National Federation of Demolition Contractors
Voice of the Global Demolition Industry

DISCONNECTION OF SERVICES
GUIDANCE NOTES

For demolition and refurbishment work places

www.demolition-nfdc.com

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INTRODUCTION

The National Federation of Demolition Contractors (NFDC) is represented on the British Standards subcommittee which prepares the code of practice for demolition (BS6187) and is, along with the Institute of Demolition Engineers (IDE), the voice of the UK demolition industry.

Founded in 1941 to help spearhead London's post-Blitz clean-up campaign, the NFDC's members are responsible for more than 90% of all demolition that takes place in the UK.

Today, the NFDC is committed to establishing safe working practices for its members and to represent their interests in areas such as training, safety, the environment, waste management, industry guidance, legislative changes and codes of practice.

However, in researching and preparing the information contained within this document the NFDC cannot be held responsible for its subsequent use, nor for any errors or omissions it may contain.

Details of NFDC publications are available at
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1 SCOPE OF GUIDANCE

For many years contractors have found that getting utility services disconnected, terminated or simply diverted has, at times, been an exercise of epic proportions where frustration has gone hand in hand with loss of earnings and lost time impediment. Indeed, such is the problem that some contractors have reported delays of 12 weeks and more in getting a satisfactory outcome, with others who can testify to completing their works with the services still in place and in need of urgent remedial action. Such situations cannot be allowed to continue and in response to the industry call for an answer to this and other conundrums associated with utility services, the NFDC has produced this comprehensive guide to ensure industry best practice on Utility Services Management (USM) by clarifying and where necessary, highlighting safety, use and maintenance of systems in operation. This guide contains information on planning, research selection, training of personnel in inspection and identification, thorough examination, supervision and monitoring, competency and application of the equipment and people.

In using this guide, it should be recognised that contractors and or management team members tasked with the organisation of the management of utility services on site, must ensure that sufficient time and resources have been allotted to administrate a successful outcome. The information contained within this guidance is intended to apply to the present day workplaces but will be reviewed and updated as technology and or innovation foresee the introduction of other systems into the workplace. Readers of this document are recommended to consult with other useful and informative information issued by the HSE or Utility Groups. Please refer to back page publications list.

1.1 NATURE, APPLICABILITY AND STATUS OF GUIDANCE

This guide has been prepared by an NFDC working party under the direction of the NFDC President. The information contained within this guidance is gathered and compiled from the working experiences of a number of utility company professionals and NFDC members who in the normal cause of their demolition and or refurbishment works have need to manage the process. No responsibility for any inaccuracies or omissions within this guidance will be accepted by the authors or the NFDC.

This guide document has no legal status although users of this guide can take assurance that the practices and principles of operation, detailed within, do not contravene any statutory regulation or approved code of practice as issued by the Health and Safety Executive from time to time.

1.1.2 LIMITATIONS OF GOOD PRACTICE GUIDANCE

Clients, consultants and contractors using this guidance must apply a risk based approach to implementing any work practice that may be considered as good or common practice. Standard operating procedures on any site would be expected to follow the recommendations and statutory duties laid down by the workplace regulations, codes of practice, the utility services conditions of operation and the individual organisations own policies and site rules. The limitations in applying this and any guidance may be determined by a number of facets and constraints, not least, the nature and number of the utility services present, their location and status, site conditions, site wide elements, local environment, weather, access and egress and topography etc. It is for the person or persons supplying, using and maintaining the systems and equipment to ensure that the application of this guidance on their site is both relevant and workable.

1.2 OBJECTIVES OF THE GUIDANCE

The principal objective of this guide is to promote safety and best practice to ensure optimum safety for all persons using equipment/plant, maintaining systems or working within close proximity to ‘live’ services. The information contained within this guide document is aimed at those persons who are working or have need to visit or inspect demolition and refurbishment sites where utility services are known to exist, have been terminated, disconnected or diverted and or remain within the site under protection. As such, this guide may not have relevance if applied to other industry sectors where operating principles may differ or the management systems in use are incompatible or not fit for purpose.

1.3 RESPONSIBILITIES

A number of stakeholders will be involved in the specification, selection, supply, training, use and maintenance of USM. Amongst those with specific duties within the workplace Acts and Regulations are the client, the principal contractor, the utility companies, the demolition contractor, his employees and other persons contracted to manage the utility services.

Contractual and operational arrangements should ensure that any live services equipment, cabling or pipe work is adequately and safely operated, inspected, maintained and as necessary, terminated, disconnected, diverted or protected during the site works. The project client also has a fundamental responsibility to ensure that his chosen contractor has all relevant information required to carry out hisworks in a safe and environmentally responsible manner.

The respective roles of the various parties should be clearly understood and the responsibilities and liabilities of all stakeholders should be defined and recorded in the relevant site specific documentation. This guide does not extend or affect any such responsibilities and or liabilities.

1.4 SAFETY LEGISLATION

The Health & Safety at Work etc Act 1974 is a UK act of parliament that defines the fundamental structure and authority for the encouragement, regulation and enforcement of workplace, health, safety and welfare in the United Kingdom. Cascading from this important piece of legislation are the workplace regulations, codes of practice and industry guidance. Most notably and of direct concern for work within a demolition and refurbishment environment are the following statutory regulations;

The Construction (Design and Management) Regulations 2007
The Provision and Use of Work Equipment Regulations 1998 (PUWER)
The Lifting Operations, Lifting Equipment Regulations 1998 (LOLER)
The Workplace (Health, Safety & Welfare) Regulations 1992
The Management of Health, Safety & Welfare Regulations 1999 (MHSWR)
Personal Protective Equipment Regulations 1992 (PPE)
The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR)
The Supply of Machinery (Safety) Regulations 2008
The Control of Substances Hazardous to Health Regulations 2002 (CoSHH)
The Electricity Safety, Quality and Continuity Regulations 2002
The Electricity at Work Regulations 1989
The Electrical Equipment (Safety) Regulations 1994
The Gas Safety (Installation and Use) Regulations 1998

This list is not exhaustive.

DEFINITIONS

cable avoidance tool
a hand held or machine mounted signal generator designed to pick up the presence of buried cables and pipes, a single generator may be required to trace services.

dial before you dig
a national service operated by individual and service companies providing plans of utilities / authorities pipelines and cables for reference prior to excavations taking place.

hand dig
means to excavate using a shovel with a wooden or insulated handle, not including picks, bars, stakes or other earth piercing devices.

mechanical excavation
means boring or open cut excavation by means of mechanical excavating equipment such as powered excavator, earth mover, earth piercing equipment including hand held augers, picks, bars, stakes or any other device that may damage the utility line.

utility
means the individual, partnership, corporation, public agency, or other entity that is licensed to operate an energy distribution system under the Utilities Contracts Regulations 2006.

utility line
means those facilities operated by a utility through which gas or electric energy is conveyed and includes pipe, cables, and other directly related equipment and components such as switches, valves, meters and supporting structures.

vendor or shipper
a term commonly applied to suppliers of goods or services to a company or householder, i.e. gas and electric.

meter
a device used to measure and or regulate the amount or volume of e.g. the flow of gas or electricity supplied to a user.

exclusion zone
in the context of 'live' services, this will constitute the area in which all personnel and or equipment shall be prohibited from entering in the event that a strike or damage to those services may cause injury or incident.

method statement
a legal document that states the intended safe working system to be implemented on site.

risk assessment
a document or process to identify a significant hazard on site and the likelihood that such a hazard may cause harm.

control measure
a process or procedure, physical or otherwise, put into place prior to the commencement of a task to eliminate or mitigate against harm occurring.

inspection
a process and procedure to be enacted prior to any work being carried out where it is likely that 'live' services are present.

calibration
an examination and subsequent testing, by a competent person of the status of tools and equipment used to etermine the accuracy and working condition of such as cable avoidance tools, gas detectors, voltmeters and mmeters etc.

disconnection
in relation to 'live' services, disconnection relates to the severance and separation of cables and pipes etc from the origin of the power source to the feed point or user point being worked on.
The Disconection of a service may only be carried out by the service provider or approved appointed agent outside of the site boundary.

termination
in relation to 'live' services, termination means the interruption, breach and or break to cables or pipes etc from the origin of the power source to the feed point or user point being worked on.
The live head may be maintained for future use following the complete separation of incoming supplies to remainder of the building.

isolation
in relation to 'live' services, isolation means separating or segregating those service cables or pipes etc from the origin of the power source to the feed point or user point being worked on and may not necessarily constitute the 'killing' of the power source in its entirety. i.e. the removal of fuses from a fuse box feeding to an area of the building does not 'kill' power to the fuse box itself.

diversion
in relation to 'live' services, diversion means to alter, change and or re-route cables or pipes etc from the origin of the power source away from the feed point or user point being worked on.

energy systems
any services, including electricity, gas, water, telecom, oil, compressed air, fire systems, security systems etc, entering into or present in and around the site.

2 UTILITY SERVICES MANAGEMENT

The dissemination and continued stream of information gathered for the safe and efficient processes on site should be provided in a timely and effective manner. Where this information concerns the presence and location of all services feeding into and around the site operations, it should beundertaken by competent people who fully understand the potential hazards and the risk associated from contact with 'live' services. This process, distributed and or gathered on site should be available in a timely and effective manner. The site management team, whether it be one person or many persons should have all relevant health, safety, environmental and operating procedures in place and an effective system of delivery to others. Managers of the construction or demolition process in which the use of mechanical or hand held equipment is required for services locating or the protection of those supplies or persons involved, should be conversant with all aspects of such use and although managers do not necessarily need to be the operator of such tools and equipment, they should be familiar with the safe operating use, maintenance and calibration requirements.

A person or persons having responsibility for work equipment and its use, directly or indirectly, i.e. employers, employees, the self employed and those who hire work equipment, have a duty to comply with The Provision and Use of Work Equipment Regulations (PUWER) of which its primary objective is to ensure that work equipment should not result in health and safety risks, regardless of its age, condition or origin. Such persons must also ensure that the provisions set out within The Construction (Design and Management) Regulations (CDM) are complied with. Powered equipment should usually have a thorough examination at least every 12 months or at an interval determined by the manufacturer or a competent person. If the equipment is used for metering, measuring and or locating services, leaks or the presence of gases etc. it should be tested and calibrated at frequent intervals.

The procedures and work processes to be undertaken on site should follow an hierarchical principal, that is to say, what must be carried out from inception to completion in a safe, logical and efficient manner with due regard to the environment and other relevant matters. Managers having particular responsibility for the procurement, hire or use of equipment must fully understand the site conditions, any proximity hazards, below and above ground services or obstructions, access and egress constraints, other on site operations, the workforce and public safety and the local environment.

2.1 STANDARD OPERATING PROCEDURES

The CDM Regulations state that "the demolition or dismantling of a structure, or part of a structure, shall be planned and carried out in such a manner as to prevent danger or, where it is not practical to prevent it, to reduce danger to as low a level as is reasonably practicable." Extrapolation of this statement and its inference to 'live' services and the word danger is significant and should be of prime importance when considering the safe system of work.

Demolition and or refurbishment contractors must fulfil all the duties imposed upon them by the statutory workplace acts and regulations. A large part of those duties will invariably concern the identification of hazards and an ssessment of the risks involved in undertaking the works. Clients and or Principle Contractors are required to take reasonable steps to ensure suitable management arrangements are in place throughout the life of the project so that the work can be carried out safely and without risk to health. When deciding whether management arrangements are suitable and maintained throughout the project, clients and or principle contractors will need to make a judgement based on the nature of the project and the risks that the work will entail using equipment/plant, maintaining systems or working within close proximity to 'live' services. The information contained within this guide document is aimed at those persons who are working or have need to visit or inspect demolition and refurbishment sites where utility services are known to exist, have been terminated, disconnected or diverted and or remain within the site under protection. As such, this guide may not have relevance if applied to other industry sectors where operating principles may differ or the management systems in use are incompatible or not fit for purpose.

For the greater majority of demolition or refurbishment projects the presence of 'live' services, at tender and or pre-start stage, can be said to be a common factor. Therefore, arrangements need to be made to determine who is to be responsible for dealing with these services and what their status is likely to be throughout the duration of the project. Ideally, services feeding into the working area should be made safe prior to the appointed contractor arriving on site. However, if the appointment of a contractor is made late in the management process or there has been a failure in the management process regarding dealing with the services, it is likely to delay the commencement of a project or entail an expensive and expansive process of protection whilst awaiting such as termination, diversion or isolation etc.

Contractors called upon to tender for work will benefit from the timely and effective procurement of information (pre-construction information) which is project specific and intended to help in identifying significant hazards and risks associated with the work and site, particularly those that may not be readily obvious. All contractors when tendering for work would be expected to have visited the site and carried out their own survey, be it visual, desk top or intrusive. Some proximity hazards such as overhead cables can be said to be obvious, whilst the presence of underground cables are not necessarily so. Similarly, over ground gas pipes painted yellow or metal plates and markers on nearby walls, roads and or paving's will indicate the presence of a gas supply, but those within the ground are not so easily recognised. Clear, up to date and well laid out utility drawings giving comprehensive information of service locations should be provided to allow the contractor sufficient opportunity to identify the extent of any utility services in and around the work site location. Particularly attention should be given where it is intended that heavy plant and equipment is required to access over underground services and or the structure is to be collapsed within those locations.

2.2 GETTING RELEVANT INFORMATION

The CDM Regulations state that "the demolition or dismantling of a structure, or part of a structure, shall be planned and carried out in such a manner as to prevent danger or, where it is not practical to prevent it, to reduce danger to as low a level as is reasonably practicable." Extrapolation of this statement and its inference to 'live' services and the word danger is significant and should be of prime importance when considering the safe system of work.

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Examples of schemes in operation nationwide are as follows;

National Grid – linesearch or plantprotection

BT Openreach and others – dial before you dig

Thames Water – asset location search

The utility services information provider will invariably supply the researcher with a drawing showing the type of utility service present and the location/run of cables or pipes etc. Generally these drawings will be colour coded for ease of identification, with a legend depicting the nature of the services and their presumed location. The contractor should also ensure that all electrical cables are depicted, i.e. low voltage and high voltage Users of these drawings must assume that depth and exact location cannot accurately be ascertained from this information source and that where it is necessary to ensure absolute accuracy, a process of hand digging, along the presumed route, to physically locate the services may be the best option.

Figure 1: Service Drawing

Contractors requiring a disconnection to premises about to be demolished would obviously seek a permanent solution. However, those undertaking refurbishment may require a temporary solution only as the incoming service supply, e.g. gas or electricity will be needed following the works completion.

Generally, the service provider organisation will not provide a temporary disconnection service as disconnections will involve excavation on or off the premises with a physical cut. Temporary termination or diversion may involve a localised shutting down of the system, at a distribution box or valve, which in turn may need to be protected from damage and or contact throughout the duration of the works. Where such a situation is to arise the contractor should ensure that his/her safe system of work and safe working procedures have adequately addressed and detailed the process of risk assessment, protection, work, monitoring and hand over prior to commencement.

Additionally, where temporary works are required, i.e. support structures and mechanisms regarding the continued integrity of the structure or building, consideration must be given to the presence of the 'live' services and any concerns relevant to the placing and alteration of the temporary works.

The temporary works coordinator or engineer should be informed at the earliest opportunity together with input from a competent and relevant services tradesperson who will assist in the safe working procedure to be adopted.

LOOK OUT FOR 'DANGER OF DEATH' SIGNS THEY MEAN WHAT THEY SAY.
If in doubt contact the Network Operator for Safety Advice

+ NOTES

1. Disconnection should always be the desired first choice in which a 'physical' cut and pot ending of the cable or pipe will be made outside of the footprint of the site. In addition, cutting of the cables and pipes as they enter the building provides a permanent visible assurance to the site operatives.

2.2.1 WHO TO CONTACT AND HOW

Starting on the trail for the Disconection of Services can be onerous and disconcerting, particularly for first time users of the process. However, a simple hierarchy should be adopted and that is;

1. Contact the energy supplier to have the meter/s removed.
2. Make contact with the utility Supplier to arrange payment and to disconnect the service.
3. Keep on top of the process by regular contact.
4. Make sure you have a presence on site the day of the disconnection.
5. Obtain proof of disconnection. Information rerquested will include:
   a. Full site address.
   b. MPAN or MPRN number (found on the meter).
   c. Site plan clearly marked to show building that requires disconnection.
   d. Contact details.
   e. Payment details.

Some service providers will own the meter and the infrastructure (pipe or cable etc) so will arrange to remove the meter and disconnect the service. However, this is not always the case as some meter owners may be bulk buyers of the gas or electric supply which they in turn will sell to the user.

These organisations are usually referred to as the ‘Vendor’ or ‘shipper’ and they in turn may have what is termed a ‘meter asset manager’, others may have a ‘meter point administration team’.

Therefore, the vendor or meter asset manager/team should be contacted to remove the meter prior to approaching the actual gas or electric infrastructure owner to make the necessary permanent disconnection.

Finding out who actually owns the meter or supplies the power is not always obvious. There are a number of ways in which contractors seeking disconnection can utilise to find the answer and these are as follows:

a. Ask the building owner, landlord, tenant or services engineer for the supplier details.
b. Look at any post, leaflets or invoices that may be present.
c. Check the meter or distribution boxes/valves for labels.
d. Check on line web sites for regional coverage of service providers.
e. Consult the Energy Networks Association web site for utility service companies and their regional coverage.

Alternatively, one can call the meter help lines by telephone.

Gas: The majority of the UK's gas is delivered by National Grid, Northern Gas Networks, Scotland Gas Networks, Southern Gas Networks or Wales & West Utilities. To find out who supplies your gas; call the Meter Point Administration Service on 0870 608 1524 FREE.

Electricity: The UK electricity network is split into regions and each region has a local distribution company. They keep a record of who supplies electricity to every home and workplace in their area.

If you need to find out who your supplier is then you can contact your local distribution company using the numbers below.

- Scotland North (SSE Power Distribution) - 0870 900 9690 - FREE
- Scotland South (SP Energy Networks) - 0845 270 9101 - FREE
- North East England (Northern Powergrid) - 0845 601 3268 - FREE
- Yorkshire (Northern Powergrid) - 0845 330 0889 - FREE
- North West England (Electricity North West) - 0800 195 4141 - FREE
- Merseyside and North Wales (SP Energy Networks) - 0845 270 9101 - FREE
- South Wales (Western Power Distribution) - 0845 601 5972 - FREE
- West Midlands (Western Power Distribution) - 0845 603 0618 - FREE
- East Midlands (Western Power Distribution) - 0845 603 0618 - FREE
- South East England (UK Power Networks) - 0845 601 5467 - FREE
- London (UK Power Networks) - 0845 601 5467 - FREE
- East Anglia (UK Power Networks) - 0845 601 5467 - FREE
- Southern England (SSE Power Distribution) - 0870 905 0806 - FREE
- South West England (Western Power Distribution) - 0845 601 5972 - FREE
- MPAN help line M Number helpline 0870 6081524
- ECOES is a National database that holds the MPAN number for all properties.

2.2.2 METERS

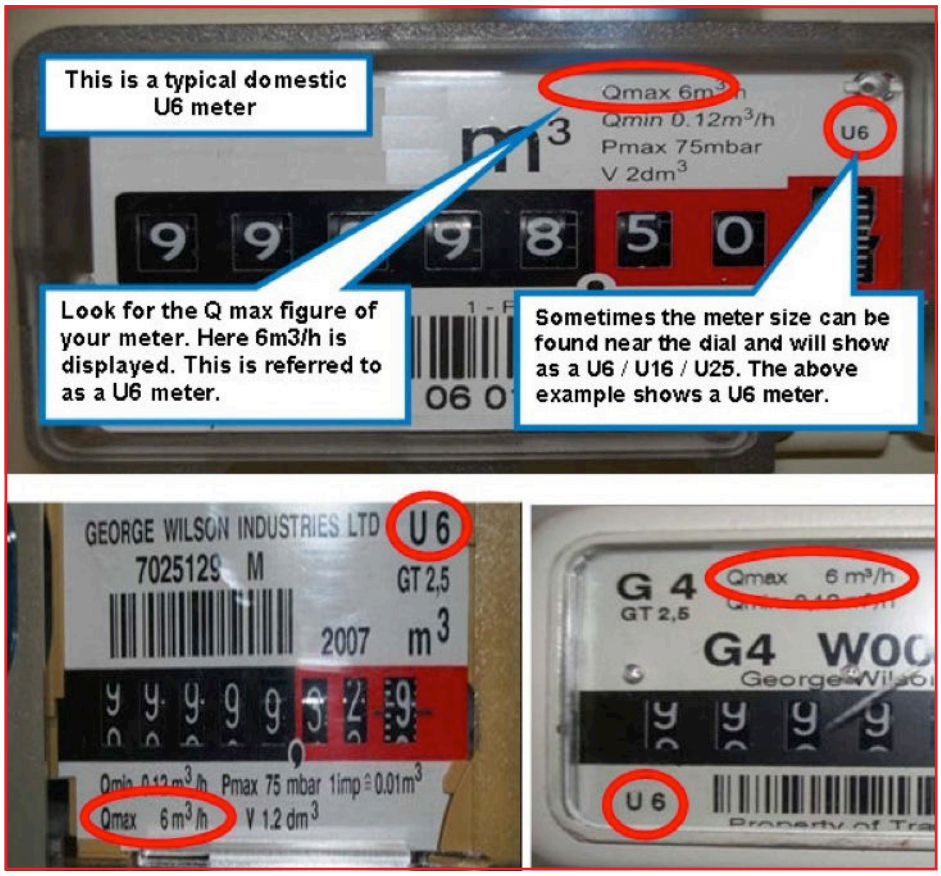
GAS

As a guide the common domestic meter is a U6/G4 diaphragm meter which will cope with the normal requirement of a medium sized home including central heating. U6 and G4 meters have the same maximum capacity of 6m^3 per hour. Refer to figure 2. The size of the meter is determined by the volume of gas flowing and not the size of the pipe. The number after the U or G refers to the maximum capacity of the meter in cubic meters per hour.

Larger properties will typically be U16 meters, i.e. those with swimming pools or light industrial units etc and for very large properties, i.e. mansions or factories etc they will typically be U25 meaning a maximum flow of 25m^3 per hour.

The meter owner will invariably want to know the meter size, location and meter reading when enquiring about removal the MPRN (Meter point referance number) number will greatly assist you in finding the service shipper.

Figure 2: Typical domestic U6 gas meter



+ NOTES

1. In the unusual event that no meter owner can be found it may be possible to have the meter removed by a competent tradesperson. In the case of a gas meter this will be someone who is a gas safe registered engineer.
2. MPRN number can be found on the gas meter or better still on last invoice.

WATER

Typically, an electricity meter will record the usage in kilowatt hours. The meter, if an older type will be an analogue meter as shown in figure 3 or a digital meter as shown in figure 4. The process for disconnection of the electricity meter is similar to that of gas. The organisation that supplies the electricity is usually the owner of the meter. After giving a meter reading (and sometimes the meter serial number) and the address of the property, the organisation will arrange for someone to call and de-energise the meter prior to removing from the site. Please note that even though the meter hasbeen removed the electrical supply to the mains or distribution box/s will remain 'live'.

The meter owner will invariably want to know the meter size, location and meter reading when enquiring about removal the MPAN (Meter point administration number) number will greatly assist you in finding the service shipper.

Figure 3: Analogue meter

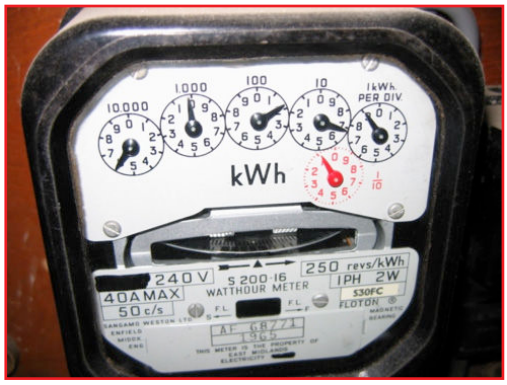


Figure 4: Digital meter

ELECTRIC

Water meters are invariably inline meters which means they are fitted to the supply pipe. Removal of a meter would generally be taken at the time of any permanent disconnection to the supply so would not necessarily be the subject of your enquiry.

Maintenance of a water supply to the site is usually required for either the asbestos removal phase or the demolition phase or both.

Localised removal of a supply is generally possible by turning offstop cocks within the site boundary or in the pavement.

2.2.3 SERVICE CUT OFF'S

Unless the utility company (power or energy provider) is the owner of the meter it is unlikely that any cable or pipe disconnection, permanent or temporary, will be carried out without the meter being removed first. The meter owner would normally notify the power or energy provider that the appliance has been removed and that a disconnection of services is required. However, a judicious contractor will not rely solely on this and will follow up the notice to invoke the final disconnection process personally. Provided that no outstanding monies are due to the utility providers and the meter owner is quickly identified, the removal of the meters should be a relatively straightforward process, taking an average of 2 weeks to complete. **It is imperative that all the meters have been removed before disconnection is arranged as failure to do so will result in the disconnection process being aborted and additional cost and time incurred.**

Making a request for a disconnection is generally carried out on line via email once the meter is emoved. Most utility companies have a form that needs to be completed and returned electronically. The information given will identify the property and size of service supply to be removed which in turn will dictate the cost. The utility company will generally have a standard charge provided that the job is straightforward. If there are anomalies or multiple disconnections it may require the utility company to survey the site prior to acknowledgement of the costs. If the site is a single domestic unit it is unlikely that there will be more than one service line (gas or electric) entering into the building. However, for larger commercial and or industrial sites there are likely to be more than one. Finding these service runs yourself by 'cat' scan and hand digging, may save time and prevent incidents or delays later.
Refer to section 3.

When the form has been returned the utility provider will advise of the disconnection costs which will require your acceptance of the costs and terms. You will need to make the payment for the works before being given a mutually acceptable date for disconnection. It is unlikely that any such works will be carried out before a period of 35 days has elapsed, particularly if it means working on the highway or pavement which will invoke the New Roads and Street Works Act, as this is a period dictated by the Local Authority. If the works can only be carried out under a Local Authority permit scheme, such as on the 'London Red Route' there may be additional charges for the permit and an extended period of notice needed before the works can be commenced. An average minimum period, from inception to disconnection is usually 8 weeks, although this period can vary dramatically.

Irrespective of which utility company will be undertaking the disconnection works, the applying contractor is advised to follow up, on a regular basis, with the point of contact name or office given, to ensure that the proposed works are being processed and enacted within the time stipulated. As a safety and conformance check, the following should be completed before disconnection;

1. Make sure all meters have been removed
2. Ensure that what you have requested is correct and relevant to the property
3. Purge all gas pipes
4. Dismantle and remove any scaffolding or other obstructions from the cut off points
5. If a variation to the proposed works is needed make sure you are on site at the time of disconnection to agree those works
6. Insist on the disconnection being undertaken outside of the site boundary

Following the completion of the disconnection works always insist on a disconnection/termination certificate that has been signed by the contractor team carrying out the work. The excavation will usually be filled with the excavated spoil and compacted. Where entry into the highway or pavement has been necessary, reinstatement of the top coat may be completed several days later. The contractor should endeavour to ensure that this work has been completed before vacating the site.

3 ON-SITE MANAGEMENT

It is generally accepted that the bulk of the administration, needed to initiate and finalise the onsite services disconnection process, is undertaken within the organising contractor's offices. What is not always clear is whose responsibility it is to carry out this action. It could be argued that it is the client's duty to make sure that the site is safe for occupation and that where intrusive works, such as demolition or refurbishment is required, potentially hazardous situations must be eradicated or at least reduced to as low as is reasonably practicable. However, the statutory regulations are not sufficiently prescriptive, in that they do not specify individual persons or organisations, they merely set out the duty of care. It is perhaps appropriate at this stage to define what the 'duty of care' means; **The responsibility or the legal obligation of a person or organization to avoid acts or omissions (which can be reasonably foreseen) to be likely to cause harm to others.**

Whilst the statement above is clear in its message, who does it refer to? Well the answer of course is everyone. Unless there is a clear unambiguous statement made within any project/contract documentation that states all services have been made safe or removed, one should always assume that they are 'live' and therefore must be attended to. Who eventually enacts this process will be decided, one presumes, at tender stage or pre-order stage. Obviously the earlier the better given the time frames to which the utility companies respond within.

The onus of responsibility can therefore be said to be a shared burden between all parties involved in the management of the works. Each party will be expected to perform their duty of care and to collaborate and share information relevant to the foreseeable and or potential hazard arising from the presence of 'live' services. In almost all cases it could be stated that risk assessment will identify the potential for harm where work is to be undertaken in and around the presence of 'live' services. Suitable and adequate control measures must be formulated and engineered to eliminate or at the very least reduce the hazard to as low as is reasonably practicable. The most advantageous and desirable control measure will be a physical disconnection (severing) of the pipe of cable outside of the site boundary. However, in some instances the services may need to remain connected and the contractor will be expected to provide a robust process of protection to the services and prevention of contact for personnel and the public.

3.1 LOCALISED TERMINATIONS AND DIVERSIONS

It may transpire, from time to time, that work has to be undertaken whilst the energy networks remain 'live'. This may be particularly true for many refurbishment or part demolition projects undertaken in occupied buildings where a temporary closure of a section has been enacted or the removal of old/redundant for new is required. Whatever the reason, it may be impractical or impossible to completely disconnect the service supplies and the best that can be expected is localised isolation or a diversion.

In these scenarios it is imperative that risk assessment together with a site survey/inspection be conducted to assist in the formulation of a safe working system. The building owner or client (if not the building owner) will be expected to supply adequate information regarding service runs, mains/distribution boxes/valves, fire and emergency systems and technical/maintenance requirements as well as the general access and egress and daily routine of the premises and site wide elements.

Making safe energy systems within and around the work place is a priority action that must be carried out prior to commencing work. It is possible that the premises may have a maintenance or estates team that can identify and isolate the energy supplies to the work area. Alternatively, you may need to engage the services of a qualified and competent tradesperson to undertake this work on your behalf. Where such isolation activities have been enacted they should be securely locked off from accidental engagement and fitted with suitable warning signs. Refer to figure 5.

Figure 5: Examples of 'Lock Out' signs

Whilst isolation of a particular service may be a simple or straightforward action, i.e. remove fuses, turn off a valve and apply lock off's etc, service diversions may be involved and require the installation of a new service pipe or cable prior to stripping back of the redundant energy line. The redundant pipe or cable should always be physically cut to show a clear break from the 'feed' to the 'appliance'. A qualified and competent service engineer must always be employed for such works and a termination certificate should be issued by the engineer carrying out the work.

Those service pipes or cables that are to remain may also require a level of protection against damage from the proposed refurbishment or demolition works. It may also be necessary to provide additional personal protective equipment to the operatives working close to them. A robust risk assessment will obviously advise on this requirement. The level of protection will always be subjective based on the type and nature of the services, their location, the propensity for contact and the duration of the intended work. Therefore protective measures may vary from a toolbox talk to complex temporary works. The latter will surely involve a structural engineer and or a temporary works coordinator.

+ NOTES

1. If the previous building owner, occupier, maintenance staff or even long term employees are around they can be a valuable source of information regarding service runs, distribution boxes and valves etc. Getting local knowledge, often free, can save many hours and cost trying to sort out the intricacies of supply lines and energy systems.
2. The only live service on a demolition/refurbishment project should be clearly identified and comply with regulation ### at 110v.
3. Terminated service should be clearly separated for the avoidance of any doubt by a qualified competent person.

3.2 CABLE AVOIDANCE TOOLS AND HAND DIG

Despite the plethora of utility service providers and their access to services related drawings, one cannot always rely on the accuracy of the information in every instance. For those buildings constructed on sites of 25 years and less, the service drawings may be relatively modern and reflect a reasonable accuracy of what to expect and where to expect it on site. However, for older structures on historically industrialised sites the drawings, if any survive, are likely to be outdated and should be taken as representative only. This obviously creates a conundrum in that identification of a cable or gas pipe for example cannot be assumed to be in a stated or expected location. When those locations are under aslab or close to foundations that need to be taken out one cannot take the chance that they are deep enough not to matter. Equally, shallow utility service runs may need protection against damage when heavy machinery and transport will be crossing over, particularly if the ground may be soft. Other considerations to take into account may involve older service runs laid in clay ducts or with no external protection other than the earth around them.

With all this in mind it is imperative that the veracity of the drawings (if any exist) and the expected locations of the utility service runs are determined prior to tracking heavy plant on site or taking out any structures.

Follow the advice in HSE Guidance Note HSG47
'Avoiding Danger from Underground Services'

C.A.T. AND GENNY

One of the most common tools in use today, for buried pipe and cable detection, is the CAT and Genny. The cable avoidance tool can used as a standalone instrument or in tandem with the genny unit to aidin greater detection, particularly for small cables such as telecom that do not emit a strong signal. It is also possible to use the genny in connection with a 'mouse' or 'sonde'. These can be obtained in a range of small self-contained watertight transmitters for insertion into non metallic ducting/pipes or even sewers. The unit will radiate a signal which can be pinpointed by the CAT in the Generator or transmitter mode.

Using the instruments in the correct manner to detect the utility service will greatly assist in ensuring a safe system of work is in place. However, it is not recommended that this system used alone will provide the kind of assurances one needs to remove all doubt. Locating the service run is the first line of action. Actually getting sight of it and unearthing it is the only sure way of knowing what it is you are dealing with and at what depth.

Hand digging a series of trial holes and marking the run is the ideal option although one must also ascertain that there are no junctions and spurs taken off the run to which you are marking. Some utility companies, such as National Grid, stipulate that hand digging must be carried out over their gas mains to locate them ahead of any mechanical digging or breaking that range from 0.5 metres away for low pressure to 3.0 metres away for high pressure. Becoming adept at using a CAT and Genny starts with attendance at a suitable training course and the subsequent relevant hours of practice needed to become proficient.

3.3 OVERHEAD POWER LINES

Overhead power lines are common place in our cities, towns, villages and rural areas. They carry voltages ranging from a domestic supply of 230 volts up to 400,000 volts. At any voltage electricity can be fatal and given the right conditions, i.e. atmospherics, geographical conditions, high voltages etc, can jump large gaps. Electricity from overhead lines kills a number of people each year and just getting close to lines can be dangerous. Many objects such as trees, string, rope, water and even the ground you stand on can conduct electricity.

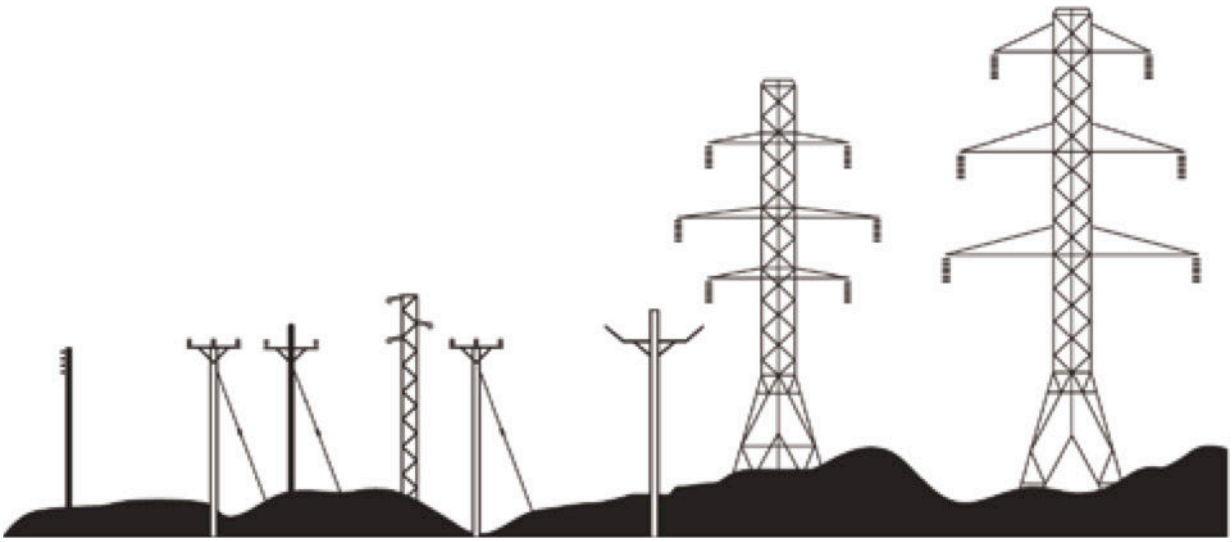
Before carrying out any demolition work where overhead cables are known to exist, contact with the relevant local electricity company should always be undertaken to obtain advice and a copy of the cable records and drawings. A general rule is to maintain a 6 metre clearance from the cable and themachine. However, the electricity company will almost certainly want to survey the site ahead of the planned work and will advise on the erection of marker posts (usually called goal posts) to indicate the maximum height that plant and equipment may pass under.

In some instances, particularly around domestic premises and small industrial units the cables will be quite low and the electricity company will probably insist on 'sheathing' the cables to give added protection against such as arcing when metallic objects are passed underneath. The only sure way of avoiding contact is to keep well away. High voltage overhead power lines are usually supported off steel pylons, whilst telecommunication lines are generally on wooden poles However, one should not assume that all wood poles hold telephone lines, most overhead electricity cables are supported off poles and not all power lines are insulated. If an overhead power line has fallen to the ground it may still be 'live' therefore you need to keep at least 5 metres away because the current can travel through the ground, through objects such as fences, metal objects (plant and equipment), water or other liquids etc. Wearing rubber boots will not protect you and if you need to get clear, jump clear making leaping strides so that one foot is off the ground at all times until you are at least 5 metres away. You do not need to touch the power line to be killed by it. Downed or damaged systems can be subject to auto resets meaning that the cables may become 'live' having just gone 'bang'.

For further advise refer to HSE leaflets GS6 and HS(G)47 on reducing the risk of contact with overhead lines and underground cables. The diagram below shows typical types of overhead lines and provides a guide to help assess the line voltage of lines on wooden poles or steel pylons.

The minimum EXCLUSION ZONE DISTANCE is shown for each example.

Figure 7: Typical UK overhead Pylon Profiles



275kV or 400kV Exclusion Zone 7m	**132kV11kV Exclusion Zone 6m**	or	**33kVLV Exclusion Zone 3m**	**230/400V Exclusion Zone 1m**

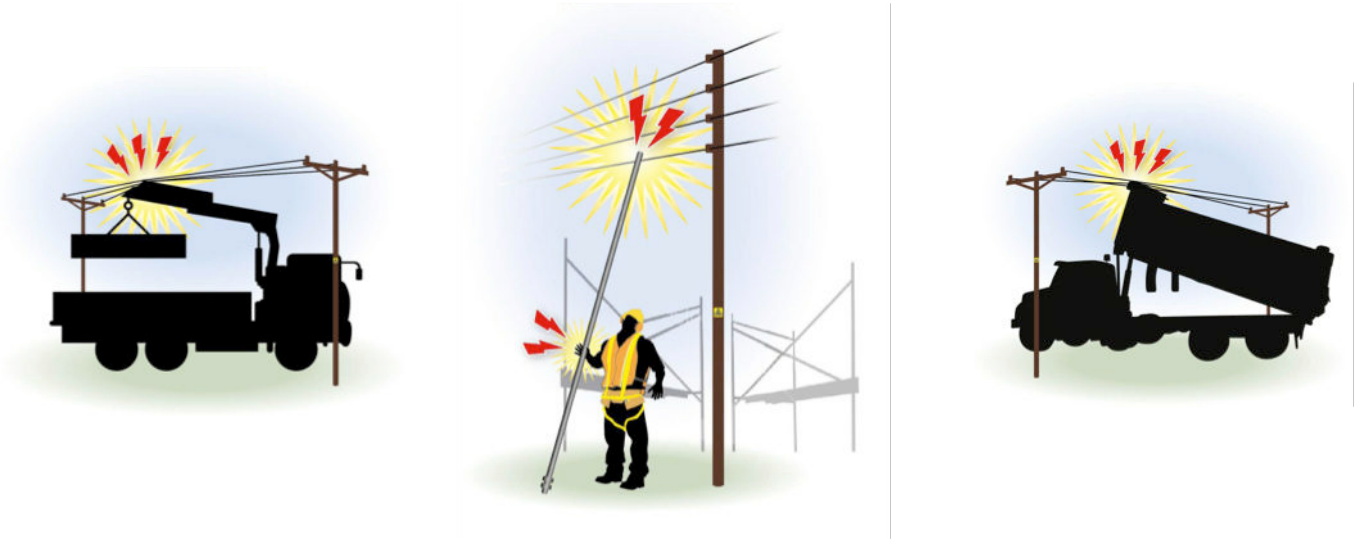
+ NOTES

1. When arriving on site for the first time, stand well back and survey the area for the presence of any overhead lines. Make a note of what they are, how they may affect the job in hand and what action needs to be taken to deal with them
2. If you damage an overhead power line, cable or support, stay well away and keep others away. Stop plant and transport movements. Contact the electricity company and declare the area an exclusion zone
3. If you strike an overhead line or damage one it may still be 'live' and conducting through the machine into the ground. Therefore leaving the machine will almost certainly be more dangerous than staying put.

Please note that these are absolute minimum distances that should under no circumstances be infringed.
If you do - it could prove fatal.

Follow the advice in HSE Guidance Note GS6
'Avoidance of Danger from Overhead Electric Power Lines'

LOOK OUT! LOOK UP!



3.4 RIDDOR (REPORTABLE INCIDENTS)

RIDDOR (The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations) is the law that requires employers, and anyone else with responsibility for health and safety within a workplace, to report and keep records of:

- Work-related deaths
- Serious injuries
- Cases of diagnosed industrial disease
- Certain 'dangerous occurrences (near miss accidents)

Dangerous occurrences are certain listed near-miss events. Not every near-miss event must be reported but certain incidents regarding gas and electricity fall within the reporting regime and these are as follows;

GAS INCIDENTS

If you are a distributor, filler, importer or supplier of flammable gas and you learn, either directly or indirectly, that someone has died or suffered a 'major injury' in connection with the gas you distributed, filled, imported or supplied, then this must be reported online using form (F2508G1).

If you are a gas engineer registered with the Gas Safe Register, you must provide details of any gas appliances or fittings that you consider to be dangerous, to such an extent that people could die or suffer a 'major injury', because the design, construction, installation, modification or servicing could result in:

- An accidental leakage of gas;
- Inadequate combustion of gas or;
- Inadequate removal of products of the combustion of gas.
- Sudden, uncontrolled release in a building of:
- 100 kg or more of flammable liquid;
- 10 kg of flammable liquid above its boiling point;
- 10 kg or more of flammable gas; or
- of 500 kg of these substances if the release is in the open air;
- Accidental release of any substance which may damage health - complete the online form (F2508G2).

In this regulation "liquefied petroleum gas" means commercial butane (that is, a hydrocarbon mixture consisting predominantly of butane, butylene or any mixture thereof) or commercial propane (that is, a hydrocarbon mixture consisting predominantly of propane, propylene or any mixture thereof) or any mixture of commercial butane and commercial propane.

If you are a contractor that is recording an incident of this nature and or similar where there is the potential for personal injury or an injury has occurred it must be reported using one of more of the aforementioned forms.

ELECTRICAL INCIDENTS

In comparison to gas incidents the reporting regime for electrical incidents is small by comparison and requires that you report any incidents of the following nature;

Any unintentional incident in which plant or equipment either –

Comes into contact with an uninsulated overhead electric line in which the voltage exceeds 200 volts; or causes an electrical discharge from such an electric line by coming into close proximity to it.

OR

An electrical short circuit or overload attended by fire or explosion which results in the stoppage of the plant involved for more than 24 hours or which has the potential to cause the death of any person.

3.5 WHAT THE UTILITY COMPANIES ADVISE

ELECTRICITY: ADVICE FOR DEMOLITION WORKERS

Before carrying out any demolition work, always stand well back and check for overhead power lines and other electricity equipment. At the planning stage of any demolition activity, you should contact your local Electricity company for advice and obtain a copy of the local cable records before starting work.

Even when the electricity has been switched off there may still be live cables and equipment in a building or within the grounds. Never demolish a building or structure until it has been confirmed that the electricity supply has been disconnected and all live cables and equipment have been removed. **Do not assume that lines can be made dead.**

- Cutting off electricity supplies for planned work is only permitted under a strict legal process which electricity companies must follow.
- There is no safe way to dig around live underground cables that are embedded in concrete.
- The best way to stay safe from live overhead power lines is to stay well away.
- Always assume an overhead power line is live and dangerous.
- Keep all electrical equipment secure and protected from the weather.
- Erect signs and barriers around any live lines that may remain on your site and brief your staff where they are and how to avoid them

REMEMBER

Houses, offices, shops, factories and street furniture all have electric cables supplying them.

CHECK PLANS

Ensure current cable records are on site.

Carry out a risk assessment in accordance with HSG47.

Be aware that not all cables are shown on plans.

USE CABLE LOCATORS

Before every use of CAT and Genny make sure they are calibrated and working properly.

Check plans by tracing cables and marking their position using paint, crayon, chalk or pegs.

Always scan the area you intend to excavate before you start to dig.

NOW DIG SAFELY

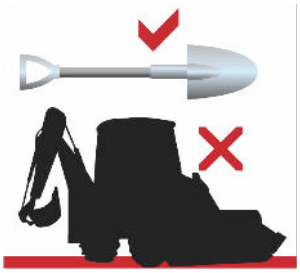
Hand-dig trial holes to find the exact position of cables before you use a mechanical excavator.

Be aware that cables can be found at any depth, even just below the surface.

If you find a cable embedded in concrete do not attempt to break it out.

Contact your Network Operator to ensure it is de-energised.

If you cannot find cables shown on the plan never assume they are not there - contact your Network Operator.



If you damage a cable vacate the excavation, immediately phone your Network Operators emergency number and keep everybody.

FURTHER READING

- GS6 – Avoidance of Danger from Overhead Lines (fourth edition)
- HS(G)47 – Avoiding Danger from Underground Services
- AFAG 804 – Electricity at Work: Forestry & Arboriculture
- Energy Networks Guidance – Look Out, Look Up
- ENA Technical Specification 43-8 Overhead Line Clearances
- ENA 2008 – Safety information for demolition companies
- SSW22 – Safe working in the vicinity of National Grid high pressure pipelines and associated installations
- Energy Networks Association website
  www.energynetworks.org
- Provision & Use of Work Equipment Regulations 1998: approved code of practice L22
- Management of Health & Safety at Work Regulations 1999: approved code of practice L21
- Electricity at Work Regulations 1989:
- The Electricity Safety Quality and Continuity Regulations 2002:
- The Construction (Design and Management) Regulations 2007: approved code of practice L144

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