BE TAKEN TO PREVENT INJURY?

Providing the requirements above have been met, live working can still only be justified if suitable precautions are taken to prevent injury arising from the hazards identified in the risk assessment. The precautions should have been identified in the risk assessment and might include:

- installing temporary insulation, protective enclosures, or screens to prevent parts at different potentials being touched at the same time;
- using temporary barriers with warning notices affixed to keep unauthorised people away from the work area;
- ensuring that adequate clearances are established and maintained when working near to live equipment making sure that workers understand the task and the system to be worked on (clarity of instructions is essential), are trained and experienced, and follow the correct procedures. They must be competent to realise their own limitations and know when to seek help;
- providing lighting and working space that is adequate and free from trip hazards. Further details on lighting at work can be found in HSG38 *Lighting at work*;
- using robust and properly insulated tools (see BS EN 60900);
- using test instruments with insulated probes and fused leads (see GS38 *Electrical test equipment for use by electricians*);
- maintaining tools and test equipment in good condition and replacing them if
- storing tools correctly – horizontal surfaces and projections inside control cabinets should not be used – and ensuring that objects such as tools and bolts cannot fall onto exposed live parts;
- avoiding lone live working. Quick action is needed in the event of an electric shock to disconnect the supply and give assistance, so it will usually be necessary to be accompanied by someone who is competent to make the system safe and avoid injury;
- providing and using correct personal protective equipment (PPE) to reduce the risk of contact with live parts or earth, eg insulating gloves, insulating matting. If there is a risk of burns from arcing or flashover that cannot be avoided, consider the use of adequately rated, thermally insulating, flame-resistant PPE (including face/eye protection). PPE should be frequently inspected and replaced if damaged.

13. PLANNING AND PREPARATION FOR BOTH DEAD AND LIVE WORKING:-

13.1 Identify the circuit or equipment to be worked on or near and the work that needs to be done

These tasks should be carried out before the work starts. Factors that may affect the safe system of work should also be taken into account. In many cases, actual physical identification will be necessary and this may be aided by the use of appropriate drawings, diagrams and other written information. Refer to selection of equipment in section 9.

13.2 Plan the work

Electrical accidents are mainly due to a failure to plan ahead. Planning should consider the management, supervision, implementation and completion of the work, and should lead to a formal system of work based on information in the safety rules and a task-specific risk assessment. In some instances, the planning requirements of the Construction (Design and Management) Regulations will apply, please check. You should consider the following:

- the work to be done;
- the hazards of the system or equipment to be worked on and the risks associated with the work;
- the people doing the work, their competence and the level of supervision
- the precautions to be taken and the system of work to be employed;
- the possibility that the nature of the work may change, eg a testing job may turn into fault finding.

There must be adequate information available about the electrical system and the work to be completed. For corporate buildings, drawings, schematics and test records will be held on RAMIS. Housing and Highways will hold specific records on electrical services. Contractors must be provided with relevant information in order for them to plan the work properly.

Drawings and/or schedules should be kept on RAMIS. In the case of old installations where records may be poor, the Council will improve the records by a combination of surveying, testing and labelling. All information should be reviewed and issued in order to plan works.

Service areas and framework contractors will establish fault-finding procedures to be implemented during breakdown maintenance which anticipate the pressure to reinstate power as soon as possible.

13.3 Specify level of supervision

The planning process will have indicated the level of supervision required. An important factor to consider is the amount of training and experience employees and contact workers have had to do the specific jobs – the less

experienced or knowledgeable the employee/contract worker is, including the level of familiarity with the system to be worked on, the greater will be the need for supervision. There will also be a greater need for supervision when working live. The need for accompaniment is also greater for live work, although it may still be necessary for some cases of working dead, especially if there are adjacent live parts. The accompanying person should be trained to recognise danger, to switch off and, if necessary, to give assistance in the event of an emergency.

13.4 Select and instruct competent workers

Training as part of making a person competent is very important. Even the most highly qualified and capable people may not be competent to carry out specific types of work without suitable training. Competent workers will be self-disciplined and aware that reckless behaviour with electricity can lead to injury and death.

Managers/Supervisors and Contractors in control of the work should:

- assess the degree of competence of individual workers against the **specific** type of work to be done;
- provide clear instructions, information and adequate training for employees on:
 - the risks they may face;
 - the measures in place to control the risks, emphasising the safe system of work to be used;
 - how to follow emergency procedures;
- arrange for those being trained or those newly trained to be accompanied and supervised.

13.5 Ensure correct working methods

Managers/supervisors and contractors should ensure that employees/workers understand the correct working methods, related to the specific work in hand. People doing the work should be aware of the limitations of that work and the constraints as to how they carry out the work. This includes recognising when it is unsafe to continue with the work and knowing how to deal with any contingencies that may arise.

13.6 Provide and ensure use of appropriate protective equipment

Managers, supervisors and contractors have a responsibility to provide the protective equipment identified in the task-specific risk assessment and make sure that it is:

- suitable for the use for which it is provided;
- maintained in a condition suitable for that use; and
- used properly.

13.7 Information, tools and instruments and ensure workers are fully instructed

Employee and contract workers must be supplied with and use correct equipment and appropriate information, such as electrical drawings, tools, instruments etc.

13.8 Management checks and supervision of work

The Council and its appointed contractors must comply with the EAW Regulations in so far as they relate to matters within our control. The Council will undertake monitoring of employees and contractors to ensure they are following the rules and correct safe working procedures. Service Areas will retain written records of regular inspections of in-house electrical testing and maintenance work. These inspections will be undertaken by a suitably qualified Supervisor or Manager. In line with CDM15 and EAW Regulations Monitoring, records of contractors work will be retained by the CCBC Contract Manager.

14. WORKING DEAD

14.1 Identification

Adequate information will be supplied to identify equipment correctly. For most circuits and equipment, correct labelling is important, but it should never be assumed that labelling is correct and that work can be started without having first proved that the equipment or circuit is dead. In some special cases, eg underground cables, cable-locating techniques using specialised scanning instruments may be necessary and it may also be necessary to identify the cable both before and after switching operations and cable spiking.

14.2 Disconnection

Disconnect the equipment from every source of electrical energy before working on, or near, any part which has been live or is likely to be live. On equipment that is capable of storing charge, such as capacitors and high-voltage cables, ensure that any stored charge has been safely discharged.

14.3 Secure Isolation

For adequate isolation, the disconnecting device should have an isolating gap sufficient for the voltage levels present or likely to occur. Make sure that any switch disconnecter or other means of disconnection is secure. Switches, including circuit breakers, should be locked in the OFF position using a 'safety' lock ie., a lock or padlock having a unique key or combination. Lockout devices that can be attached to the actuators of circuit breakers are available and should be used where appropriate. All keys should be retained in a secure place. If a plug has been withdrawn, make sure that it cannot be reconnected to the electrical supply while work is

taking place on the circuits or apparatus – proprietary lock-out devices should be used for this purpose.

If a fuse is removed, make sure that it or a similar one cannot be reinserted by taking it away or by locking the box or enclosure until work is completed. Lockable insulating blanks that you can insert in an empty fuseway could be used where able to as these prevent inadvertent fitting of a fuse while the associated circuit is being worked on.

If you rely on locking off where a number of people are working, the use of a multiple locking hasp attachment, lock-out box or key-safe may be appropriate to ensure that all the locks have to be removed before the equipment can be re-energised. Everyone involved in the work should apply a lock to the multiple locking hasp and keep personal possession of the key.

14.4 Post Notices

A notice or label should be posted at the place of disconnection so everyone else knows that work is being done. For example, a 'caution' notice can be used to indicate that someone is working on the apparatus and may be injured if it is re-energised, and 'danger' notices attached to live equipment adjacent to the place of work will indicate that the apparatus is still energised. Notices or labels should be easily understood by anyone in the area. Remove labels or notices when they no longer apply.

14.5 Proving dead

Having isolated the circuit or equipment, and before working on it, employees and contractors should check that the parts to be worked on or near are dead, even if the isolation has been achieved automatically through an interlocking system. If it is a three-phase system or equipment with more than one supply, prove that all supply conductors are dead.

The instrument to do this should be properly constructed to protect against electric shock and designed to prevent short circuits occurring during use. For low voltages, proprietary, voltage detectors such as two-pole voltage detectors, test lamps, or voltmeters with insulated probes and fused leads can be used (see HSE Guidance Note GS38). The use of multimeters, which can be set to the wrong function, is not recommended for proving dead on low-voltage systems, neither is the use of non-contact devices such as 'volt sticks'.

It will be necessary to test the instrument before and after use. This may be done by means of a proving unit with a low power output. If live circuits are used to prove instruments, adequate precautions against electric shock and short circuits should be taken. Training in the correct use of voltage detectors is essential to avoid risk in the event of unexpected use on a live conductor. All instruments used for checking circuits should be maintained and inspected frequently.

Where underground cables cannot be positively identified and proved dead at the point of work, it may be necessary to spike the cable using a properly

designed, cartridge-operated spiking gun.

14.6 Earthing

The risk to people if the above precautions fail can be minimised by securely earthing all the conductors using properly designed earthing devices or earthing leads, usually applied to all points where the circuit or equipment is isolated from the supply. Additional, local earths at the point of work may also be necessary if this is remote from the point of isolation, but these should be applied only after proving dead at the point of work. This procedure is essential for high-voltage apparatus and stored energy equipment (eg capacitors). The earthing conductors and their connections should be suitable for the energy that may flow in the event of a failure of the above precautions.

Earthing low-voltage equipment is desirable if there is a risk of re-energisation, eg from a generator under someone else's control. In other low-voltage equipment, however, it may be physically impractical to apply earths, or the risk of short circuit from introducing an earth near adjacent live parts may outweigh the benefit of earthing the apparatus being worked on.

14.7 Adjacent parts

When the circuit or equipment to be worked on has been made dead or where the work is non-electrical, you must still protect against danger from inadvertent contact with other live parts nearby. This should preferably be done by erecting physical barriers and/or the use of temporary insulation and posting 'danger' notices. The requirements regarding adequate working space, access and lighting must also be considered and planned for.

14.8 Additional procedures

A permit to work should be organised for work on high-voltage systems, those over 600 volts. A Permit is not required for work on low-voltage systems, but could still be used if deemed an additional safety measure.

14.9 Extra precautions for high-voltage work

Work on High-voltage equipment (Voltages from 69 kV-230 kV) is contracted out. Equipment should be designed and installed so that it is not necessary to work on exposed live parts. However, it is commonly necessary for voltage checks or tests to be carried out, and for observations to be made from safe distances such as when carrying out phase rotation tests.

High voltages can arc across an air gap, resulting in a shock or burn without touching live voltage parts. The dead working procedure in paragraphs detailed in this policy must therefore be followed by contractors and detailed in their Risk Assessments and Safety Systems of Work. Isolation should be by means of a device that has a safe isolating gap between live parts and those that have been made dead for work to be carried out (refer to the relevant British Standards). Earthing conductors at the point where the supply is disconnected are essential and additional earths may be necessary

at the place of work.

The system of locking OFF while work is in progress must use safety locks which have unique keys so that the apparatus cannot be inadvertently re-energised. The keys should be retained in a key safe or other suitable place available only to the person in charge of the work. The precautions should be detailed in the permit to work (see appendix 2).

Additional procedures will be necessary to adequately cover any shift changes (if applicable) or work extending over long periods. It may also be necessary to have special rules or procedures for particular items of equipment and for particular working practices such as testing (eg it may be necessary to remove earths to facilitate testing under a clearly defined sanction-to-test procedure).

15. ASBESTOS INVOLVED IN ELECTRICAL WORK

- 15.1 CCBC requires that all operatives working on its buildings have received asbestos awareness training from a suitably accredited provider (UKATA/ IATP/ BOHS/ ASHEeLA) within the previous 12 months. Furthermore, those involved in statutory testing including electrical inspection and testing must have also received Task Specific Work with Non-licensed Asbestos Products (Category B) training from a UKATA/IATP registered provider.
- 15.2 Electrical contractors can access all available asbestos information via the Risk Assessment Management Information System (RAMIS) database. Where available, supplementary guidance provided by the CCBC asbestos team is also included with tender documents and additional support is provided by a CCBC asbestos officer, where appropriate.
- 15.3 It is CCBC policy and a condition of the contract that all Contractor's staff sign the asbestos log book for the premises and read the asbestos survey and any associated prohibitions or restrictions relating to the site at commencement of each visit to an Authority building

The following section is consistent with the Council's Asbestos Management Plan

- 15.4 CCBC requires all internal staff/Contractors working on the fabric of its buildings to have undertaken and completed Asbestos Awareness Training as a minimum. This training must be provided by a Training Company/Trainer accredited by the following bodies (UKATA/ IATP/ BOHS/ ASHEeLA). The training must be valid within the previous 12 months. As stated, Asbestos Awareness is the minimum level of Asbestos Training required, however, works within some of Caerphilly properties require Non Licensed Training (Category B) as a minimum. This level of training must be accredited by the following bodies (UKATA/IATP). Non Licensed Training has been stipulated as a minimum requirement for those undertaking Statutory Testing throughout Caerphilly Properties.

- 15.5 The electrical contractors can access all available asbestos information via the Risk Assessment Management Information System (RAMIS) database. However, unless the building is constructed post 2000, then site specific advice and support must be provided by Building Consultancy's Asbestos Officer (AO). This AO has the correct level of training, skills, experience and knowledge to review proposed testing programme/works and cross reference with all relevant asbestos information relating to site and specific work areas. Following this, the AO will provide advice to support the proposed testing at tender stage, along with all relevant Asbestos information. Once the tender is awarded to the successful contractor, there may be a requirement for more detailed specific advice from the AO once contractor has attended site. Also onsite support and monitoring from the AO will be carried out whilst some asbestos works are being undertaken.

Although Asbestos information and advice will have been provided to the selected Contractor prior to them attending site(s), the Contractors must read the relevant sections of the asbestos survey and any prohibitions or restrictions relating to the site. This must be prior to the commencement of work or disturbance to the fabric of the building or prior to any access into a Prohibited or Restricted areas, they must then confirm they understand the information by completing and signing the Asbestos Log Book for the premises. The Contractors should be fully aware of this information, as it will have been provided to them prior to any access. The contractor must ensure this information is provided to any members of staff who attend the specific site(s).

Appendix 1

Arrangements for Inspection and Testing of Fixed Electrical Systems in Council Premises

1. FREQUENCY OF TESTING:

1.1 The frequency of periodic testing is determined by taking into account the type of installation; its use and operation, the frequency of maintenance and external influences to which it is subjected. In general terms, frequencies advised by BS7671 and Guidance Note 3 – Inspection and Testing, will apply i.e. Inspection and testing will be undertaken every 5 years except in the following circumstances:

- Swimming Pools and associated changing rooms – Annually
- Caravan Parks, communal facilities and individual connections – Annually
- Installations in the vicinity of fuel pumps – Annually
- Leisure Centres – 3 Yearly
- Public entertainment venues / theatres – 3 Yearly
- External Flood Lighting, 3 yearly
- Domestic Dwellings (which form part of the Council Premises) will be inspected 10 years after installation or full rewiring and every 5 years thereafter.

1.2 All buildings and facilities shall be subject to a full periodic inspection and test at the prescribed frequency. Partial testing of circuits or installations is not permitted. Any reduction in testing frequency must be agreed by the Statutory Maintenance Board and ratified by the Corporate Management Team, following review of detailed records and test results and risk assessment by a competent person.

1.3 The frequency of inspection and testing will be increased if the history indicates signs of progressive deterioration.

2. SCOPE OF TESTING:

2.1 All circuits to the building side of the main meter shall be tested, using the following:-

2.2 All visible fittings and accessories will be visually inspected for damage, signs of overheating etc.

2.3 In addition, a proportion, but at least 20% of fittings (sockets, lights etc), will be dismantled or removed and the condition of the incoming wiring inspected. Proportionally more power sockets will be inspected than lights. Furthermore, the proportion of fittings inspected will be increased where poor or unacceptable conditions are encountered. Records to be provided by the Contractor of the location of the 20% of fixtures and fittings in each premise, which have undergone detailed inspection.

Appendix 1

- 2.4. Fixed Appliances will be tested by the fixed wiring testing contractor. Where testing could not be completed on a given appliance, the Contract Administrator will be notified whilst the testing contractor is still on site. Where it is agreed that testing is not possible, the omission and reasons will be recorded on the test report.
- 2.5. Portable appliances are excluded. The relevant building manager is responsible for ensuring PAT testing is carried out

3. LIMITATIONS OF TESTING:

- 3.1 The testing contractor is expected to eliminate limitations wherever possible. Meaningful live/neutral tests on lighting circuits which include ballasts are not possible and this is an acceptable limitation although live/earth tests shall be carried out. Any other limitations that are not eliminated will be recorded as faults. An installation shall not be deemed satisfactory if the scope of testing was limited.
- 3.2 A visual inspection of wiring above all ceiling and roof voids is required, high level access should be arranged as appropriate. Contractors must read the relevant sections of the asbestos survey and any prohibitions or restrictions relating to access into ceiling or roof voids, refer to section 18.0 of the policy.

4. ENSURING ALL ASSETS ARE TESTED:

- 4.1 CCBC has a large and diverse property portfolio. It includes operational buildings, non-operational buildings, buildings leased in and buildings leased out. A list of all such buildings has been compiled and Heads of Service will be consulted to check that no assets have been omitted and to ensure it is clear where responsibility lies for Statutory Testing.

5. ENSURING TIMELY ACCESS FOR TESTING:

- 5.1 The escalation hierarchy is:
 - Contractor attempts to arrange access to complete the testing. If unsuccessful the contractor will escalate to:
 - Property Administrator, If unsuccessful the contractor will escalate to:
 - Head of Property who will contact the relevant Head of Service.

Significant issues with access will be reported to the Statutory Testing board

6. FAULT RECTIFICATION:

- 6.1 If the testing contractor encounter any faults that presents an immediate danger such as C1 faults, then these are made safe – either by disconnection or rectification – at the time of identification.

If the fault is isolated, the testing contractor will upload the fault onto RAMIS detailing the isolation.

- 6.2 The Contract Administrator (CA) and building manager are notified forthwith and an additional written record of all such emergency works is submitted to the CA within 24 hours.

- 6.3 Furthermore, any C2 category faults which, due to their location or other reason, the testing contractor considers present a relatively high risk are also rectified or made safe at the time of identification.

If the fault is isolated, the testing contractor will upload the fault onto RAMIS detailing the isolation.

- 6.4 Any remaining C2 faults are uploaded onto the RAMIS database system together with the testing report within 14 days of the test and wherever possible rectified within the following 60 days.

7. RAMIS DATABASE:

- 7.1 The testing contractor is provided access to the RAMIS system to view building related information as well as historic testing information held on the site. Contractors will upload test information and to close down remedial tasks when completed. A RAMIS user guide for CCBC appointed electrical contractors is issued to the testing contractor and is included in Appendix A. Training is also provided to the appointed contractor in RAMIS.

- 7.2 The contracts require that the Contractor uploads reports and details of any required remedial works to the RAMIS database system within 14 days of the site inspection.

8. RECORDS

Inspection and Testing records uploaded to RAMIS must be provided in full accordance with BS7671 2008 Requirements for Electrical Installations and Guidance Note 3 (Inspection and Testing) including all amendments. Additionally, electrical schematics shall be suitable provided/annotated to illustrate the electrical layout and circuit configuration of the installation following completion of the Inspection and Testing regime and any necessary rectification works.

- 8.1 Test reports must be reviewed and countersigned by a person of equal competence prior to uploading to RAMIS.

9. AUTHORISATION OF PAYMENTS TO CONTRACTORS:

- 9.1 All electrical orders issued to contractors will include the RAMIS ID number for the Building to be tested or in the case of fault rectification the fault ID number. Conversely, all invoices submitted by contractors must include the RAMIS ID number for each fault included in the invoice. Invoice details are spot checked against RAMIS records. If the invoice details do not match the RAMIS records, the contractor is notified and payment is withheld until RAMIS discrepancies are resolved.
- 9.2 **Payments for electrical fault rectification will not be made until the contractor has closed down the faults on RAMIS.**

10. MONITORING CONTRACTOR PERFORMANCE:

- 10.1 Regular progress meetings are held with the testing contractor and contract KPIs monitored and discussed. These KPIs include timeliness of testing and timeliness of uploading records to RAMIS.
- 10.2 The NICEIC have previously carried out audits of contractors during testing and have also carried out desktop reviews of testing certification.
- 10.3 A consultant electrical engineer has now been appointed to further assist with quality control. Specifically, the consultant will:
- Review the content of electrical testing reports,
 - Provide confirmation that C1 and C2 faults have been properly categorised.
 - Provide assurance that residual C2 designated faults entered into the RAMIS system have been properly risk assessed and confirm that the Council's standard 60 day maximum period for completing rectification is reasonable.
 - Quality assure selected rectification work.
 - Work with the Council's Statutory Maintenance team to provide assurance that RAMIS entries are accurate and timely.
 - Oversee and give advice on council statutory maintenance procedures
 - Maintain an independent audit relationship with all parties
- 10.4 Furthermore, an electrical inspector is to be employed to spot check the quality of the visual element of the testing and inspection completed by contractors and to spot check the quality of completed remedial works.
- 10.5 Additional technical support is available from Building Consultancy electrical engineers, but this arrangement will be subject to continuous review and a dedicated officer will be recruited into the statutory testing team, if required.

Appendix 2

Arrangements for Inspection and Testing of Fixed Electrical Systems for Council Highway Power supplies

Periodic electrical testing is carried out to the street lighting and illuminated signs at the frequency recommended within *Guidance Note 3 Inspection and Testing*, with each item of street lighting electrical equipment subject to testing once during a 6 - 8 year cycle. Day to day monitoring shall be the responsibility of the Engineers staff. A sample of lighting units, which have been tested under the terms of the Contract shall be inspected to ensure the specified standards, as laid down in the Criteria of Assessment, are achieved. A copy of the results of the lighting units inspected will be made available to the Contractor.

Electrical Testing of Lighting Units

- (i) The Engineer will issue an instruction, identifying the quantity, location, column/sign number and type to be inspected.
- (ii) The Contractor shall carryout Electrical inspection and testing in accordance with the requirements of the Electricity Safety, Quality and Continuity Regulations 2002 and BS7671 2015 for compliance with health and safety legislation.

SCOPE OF TESTING:

- (i) The testing for adequate insulation and earth loop impedance of individual lighting units.
- (ii) The testing for adequate insulation and earth loop impedance of "Council" owned underground cable networks at the control point.
- (iii) The testing for polarity, continuity of protective conductors, the operation of residual current devices and resistance of earth electrodes at all locations.
- (iv) To identify items which pose a possible danger such as bare conductors, loose or missing earth wires, poor earth crimps, wrong size fuses, missing bolt or connection of any earth within the internal wiring.
- (v) To undertake a visual inspection of the general condition of the equipment.
- (vi) To provide and fit a waterproof label in the base of each column or lit sign post, indicating with indelible marker the name of tester and date on which the test was carried out.
- (vii) Western Power Distribution the "Distribution Network Operator" shall supply the service to the Units, unless otherwise stated. The supply service will be terminated with a DNO service cut-out. This cut-out is not included as part of this testing.

LIMITATIONS OF TESTING:

The testing contractor is expected to eliminate limitations wherever possible. Meaningful live/neutral tests on lighting circuits which include ballasts are not possible and this is an acceptable limitation although live/earth tests shall be carried out. Any other limitations that are not eliminated will be recorded as faults. An installation shall not be deemed satisfactory if the scope of testing was limited.

FAULT RECTIFICATION:

If the testing contractor encounter any faults that presents an immediate danger such as C1 faults, then these are made safe – either by disconnection or rectification – at the time of identification.

The Contractor shall notify the Engineer of any column/sign found on site that represents an immediate electrical danger.

Any C2 category faults which, due to their location or other reason, the testing contractor considers present a relatively high risk are also rectified or made safe at the time of identification.

1. YOTTA “MAYRISE” DATABASE:

The Council operates a “Mayrise” computerised street lighting management system which is utilised for the following:-

1.1 Computer Record and Management Systems

- (i) Storage of inventory records for street lighting, traffic signs and feeder pillars, private cable network and other furniture covered by the Contract.
- (ii) The transmission of works instruction and fault instruction by the Overseeing Organisation.
- (iii) The return of completed reports, repairs and final measure by the Contractor.
- (iv) Budgetary management and audit.

The contractor is provided access to the “Mayrise” system to view Highway asset information as well as historic testing information held. Contractors will upload test information and to close down remedial tasks when completed.

2. RECORDS

The Contractor shall enter the duly signed and certified results of any test carried out during the inspection and of any minor repairs carried out whilst on site directly onto the Clients “Mayrise” computer database within five working days of the date of inspection.

3. AUTHORISATION OF PAYMENTS TO CONTRACTORS:

- 3.1 Orders issued to contractors will include the unique ID number for the asset to be tested.
- 3.2 Payments will be authorised following a satisfactory inspection by the Councils Technician.

4. MONITORING CONTRACTOR PERFORMANCE:

- 4.1 The Councils supervisory staff undertake sample inspections of all electrical works undertaken by the contractor.
- 4.2 Regular progress meetings are held with the testing contractor and contract KPIs monitored and discussed.
- 4.3 The NICEIC regularly audits the contractors during testing and have also carried out desktop reviews of testing certification.
- 4.4 Further in addition to the existing Technician, extra resources are to be engaged to sample the quality of the visual element of the testing and inspection completed by contractors and to sample the quality of completed remedial works. The number of units sampled will be a minimum of 10% of the tested installations.
- 4.5 Additional technical support is available from the Senior Engineer

Appendix 3

Electrical permits-to-work

1. The electrical permit-to-work form is provided in this appendix. Further information is available in BS 6626 and BS 6867. An electrical permit-to-work is primarily a statement that a circuit or item of equipment is safe to work on – it has been isolated and, where appropriate, earthed. You must never issue an electrical permit-to-work for work on equipment that is still live or to authorise live work. The information it contains should be precise, detailed and accurate. It should state which equipment etc has been made safe, the steps by which this safety has been achieved, and exactly what work is to be done.
2. An electrical permit-to-work differs to the more general permit-to-work systems.
3. You should not allow anyone to work on equipment that is not specified in the electrical permit-to-work as having been made safe. This restriction should be understood and complied with by everyone in the premises, including directors and senior staff.
4. If a programme of work must be changed, the existing electrical permit-to-work should be cancelled and a new one issued before any variation is made to the work. The only person who has the authority to agree the change in programme and issue the new electrical permit-to-work is either the person who issued the original permit or the person nominated by management to take over the responsibility, eg at the end of a shift or during absence or leave.
5. An electrical permit-to-work should be issued by a designated competent person who has been assessed to be so by means of technical knowledge and/or experience and who is familiar with the system and equipment. The person should be authorised, in writing, by their Head of Service to issue electrical permits-to-work relating to specified equipment or systems. Before issuing the permit, they should work out, in detail and in writing, what the various steps are to disconnect, isolate, prove dead, lock OFF, earth the equipment, post warning notices, and identify the equipment to be worked on and adjacent equipment which will still be live.
6. The electrical permit-to-work should state clearly:
 - the person the permit is addressed to, ie the Manager/Supervisor or leader of the group or working party, who will be present throughout the work;
 - the exact equipment which has been made dead and its precise location;
 - the points of isolation;
 - where the conductors are earthed;
 - where warning notices are posted and special safety locks fitted;
 - the nature of the work to be carried out;
 - the presence of any other source of hazard, with cross-reference to other relevant permits;
 - further precautions to be taken during the course of the work.
7. In most cases it is preferable to include a diagram on, or attached to, the permit confirming the above information and showing the zone for work.
8. The electrical permit-to-work should be issued at the place where the work is being done. The designated competent person issuing the permit should explain the work and agree the accuracy and completeness of the details with the person doing the work before they both sign the permit. The person issuing the permit must be sure that all necessary action has been taken to make the equipment safe.

Appendix 1

9. In cases where there may be divided responsibility i.e. leased premises, roles must be defined to ensure there is no confusion over respective responsibilities, for instance.
10. At the time the person in immediate charge of the operation accepts the permit they become responsible for ensuring that all the specified safety precautions are followed that:
 - only permitted work is done; and
 - the work is confined to the area defined in the permit.
11. If the permit is issued to the leader of a group, the leader accepts responsibility for the people in the group and should explain to them – before the work begins – the scope of work and the means by which safety has been achieved.
12. If the person issuing the electrical permit-to-work will also be doing the work, it is strongly recommended that someone else makes an independent check of the precautions taken. The person doing the work should then issue a permit to themselves. This routine helps to ensure that the full safety procedure is applied.
13. The recipient of an electrical permit-to-work should keep it for reference while the work is in progress and to prevent inadvertent cancellation and re-energisation of the equipment.
14. When the work is complete, whoever the permit was issued to should sign it to declare that any additional earths and tools have been removed and people in the group have been withdrawn and instructed not to approach the equipment again. The person clearing the permit should also indicate whether or not the equipment is fit for service. The permit is then returned, preferably to the designated competent person who originally issued it, for cancellation before the equipment is re-energised.



Electrical permit-to-work

To: _____ in charge of this work.

I hereby declare that the following high-voltage apparatus in the area specified is dead, isolated from all live conductors and is connected to earth:

Treat all other apparatus and areas as dangerous

The apparatus is efficiently connected to EARTH at the following points:

The points of isolation are:

CAUTION NOTICES have been posted at the following points:

SAFETY LOCKS have been fitted at the following points:

The following work is to be carried out:

Diagram (attached)

Signed _____ Time _____ Date _____