
Guidance on Regulations

**GUIDANCE ON THE ELECTRICITY
SAFETY, QUALITY AND CONTINUITY
REGULATIONS 2002**

Publication reference - URN 02/1544

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22 October 2002 v1



Department of Trade and Industry

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A. INTRODUCTION

The purpose of this document is to provide guidance to duty holders on their responsibilities contained in the Electricity Safety, Quality and Continuity Regulations 2002 (S.I. 2002/2665), and to clarify necessary actions for duty holders to demonstrate compliance with the Regulations.

The new Regulations specify safety standards which are aimed at protecting the general public and consumers from danger. In addition, the Regulations specify power quality and supply continuity requirements to ensure an efficient and economic electricity supply service for consumers.

The Guidance is targeted primarily at the duty holders identified in the Regulations, specifically generators, distributors, suppliers and meter operators, including licensed and non-licensed duty holders. It should be noted that contractors and agents of duty holders, parties constructing networks, persons installing connections, persons operating embedded generation, and consumers may also have duties under the Regulations. The requirements of the Regulations apply to public and private operators and to electricity networks used to supply consumers in England, Wales and Scotland.

The Guidance is intended to assist duty holders in meeting the requirements of the Regulations. It will be of interest and practical help primarily to engineers (including those involved in the design, construction, operation or maintenance of power systems), technicians and their managers. While it reflects the DTI's view of the meaning of terms used in the Regulations, only the Courts can provide a binding interpretation. The purpose of the Guidance is to amplify the nature of the safety measures and procedures in general terms so as to help in the achievement of high standards of electrical safety in compliance with the duties imposed. However, for detailed advice reference must be made elsewhere and some relevant sources of information available at the time of writing are made throughout the Guidance.

In accordance with government guidelines for implementation of new legislation, this Guidance is published in advance of the new Regulations coming into force so as to allow sufficient time for duty holders to comply with the new requirements by the commencement date.

The Guidance is available for download at the DTI's website at www.dti.gov.uk/electricity-regulations. A copy of the Electricity Safety, Quality and Continuity Regulations 2002 may be obtained from The Stationery Office (telephone 0870 600 5522, or on line bookshop www.tso.co.uk). Alternatively the Regulations can be viewed on HMSO's website at: www.legislation.hmso.gov.uk/si/si2002/20022665.htm.

B. BACKGROUND

The Electricity Safety, Quality and Continuity Regulations 2002 replace the Electricity Supply Regulations 1988 (S.I.1988/1057) which were amended five times since coming into force on 1 October 1988 (amendments 1990, 1992, 1994, 1994 No.2, and 1998). The new Regulations revoke the 1988 Regulations and all amendments.

Since the commencement of the Electricity Supply Regulations 1988 the electricity supply industry in the UK has experienced radical reform reaching across virtually all activities in the industry. The most significant changes include: privatisation of the Central Electricity Generating Board and the Area Electricity Boards; takeovers and mergers involving foreign ownership and multi-utility businesses; regulation of licensed activities by Offer/Ofgem; introduction of the Electricity (Standards of Performance) Regulations 1991 and guaranteed service standards; launch of price control mechanisms and successive price reviews by the Regulator; opening up of some of the monopoly activities to competition; introduction of the Utilities Act 2000 and consequential separation of businesses into supply and distribution activities.

The result of all these and other changes is that the framework of, and participants in, the industry are very different to those at the time of the commencement of the 1988 Regulations. Consequently the 1988 Regulations have become increasingly outdated and are to be replaced by the Electricity Safety, Quality and Continuity Regulations 2002 to ensure the ongoing protection of the public, and quality and continuity of supply in appropriate circumstances. The new Regulations are aligned to modern electricity markets in the UK and identify the main duty holders responsible for maintaining safety and power quality standards and continuity of supply.

A public consultation exercise on specific proposals for the successor legislation to the Electricity Supply Regulations 1988 (as amended) was carried out between 16 February and 11 May 2001; this followed a public consultation on outline proposals for the new Regulations in 1999. A summary of responses received from the most recent consultation and DTI's reasons for implementing proposals in the light of responses to the consultation will be included in the DTI publication entitled *Response to Public Consultation for the Electricity Safety, Quality and Continuity Regulations* [not yet published]. The impact, in terms of costs, benefits and risks, of the new Regulations on businesses is included in the publication entitled *Regulatory Impact Assessment for the Electricity Safety, Quality and Continuity Regulations 2002*. The Regulatory Impact Assessment may be viewed at the following website – www.dti.gov.uk/electricity-regulations.

C. ARRANGEMENT OF THE REGULATIONS

The Electricity Safety, Quality and Continuity Regulations are made by the Secretary of State for Trade and Industry under powers contained in the Electricity Act 1989 as amended by the Utilities Act 2000. The Regulations are a statutory instrument and therefore have the force of law.

The first part of the Regulations (Introductory) includes definitions of terms and the scope of application of the Regulations. Importantly, the Introductory also includes general duties on the main participants.

In Parts II to VII the requirements of the Regulations are separated into broad equipment categories to clarify the scope of specific regulations, to aid understanding and for ease of reference.

The final part of the Regulations (Miscellaneous) deals with reporting requirements and the role of the Secretary of State to enforce compliance with the Regulations where necessary.

The Schedules (1 to 5) contain specific requirements relating to certain regulations. Duty holders should note that the Schedules are part of the Regulations and have the same force of law as the individual regulations themselves.

The Explanatory Note included after the Schedules provides a summary of each part of the Regulations. The Explanatory Note is not part of the statutory instrument.

D. *SO FAR AS IS REASONABLY PRACTICABLE*

The term *reasonably practicable* is used frequently throughout the Regulations. Essentially the term requires duty holders to undertake a risk assessment of the circumstances at hand, i.e. how do the risks of interference, danger or interruption of supply compare with the time, trouble and expense which would be involved in taking steps to eliminate or minimise the risks? The greater the degree of risk the less weight can be given to the cost of measures needed to prevent that risk.

E. INTRODUCTORY (PART I)

1. Citation, commencement and interpretation

1(1)	The Electricity Safety, Quality and Continuity Regulations come into force on 31 January 2003, and on the same date the Electricity Supply Regulations 1988 (as amended) are revoked (see Schedule 5 <i>Revocations</i>).
1(2) & (3)	In accordance with EU Directive 98/34/EC (as amended by Directive 98/48/EC) these Regulations allow for recognition of standards in other States of the European Economic Area (EEA) which provide equivalent levels of performance, safety, health, consumer protection, etc. The purpose of recognising other equivalent standards is to avoid apparent barriers to trade within the EU. Insofar as these Regulations are concerned, this means that where the requirements of the <i>British Standard Requirements for Electrical Installations BS7671:2001</i> are invoked, other equivalent CENELEC standards are also acceptable where appropriate to the circumstances.
1(5)	There are numerous definitions aimed at clarifying the intended meaning of important terms used in the industry in the context of the requirements of specific regulations. Definitions are provided for duty holders and for various types of equipment mentioned in the Regulations. Clarification and explanation of some of the definitions is provided below:-

<i>conductor</i>	This term is aimed at power conductors which are themselves used directly to transmit electrical energy or to release fault energy to earth. Small wiring for control, protection and communication purposes is excluded from the scope of this term.
<i>consumer</i>	The reference to the Railways Act 1993 prevents duty holders from exercising certain powers with regard to railway operators (including powers to disconnect supply), for reasons of safety and economic and social impacts.
<i>distributor</i>	Since the Regulations do not differentiate between licensed and non-licensed operators, the requirements apply equally to owners and operators of both public and private electricity networks supplying industrial, commercial and residential consumers or street furniture (see definition of <i>network</i>). The term <i>distributor</i> is intended to encompass operators transmitting and distributing electricity under the terms of the Electricity Act 1989 (as amended by the Utilities Act 2000). Railway traction operators (whether servicing mainline trains, underground trains, trams or trolleybuses) are excluded from the definition of <i>distributor</i> . However, where railway traction

<i>distributor cont'd</i>	<p>operators install and maintain electrical equipment in the highway, it is DTI's expectation that they will comply with the requirements of these Regulations for that equipment.</p> <p>Distributors should note that they are exempt from implementing certain requirements within substations (see regulations 12 and 16).</p>
<i>electric line</i>	<p>Duty holders should note that this term has a much wider application than the term <i>conductor</i>. <i>Electric line</i> includes equipment such as cables, ducts, marker tape, pavement covers, underground link boxes, overhead line supports, etc.</p>
<i>equipment</i>	<p>This is a broad definition aimed at including all items, used or likely to be used by duty holders, which are directly associated with the provision of electrical energy.</p>
<i>generator</i>	<p>For the purposes of the Regulations, generators operate high voltage equipment and are particularly associated with the provision of electrical energy to consumers via networks (see definition of <i>network</i>). The intention here is to include medium and large scale generating plant incorporating substations and electric lines to which the public may have access.</p> <p>Operators of any sort of generation in domestic situations are not expected to comply with the requirements placed on generators.</p> <p>However, all operators and consumers should note that they may still be caught by the requirements of Part VI <i>Generation</i>.</p> <p>Generators should note that they are exempt from implementing certain requirements within generating stations (see regulations 12 and 16).</p>
<i>insulation</i>	<p>This term defines insulation surrounding phase conductors which is designed to withstand the operating voltage of the equipment.</p> <p><i>Insulation</i> as defined does not include protective coverings or coatings (surrounding phase conductors) which are not designed to support the full phase to earth or phase to phase voltage (as appropriate). For example the covering on BLX overhead line conductors could not be described as <i>insulation</i>.</p>
<i>meter operator</i>	<p>This term includes all persons installing or maintaining meters situated at or near the <i>supply terminals</i> (see definition). Therefore distributors or landlords who install metering equipment would be caught within the scope of the definition and must comply with the appropriate requirements.</p>

<i>network</i>	<p>This term is meant to include transmission and distribution networks designed to supply electricity to consumers, either directly or indirectly.</p> <p>It is recognised that generators may operate networks linking generating stations with consumers or with other networks. However, industrial plant within a generating station would not be considered to be included with the definition of <i>network</i> (e.g. high voltage conductors supplying coal crushing equipment).</p> <p>Networks supplying street furniture fall within the definition.</p> <p>Consumer's installations in buildings are not intended to be included in the definition. Such installations should comply with the requirements of <i>BS7671 Requirements for Electrical Installations</i> or those of other relevant standards. Electrical distribution systems on offshore installations are also excluded from the definition, e.g. oil rigs.</p>
<i>street electrical fixture</i>	<p>Street furniture falling within the scope of this definition would include streetlights, traffic signals, bollards, advertising hoardings, bus shelters, public telephones, etc., situated on or adjacent to roads, streets and footpaths.</p>
<i>substation</i>	<p>The requirements for substations should be applied equally to cable sealing end compounds and to mobile generating plant equipped with transformers.</p> <p>Distributors should note that pole mounted transformers and other equipment attached to overhead line supports are not intended to be included in the definition.</p> <p>It is the intention that these Regulations will not apply in respect of substations providing power to industrial plant in generating stations (e.g. substations servicing coal crushing equipment).</p>
<i>supplier</i>	<p>Duty holders should note that the term <i>supplier</i> is used in the modern context of an organisation which buys and sells electricity. This is distinctly different to the definition in the Electricity Supply Regulations 1988 (as amended).</p>

2. Application of Regulations

2(1) & (2)	<p>Duty holders include market participants as defined in paragraph 1(5) and also their agents, contractors or sub-contractors, all of whom are liable to prosecution in the event of non-compliance with the requirements of the Regulations (see regulation 35 <i>Offences</i>).</p>
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2(1) & (2) cont'd	Agents and contractors are exempt from complying with certain regulations (4, 15, 25, 26, 27, 28, 31 and 32); in these situations the duty holder himself must comply with the relevant requirements, rather than delegate the duties to a separate organisation.
2(3) to 2(7)	<p>The Regulations require completion or elimination (within fixed timescales) of the following phased requirements which were introduced or allowed by predecessor Regulations:</p> <ul style="list-style-type: none"> (i) Safety signs complying with Schedule 1 must be attached to all structures supporting high voltage overhead lines by 2013 (i.e. all old style safety signs should be replaced); (ii) All stay wires attached to overhead line supports carrying bare conductors must be fitted with insulators fixed at least 3m above ground level by 2013; and (iii) Pre-1937 cut-outs with fuses in earth or neutral conductors must be removed from service by 2013. <p>The Regulations also allow for phased introduction (within fixed timescales) of the following new requirements:</p> <ul style="list-style-type: none"> (iv) Formal risk assessment of substations must be carried out within 2 years of commencement; (v) Formal risk assessment of overhead lines or, if appropriate, parts of lines must be carried out within 5 years of commencement; (vi) Where necessary, signs attached to substations must be updated within 2 years of commencement (sufficient safety signs complying with Schedule 1 and property notice bearing location or identification of substation); and (vii) Safety signs complying with Schedule 1 must be attached to all structures supporting bare low voltage lines within 10 years of commencement. <p>It is DTI's expectation that duty holders will spread workloads associated with these new requirements equally across the permitted timescales.</p> <p>For explanations of each of these limited exemptions and new requirements, see comments for the relevant regulations.</p> <p>All other requirements require immediate compliance (including protection or marking of buried low voltage underground cables).</p>
2(8)	Where a duty holder makes any material alteration to equipment subject to the works listed in paragraphs 2(4) to 2(7) (before the expiry of any exemption period), then he must carry out those works at the time of the

2(8) cont'd	material alteration. For example, if a pole supporting bare low voltage conductors needs to be replaced before 2013, then the new pole must be equipped with a safety sign complying with Schedule 1 at the time of the replacement.
2(9)	In the period between the commencement of the Regulations and the expiry of any exemption period (and where no material alterations have been made to the equipment), the works listed in paragraphs 2(4) to 2(7) are subject to the relevant clauses in predecessor legislation. For example, between commencement and the expiry date of the relevant exemptions, substations must bear signs complying with regulation 20 of the Electricity Supply Regulations 1988 as amended, and poles supporting high voltage conductors must bear a safety sign complying with regulation 15 of the Electricity Supply Regulations 1988 as amended (or, if no material alteration has been made to the poles since 1988, a sign complying with regulation 16 of the Electricity (Overhead Lines) Regulations 1970).
2(10)	This paragraph permits any approvals, authorities or exemptions granted under the Electricity Supply Regulations 1988 as amended to continue for one year after the commencement of these Regulations, after which they will cease to have effect (except for those otherwise provided for in paragraph 2(9), where they will continue alongside the predecessor legislation for the periods specified in paragraphs 2(4) to 2(7)). If duty holders feel that any approvals, authorities or exemptions need to be continued under the new Regulations, they should present their case to the Chief Engineering Inspector in writing in good time before expiry of the 12 month period (see part N <i>Queries</i>).

3. General adequacy of electrical equipment

3(1)	<p>This Regulation places general duties on generators, distributors, suppliers and meter operators to prevent danger, interference with or interruption of supply so far as is reasonably practicable, and to ensure their equipment is sufficient for the purposes in which it is used.</p> <p>A generator's obligations to prevent interruption of supply will be interpreted by DTI in the context of the commercial, contractual and legal obligations at the given time.</p> <p>For the avoidance of doubt, it is important to clarify how the Regulations will be applied to adopted and unadopted networks built by parties other than the local distributor. Where a local distributor adopts a new network constructed by another party, the local distributor will be responsible for ensuring that the new network complies with the requirements of these Regulations whilst it is in operation. Where a new network constructed by another party is connected to a local distributor's network but not adopted by the local distributor, the party operating the new network will become its distributor (see definitions of <i>distributor</i> and <i>network</i> at regulation 1(5)) and</p>
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3(1) cont'd	will therefore be responsible for ensuring that the new network complies with the requirements of these Regulations whilst it is in operation.
3(2)	<p>Generators and distributors are required to assess the risk of danger from interference, vandalism or unauthorised access associated with each substation and each overhead line circuit. Duty holders should note that the specific requirements are as follows:</p> <p>(i) Identify the assets – Identify all substations and overhead line circuits. Risk assessments are not required for individual items of plant and equipment in substations or for individual overhead line supports, equipment attached to supports or spans between supports. For overhead lines, duty holders should take into account the risk of danger from interference with supports as well as midspan conductors, and for some lines crossing different terrains it may be necessary to separately assess the risk of danger from interference for individual sections of the line, i.e. some sections may be assessed as low risk and others higher risk. (Duty holders should note that this regulation is not targeted at service termination equipment in buildings on consumers' premises, e.g. cut-outs and meters.)</p> <p>(ii) Assess the risks – Assess and classify the risk of danger to the public given the nature and situation of the asset and the reasonably foreseeable probability or possibility of interference, vandalism or unauthorised access in the particular circumstances. DTI recommends two tests which together may be used to assess the risks:</p> <p>(a) “Nature and situation of equipment” test – This test addresses the principal characteristics of the equipment and its particular siting. Generally, equipment comprising exposed conductors will be higher risk in view of the consequences of persons coming into contact with that equipment. Plant which is fully insulated or metal enclosed will generally be lower risk (unless it is insufficient for the purposes, inadequately maintained or defective) since persons may touch the external surface of the equipment without danger. For example bare overhead line conductors and exposed terminals on transformers or switchgear will generally be higher risk than distribution substations with metal enclosed plant. Equipment or plant which is likely to be attractive to vandals or thieves (e.g. terminal towers) will generally be higher risk than plant which is less attractive to such persons (e.g. single wood poles).</p> <p>(b) “Nature and situation of surrounding land” test - duty holders are required to take a view of the risk of danger from interference with the equipment – whether wilful or accidental – in consideration of the environment in which the equipment is placed. There are two aspects to this test: firstly the geography of the land and its features (for example forests, rivers, flat fields, motorway, city streets) and secondly the use of the land (for example agricultural machinery, recreational areas, schools, housing estate). Factors to be considered in carrying out this risk assessment include: likelihood of vandalism</p>

<p>3(2) cont'd</p>	<p>or unauthorised access, evidence of vandalism in the locality, height and type of mechanised and portable equipment likely to be used by persons at work or not at work, proximity of features and facilities likely to attract members of the public, derelict factory premises, and the density and make up of the local population. For example electrical equipment in housing estates or in close proximity to unsupervised recreational playing fields will generally be at higher risk of danger from interference than equipment situated on sparsely populated land or contained within occupied premises.</p> <p>Duty holders should take the two tests into account for each of the assets and establish their risk assessment for each asset, i.e. for each substation and for each overhead line circuit or, if appropriate, part of a circuit. The overall risk classification should be determined from the higher of the outcomes of each of the two tests. A single measure of the risk assessment is required, and duty holders should operate at least three levels of risk values, for example high, medium or low.</p> <p><u>(iii) Record the risks</u> – Duty holders should maintain records of the results of the risk assessments for each substation and overhead line or part of overhead line as appropriate.</p> <p>The minimum information that should be recorded is as follows:</p> <ul style="list-style-type: none"> • The identification of each substation or overhead line circuit or part of overhead line circuit, e.g. Heath Road substation or circuit to Heath Road. • The measure or value of the risk assessment, e.g. low or 42, depending on the particular risk assessment scheme operated by the duty holder. This measure or value need only be the result of the latest risk assessment, i.e. it is not necessary to record previous assessments. • The date of the latest risk assessment. • A brief summary of the key risks for the substation or circuit, e.g. farm machinery, vandalism, fishing, theft, playing fields, etc. <p>If they do not already operate a database able to accommodate the necessary fields to comply with these requirements, it is presumed that duty holders will modify existing asset databases as appropriate.</p> <p><u>(iv) Mitigate the risks</u> – Generators and distributors are required to take action to eliminate or minimise the risks in view of the outcome of the risk assessment. Actions to be undertaken will depend entirely on the risk assessment but could include: additional warning signs, enhanced anti-climbing guards, intruder alarms, steel doors, or replacement of the equipment with a safer alternative technology, e.g. insulated conductors.</p> <hr style="width: 20%; margin: 20px auto;"/> <p>Duty holders should note that the risk classification of an asset should not alter once appropriate measures are put in place in accordance with the risk</p>
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<p>3(2) cont'd</p>	<p>classification assigned. This is because in many cases the potential for danger from interference will remain. For example, an overhead line cable termination structure in a quarry next to a housing estate should not be reassigned as low risk once stringent measures to protect the asset are put in place, because the mitigating measures may not actually prevent interference in the circumstances and may themselves be subject to vandalism or be removed. Duty holders should only consider changing the risk classification when either of the two tests need to be reconsidered, i.e. when the equipment is replaced or the use of the surrounding land changes.</p> <p>In order to demonstrate compliance with this requirement duty holders should establish a policy to assess the risk of danger from interference with substations and overhead lines. The policy should take into account the various types of substations and overhead lines, the two tests for assessing the risk of interference (or an equivalent system of risk assessment), and implementation of mitigating measures. The policy should also incorporate the requirements of regulation 3(3) concerning warning the public of the dangers of overhead lines (see comments below).</p> <p>On the understanding that duty holders will establish a comprehensive policy to comply with this regulation, it will not be essential for duty holders to maintain records of how the risk of interference is assessed at each site or circuit, or the mitigating measures to be implemented at each site or circuit.</p> <p>Duty holders have 2 years from commencement of the Regulations to implement the requirements of regulation 3(2) for substations, and 5 years from commencement for overhead lines (see regulation 2(3)).</p>
<p>3(3)</p>	<p>In regulation 3(3) distributors are required to focus attention particularly on the risk of danger from contact or interference with overhead lines by persons engaged in leisure or work activities close to lines. Duty holders must take proactive measures to advise the public of the hazards associated with overhead lines and educate the public on how to avoid danger.</p> <p>In order to demonstrate compliance with this requirement distributors should take the following steps:</p> <p>(i) General application – duty holders should take steps to advise the general public on the dangers of overhead lines and how to avoid those dangers. Examples of actions that duty holders may take would include making presentations to schools or certain leisure groups on the dangers of overhead lines, or advertising in newspapers, newsletters or magazines at certain times of the year when the risk of contact with overhead lines might increase, e.g. during the summer months.</p> <p>(ii) Specific application – duty holders should take steps to target certain lines which may present a significant risk of danger to the public and address the particular group which is at risk from accidental contact with the lines. Examples may include lines oversailing or near the</p>

<p>3(3) cont'd</p>	<p>following areas: arable farmland, farmyards, lakes or water courses where persons may be fishing or sailing, public open spaces where persons may be flying kites or model aircraft, caravan sites, and spaces where children or youths are likely to be present (e.g. schools, playing fields, and beauty spots). Duty holders should target equipment at formal recreational areas (e.g. football pitches and leisure centres) as well as informal recreational areas (e.g. fields, heath land or common land close to housing where children and youths may gather together). Generators and distributors should take appropriate measures to draw the attention of the public to the hazards associated with the equipment and how accidental contact can be avoided.</p> <p>For example, for an overhead line near a fishing or sailing lake the distributor may erect danger signs near or under the line advising persons to keep away or carry long equipment parallel to the ground; similar warnings could be printed on cards and distributed to club members, or printed on posters and fixed at communal areas; safety videos could be distributed to club members; a representative from the electricity company could present a lecture about the dangers of overhead lines, etc.</p> <p>Distributors should note that compliance with this requirement does not diminish in any way their obligation to prevent danger so far as is reasonably practicable and to take mitigating actions in view of the outcome of the risk assessment, in accordance with regulation 3(2)(c). In other words, danger notices may themselves be insufficient to prevent danger, and additional protective measures may still be necessary depending on the risk of interference, e.g. replace bare conductors with insulated conductors, increase line clearances, or divert the line.</p>
<p>3(4)</p>	<p>This regulation places obligations on duty holders to prevent enclosed spaces from being contaminated with fluids which may cause danger. Environments that would be caught by this regulation include customers' premises, e.g. basements or stairwells, and generators' and distributors' own premises, e.g. substations or cable basements. Examples of fluids that may expose consumers or other duty holders to danger in such situations include: water due to burst mains or flash floods, methane leaking from gas pipes in the ground, leakage of SF₆ displacing air, or synthetic oil from fluid-filled cables. Actions to be taken by duty holders to comply with this requirement may include sealing cable ducts where cables emerge from ducts into buildings, or special measures to drain away water in the event of a flood near a substation situated below ground level.</p>

4. Duty of co-operation

<p>4</p>	<p>The four main duty holders are required to cooperate amongst each other so as to ensure that they may each comply with the requirements of the Regulations.</p>
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4 cont'd	<p>Examples of information passing between duty holders include meter operators advising distributors about defective cut-outs, and distributors advising meter operators concerning meters which have been interfered with.</p> <p>In a fragmented industry there will be many situations where information acquired by one party would be important to another party with different responsibilities. Duty holders should be proactive in passing on necessary information relevant to safety, quality and supply continuity, and be helpful in supplying such information sought by others.</p>
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5. Inspection of networks

5	<p>This regulation requires generators and distributors to carry out regular inspection programmes for their networks. Duty holders must keep records to demonstrate that inspections are carried out.</p> <p>The frequency of inspection should be as necessary to comply with the relevant regulations in the particular circumstances. For example equipment identified as being at high risk of interference (see regulation 3(2)) may require more frequent inspection than low risk equipment.</p> <p>From the commencement of the Regulations, distributors and generators should retain records of inspections of substations and overhead lines for at least 10 years. Records should include the date of each inspection and any observations, comments or recommendations made by operatives.</p> <p>(Duty holders should note that DTI does not expect inspection records of metering or service equipment to be maintained for the minimum ten year period.)</p>
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F. PROTECTION AND EARTHING (PART II)

6. Electrical protection

6	<p>This is a general requirement for duty holders to ensure that faults are disconnected from the network with sufficient rapidity to prevent danger. Protective devices, with appropriate settings, must be applied to all networks, whatever the voltage.</p> <p>Duty holders should note that <i>danger</i> includes the risk of fire or explosion as well as the risk of injury to persons (see definition in regulation 1(5)).</p>
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7. Continuity of the supply neutral conductor and earthing connections

7(1)	<p>Duty holders will be aware of the importance of maintaining continuity of the supply neutral conductor to avoid potentially dangerous situations on consumers' premises.</p> <p>This requirement is particularly relevant to supplies offered from protective multiple earthing (PME) systems where the functions of the supply neutral and protective conductors are often combined in the same conductor. Disconnection of the combined supply neutral and protective conductor could cause danger on a consumer's premises if there is no equipotential bonding (see regulation 9 <i>Protective Multiple Earthing</i>).</p>
7(2)	<p>In view of the importance of maintaining continuity of the supply neutral conductor (see comments above), duty holders are forbidden from inserting any fuses or circuit breakers in the supply neutral conductor of low voltage networks.</p> <p>Pre-1937 cut-outs not complying with this requirement, but which were previously allowed under the Electricity Supply Regulations 1988 (as amended - reference regulation 2(1)(c) of S.I 1990/390), must be removed from service by 2013 (see regulation 2(4)).</p> <p>Operators should note that the requirements of this regulation do not preclude the use of automatic switching devices inserted in the earthing connections of embedded generator equipment required to operate in both parallel and islanded modes. Such switching devices may isolate the local earth in the event of parallel operation and automatically connect the local earth immediately on disconnection of the parallel with the distributor's network (see regulation 22 <i>Parallel operation</i>).</p> <p>Duty holders should also note that the installation of double pole isolators near the supply terminals on consumers' premises is not precluded by</p>

	regulation 7.
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8. General requirements for connection with earth

8(1)	<p>This paragraph is for general application to all networks at whatever voltage.</p> <p>Networks should be designed and operated to accommodate safely the largest possible fault current that could flow through the network.</p>
8(2)	<p>This paragraph relates to earthing requirements for high voltage networks.</p> <p>Duty holders will be aware of the benefits of high voltage networks being connected with earth enabling detection of faults, discrimination between protective devices, and safe release of fault energy.</p> <p>In high voltage systems with multiple in-feeds it is often desirable to install only one connection with earth in order to avoid circulating currents. Single point earthing allows for relatively simple protective arrangements for the location and isolation of the faulty section with minimal disruption to consumers. (Duty holders should note that connections with earth via reactors or resistors to reduce the fault level are permitted for high voltage networks.)</p> <p>Duty holders must ensure that persons are not at risk of danger from low voltage networks due to the rise in potential of the earthing system caused by the release of earth fault current from a high voltage system. In practice, duty holders will either interconnect the earthing conductors connected to high voltage equipment and those connected to low voltage systems where the combined resistance to earth is very low, or alternatively operate separate earth electrodes in which case the effect of overlapping resistance areas should be minimal.</p> <p>Where duty holders operate arc suppression coils, the intention in this paragraph is that non-clearing line faults should be brought to the immediate attention of the control engineer so that he/she can take appropriate action. Automatic warnings need not be relayed to control engineers when arc suppression coils are operating in short time mode.</p>
8(3)	<p>This paragraph relates to earthing arrangements for low voltage systems.</p> <p>In order to minimise the risk of danger arising from accidental damage, the outer conductors of any concentric cables should be connected with earth.</p> <p>The supply neutral conductor should be connected with earth at the neutral point of the local transformer, i.e. as close as possible to the source, to ensure that all consumers connected to multiple low voltage cables benefit from a secure common earth at the electrical centre of the network.</p>

8(3) cont'd	<p>There is an exception in regulation 8(3)(b) for protective neutral bonding (PNB) arrangements in which it is permissible for the connection to earth to be situated away from the local transformer and close to the load. Where multiple consumers are supplied from a dedicated pole mounted transformer, the connection with earth should be closer to the local transformer than any of the service connections.</p> <p>The final paragraph of this regulation places restrictions on duty holders from inserting impedances in any connections with earth, in order to prevent dangerous transient voltages on neutral or protective conductors in the event of an earth fault.</p>
8(4)	<p>Consumers may not combine the functions of neutral and protective conductors in their installations, i.e. consumers must not operate TN-C systems or use CNE cables within their installations. Distributors operating such systems must comply with additional requirements (see regulation 9 <i>Protective multiple earthing</i>).</p>
8(5)	<p>The requirements of this regulation apply to all networks, except certain equipment in generating stations where alternative secure arrangements have been put in place to prevent danger. For example, some generators may operate high voltage equipment between the generating unit and the output transformer which are not connected with earth. Such systems are permitted providing appropriate arrangements are put in place to locate and disconnect faults, for example unit protection. Generators should note that such alternative arrangements are only permitted within generating stations, i.e. any part of their networks outside generating stations (such as underground cables or overhead lines connecting the generation to distributors' networks) must comply with the specific requirements of regulation 8.</p>

9. Protective multiple earthing

9(1)	<p>This regulation is targeted at low voltage networks arranged for protective multiple earthing (PME), i.e. where the neutral and protective functions have been combined in a single conductor, including networks employing separate neutral and protective conductors which have been converted for PME operation.</p>
9(2) & (3)	<p>Essentially, distributors' PME networks must be equipped with sufficient multiple earthing connections in order to minimise the risk of the combined neutral and protective conductor becoming disconnected from earth (particularly on overhead line networks), possibly resulting in danger on consumers' premises (see comments for regulation 7 <i>Continuity of the supply neutral conductor and earthing connections</i>). As well as the supply neutral with earth connection at the local transformer (see paragraph 8(3)(b)), other connections with earth are required. Such additional earth connections may include, for example, separate earth electrodes at the service joint on the main farthest from the supplying transformer or alternatively a connection</p>

<p>9(2) & (3) cont'd</p>	<p>with the supply neutral conductor of another distributing main (which will be connected with earth at the star point of its supplying transformer).</p> <p>In order to demonstrate compliance with this regulation, DTI's expectation is for distributors to comply with the particular requirements of the Electricity Association's Engineering Recommendation G12/3 <i>Requirements for the Application of Protective Multiple Earthing to Low Voltage Networks</i> dated 1995.</p>
<p>9(4)</p>	<p>Distributors must not offer connections to earthing terminals from PME networks for consumers' installations in caravans or boats. The particular risk at these installations arises from the possibility of the supply neutral conductor becoming disconnected from earth, possibly causing the metalwork in the caravan or boat to rise to live potential (assuming that the caravan or boat does not benefit from an independent connection with earth). Persons entering or exiting the caravan or boat would then be at risk of electric shock.</p> <p>There is a small inherent risk of danger to consumers (resulting from the possible disconnection of the supply neutral conductor under fault conditions) with all PME networks (see comments for regulation 7(1)), however it is DTI's view that the risks are acceptable provided that:</p> <ul style="list-style-type: none"> (i) distributors comply with the requirements for multiple earthing (regulation 9(2)) and take precautions to ensure continuity of the supply neutral conductor (regulation 7(1)); and, (ii) consumers comply with the equipotential bonding requirements of <i>BS7671 Requirements for Electrical Installations</i>. Distributors should note that at the time of connection they should be satisfied that consumers' installations comply with <i>BS7671</i> (see regulation 25 <i>Connections to installations or to other networks</i>). <p>Special consideration should be given to the earthing and protection arrangements for certain installations where reliance on the connection of the consumer's protective conductor with the distributor's combined neutral and protective conductor could result in more significant risks. For example, installations where it may prove difficult to attach and maintain all the necessary equipotential bonding connections (e.g. farms or building sites), installations at certain wet environments (e.g. swimming pools and petrol filling stations) and certain installations outside the equipotential zone of buildings (e.g. certain types of street furniture). Further advice may be sought from the Health and Safety Executive or the Institution of Electrical Engineers.</p>

10. Earthing of metalwork

10(1)	<p>This is a general requirement on duty holders to ensure that all exposed metalwork associated with network equipment is connected with earth where necessary to prevent danger. For example, metal enclosures protecting live conductors should be directly connected with earth (e.g. transformers and switchgear).</p> <p>Duty holders should note that earthing requirements for metalwork do not extend to small isolated pieces of metal such as individual labels and hinges.</p>
10(2)	<p>The exceptions to this requirement relate to equipment supporting overhead lines, specifically cross-arms on wood poles and insulated wall-mounted brackets, both of which should be well beyond the reach of persons on the ground.</p>

G. SUBSTATIONS (PART III)

11. Substation safety

<p>11</p>	<p>This regulation applies to substations belonging to generators and distributors, not to consumers' own substations. Duty holders should note that all substations, whether belonging to generators, distributors or consumers, must comply with the requirements of the Electricity at Work Regulations 1989.</p> <p>The regulation requires duty holders to erect and maintain enclosures to minimise the risk of danger from unauthorised entry into substations in the particular circumstances, and to erect and maintain notices warning the public of the danger of live equipment.</p> <p>Distributors should note that this regulation does not apply to pole mounted transformers (see definition of <i>substation</i> at regulation 1(5)), which are subject to other safety requirements (see Part V <i>Overhead lines</i>).</p>
<p>11(a)</p>	<p>Regulation 11(a) requires generators and distributors to enclose all substations where necessary to minimise the risk of danger or unauthorised access. The type of enclosure relates to the level of risk of danger from interference by unauthorised persons. In high risk situations (e.g. inner city housing estates) duty holders are required to erect enclosures commensurate with the particular risks, e.g. brick buildings, palisade fencing equipped for enhanced security, outer and inner fencing or walls, anti-climbing guards fitted to the tops of fences and walls, etc. In low risk situations (e.g. private grounds in the suburbs) a lower standard of security would suffice, e.g. chain link fence. A useful guide to the selection of substation enclosures is included in Appendix H of the Electricity Council's publication entitled <i>Child Trespassers in Electricity Substations</i> (published in 1986). Generators and distributors should note that the duty to enclose substations relates not only to the fabric of the enclosure but also to all other aspects of security including: locking arrangements, possible footholds or climbing aids, type of doors and hinges, etc. The duty to enclose all substations is qualified by the term <i>where necessary</i>; this means that the zero enclosure option is permissible but only in very low risk situations.</p>
<p>11(b)</p>	<p>Regulation 11(b) applies to substations containing exposed conductors located in the open air. These substations must be enclosed by a fence or wall which is at least 2.4m high. Once again the height and type of fencing must be commensurate with the level of risk of danger from interference (see comments above). In the case of a fence fitted on top of a low bunting wall, duty holders should discount the height of the bunting wall and apply the 2.4 height requirement to the fence alone because intruders may use the wall as a foothold to help gain access to the substation.</p>

11(c)	<p>Regulation 11(c) requires duty holders to erect three types of notices at substations:</p> <ul style="list-style-type: none"> (i) One or more <i>Danger of Death</i> safety signs complying with Schedule 1 of the Regulations. (ii) A property notice giving the unique identification number or location of the substation and an emergency telephone number. Where several substations are located within a single industrial site (for example within a nuclear power station) property notices are still required for each substation for the benefit of infrequent visitors, including staff or contractors, who may observe something untoward in the substation. Each property notice must carry the name of the substation's current owner or operator. (iii) Where necessary, other signs commensurate with the risk of interference, e.g. <i>Keep Out</i> signs. <p>The quantity, size and position of signs should be appropriate to the risk of danger from interference at each location.</p> <p>Duty holders have two years to update substation signs to comply with regulation 11(c) (see regulation 2(5)), and in the meantime substation signs must comply with the signage requirements of regulation 20(2)(b) of the Electricity Supply Regulations 1988 as amended (see regulation 2(9)).</p>
11(d)	<p>Regulation 11(d) requires generators and distributors to take reasonable precautions to protect against the risk of fire. In deciding which measures to implement, duty holders should consider the risk of fire or explosion and the impact of such fire or explosion in the particular circumstances. Factors to be considered include: selection of switchgear with non-flammable insulation, the nature of the environment surrounding the equipment, and the need for automatic fire extinguishing equipment.</p>

H. UNDERGROUND CABLES AND EQUIPMENT (PART IV)

12. General restriction on the use of underground cables

12	<p>This regulation makes allowances for circumstances where duty holders may have breached the requirements of regulations 13 and 14, but may have done so inadvertently because they did not have actual knowledge of the circumstances giving rise to the breach.</p> <p>For example, in carrying out excavation works another utility may remove the protective tiles or tape covering a distributor's underground cables (required by regulation 14); unless the distributor knows or knew of the removal of the tiles or tape he would not be held to account for the breach of regulation 14.</p> <p>Duty holders should note that underground cables and associated equipment installed within generating stations and substations need not comply with regulations 13 and 14. In these environments health and safety law applies.</p>
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13. Protective screens

13(1)	<p>The requirements of this regulation apply to underground cables and associated equipment containing live conductors, e.g. underground link boxes.</p> <p>Duty holders should note that these requirements for mechanical protection and screening need not be applied to earth cables or earth electrodes.</p>
13(2)	<p>The aim of this regulation is to reduce the risk of danger due to persons inadvertently damaging underground electrical equipment. All cables (at whatever voltage) should be surrounded by a metallic screen connected with earth. Buried low voltage joints and other equipment which may not benefit from a metallic screen should be protected by some mechanical means, e.g. robust resin filled plastic shell surrounding jointed low voltage conductors.</p>

14. Excavations and depth of underground cables

14(1)	<p>This requirement places a continuous duty on generators and distributors, subject to regulation 12 <i>General restriction on the use of underground cables</i>, to install and keep underground cables at a suitable depth or otherwise protect the cables (e.g. by steel plates in shallow trenches) in order to prevent danger, so far as is reasonably practicable.</p>
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<p>14(1) cont'd</p>	<p>Duty holders should decide on the depth or other protection in the light of the use of the land at installation and other likely uses of the land in the future. Generators and distributors may not necessarily be held to account for breach of this regulation if they are not aware of an increased risk of danger due to the actions of other parties (see comments for regulation 12 <i>General restriction on the use of underground cables</i>).</p> <p>Useful guidance on the depth and relative position of underground services is available from the National Joint Utilities Group.</p> <p>Safety guidance on how to avoid underground services when carrying out excavation works is available from the HSE.</p>
<p>14(2)</p>	<p>Marking or protection of underground cables is required for all voltages, i.e. high voltage as well as low voltage (including service cables), in order to offer warning to persons excavating in the vicinity of live cables (contractors working in the street as well as consumers digging in the garden).</p> <p>In the case of low voltage cables, this requirement need only apply to cables installed after commencement of the Regulations (see regulation 2(6)). If any material alteration is made to a low voltage network then a mark or indication should be applied whether to new or to pre-commencement cables (see regulation 2(8)). For example, if after commencement of the Regulations a distributor exposes a low voltage cable installed without marker tape in 1995, he must install a mark or indication at the new excavation to comply with the requirements of this regulation.</p>
<p>14(3)</p>	<p>The methods that duty holders should employ to demonstrate compliance with this regulation and thereby reduce the risk of injury to contractors or members of the public are listed in order of preference as follows:-</p> <ul style="list-style-type: none"> (i) Cable installed in a duct with marker tape above. (ii) Cable installed in a duct only. (iii) Cable laid direct and covered with a protective tile. (iv) Cable laid direct and covered with marker tape. (v) Some other method of mark or indication. <p>In consideration of the methods by which cables should be marked or protected, duty holders should make allowance for the environment in which the cables are installed and the risks to staff who may need to expose and work on the cables in future.</p>

15. Maps of underground networks

15(1) & (2)	<p>This regulation requires generators and distributors owning and operating underground cables and equipment to keep up to date maps of their equipment where it is placed on land not under their control.</p> <p>Such information is very important for the safety of all persons (whether contractors or members of the public) excavating on public or private land.</p>
15(3) to (5)	<p>DTI recognises that in many cases duty holders will maintain electronic maps of their equipment, which is permissible provided copies of the maps (whether printed on paper or provided in electronic format) are made available to other persons as requested.</p> <p>Any fee required under paragraph 15(4) has to be reasonable, i.e. any charge must reflect the actual cost of providing the maps.</p>
15(6)	<p>This paragraph allows duty holders to be exempt from retaining certain information on maps where historical maps have been lost (for example due to fire or floods at premises where the maps were stored) before the introduction of the Electricity Supply Regulations 1988.</p> <p>Generators and distributors should note that this exemption relates to extreme circumstances only. If any duty holders have omitted accurate and important details on any underground cable maps, the Secretary of State should be advised at the soonest opportunity.</p>

I. OVERHEAD LINES (PART V)

16. General restriction on the use of overhead lines

16(1)	<p>This regulation makes allowances for circumstances where duty holders may have breached the requirements of regulations 17, 18, 19 or 20, but may have done so inadvertently because they did not have actual knowledge of the circumstances giving rise to the breach.</p> <p>For example if the safety sign becomes detached from a high voltage overhead line support, the distributor would not be held to account for the breach of regulation 19 <i>Precautions against access and warnings of dangers</i> unless he knows or knew of the breach and failed to take remedial action.</p> <p>Duty holders should note that this allowance does not diminish their responsibilities to inspect their networks with sufficient frequency to ensure compliance with the Regulations (see regulation 5 <i>Inspection of networks</i>).</p>
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17. Minimum height of overhead lines, wires and cables

17(1)	The heights specified in this regulation are minimum clearances for overhead lines. Only the equipment specified in regulation 17(3) is exempt.
17(2)	For lines at 33kV and below, the minimum height over roads is higher than that for lines at other locations to make allowance for high-sided vehicles (see Schedule 2 <i>Minimum height above ground of overhead lines</i>).
17(3)	<p>This paragraph identifies three types of overhead line equipment that need not comply with Schedule 2, provided the equipment is not installed over a road:</p> <ul style="list-style-type: none"> (i) lines which are fully insulated (see definition of <i>insulation</i> at regulation 1(5)); (ii) exposed conductors connecting equipment (fixed to the support) to the line, provided the conductors are at least 4.3m above the ground (e.g. connections to pole mounted transformers or auto-reclosers); and (iii) lines which are connected with earth, e.g. earth wires or neutral conductors on low voltage networks.
17(4)	In addition to the minimum height requirements for conductors over roads (regulation 17(2)), any other wire or cable attached to an overhead line support and suspended over a road must be at least 5.8m high to make allowance for high sided vehicles. Such equipment would include pilot

17(4) cont'd	wires, control cables, and stay wires connected to other supports.
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18. Position, insulation and protection of electric lines

18(1)	Regulation 18(1) requires that any part of an overhead line which is live and which is not within reach from a nearby building or structure (i.e. is not ordinarily accessible – see regulation 18(6)) shall be supported on insulators or be covered by insulation (see definitions of <i>insulation</i> and <i>insulator</i> at regulation 1(4)), so as to prevent leakage to earth (e.g. through a wood pole).
18(2)	<p>Any live conductors which are within reach (i.e. <i>ordinarily accessible</i>) must be made dead, insulated or protected to prevent danger. The implication here is that insulated conductors (such as low voltage aerial bundled conductors but not high voltage BLX conductors) may be placed such that they are ordinarily accessible, providing they are safe in the particular circumstances.</p> <p>Duty holders should note that temporary insulation applied to overhead conductors would be an acceptable form of protection from accidental damage to, or interference with, low voltage lines in appropriate circumstances.</p>
18(3)	This paragraph requires that developers or other persons erecting buildings or structures in the immediate vicinity of overhead lines should notify the relevant distributor or generator concerning their plans. The purpose here is to give opportunity to the distributor or generator to make the line safe before it could become a source of danger arising from the proximity of the proposed building or structure to the existing line. Any person who does not notify the relevant distributor or generator in such circumstances is liable for prosecution under regulation 35.
18(4)	For low voltage overhead lines equipped with separate phase and neutral cables, the lowest conductor must be the earth or neutral conductor and the phase conductors must be mounted directly above it.
18(5)	<p>This requirement places a continuous duty on generators and distributors to maintain a safe distance between any overhead line and any tree, building or other structure where persons may be present.</p> <p>In general, duty holders may demonstrate compliance with this requirement by complying with the Electricity Association's Standard 43-8 <i>Overhead Line Clearances</i> dated 1988.</p> <p>It is DTI's expectation that distributors operate tree cutting programmes with sufficient frequency to ensure that trees do not become a source of danger, for example due to children climbing trees near overhead lines. Licensed distributors should note that they have powers under paragraph 9 <i>Felling and</i></p>

18(5) cont'd	<i>lopping of trees etc.</i> of Schedule 4 of the Electricity Act 1989 (as amended by the Utilities Act 2000) to fell or lop trees which could become a source of danger.
18(6)	In the context of this regulation an overhead line is <i>ordinarily accessible</i> if it could be reached by hand from any scaffolding, ladder or other construction erected on or near to any building or structure. For example, if a contractor standing on scaffolding erected against a building can reach out and touch a passing overhead line, then that line is deemed to be <i>ordinarily accessible</i> .

19. Precautions against access and warnings of dangers

19(1)	<p>This paragraph requires anti-climbing guards to be attached to overhead line supports to prevent, so far as is reasonably practicable, persons interfering with or vandalising the electrical equipment.</p> <p>In general, duty holders may demonstrate compliance with this requirement by complying with the Electricity Association's Technical Specification 43-90 <i>Anti-Climbing Devices and Safety Signs for HV lines up to and including 400kV</i> dated 1993.</p>
19(2)	<p>Safety signs complying with Schedule 1 <i>Design, colours and proportions of the safety sign</i> must be attached to supports carrying high voltage conductors and supports carrying bare low voltage conductors.</p> <p>The safety sign in Schedule 1 was phased in from 1988 for supports carrying high voltage lines; these Regulations now require all such supports to be equipped with safety signs complying with Schedule 1 by 2013 (see regulation 2(7)). Duty holders may wish to refer to the Electricity Association's Technical Specification 43-90 <i>Anti-Climbing Devices and Safety Signs for HV lines up to and including 400kV</i> dated 1993.</p> <p>Since safety signs for supports carrying bare low voltage conductors is a new requirement. Duty holders have 10 years to fully comply (see regulation 2(7)).</p> <p>Distributors should note that safety signs need not be attached to poles supporting only low voltage insulated conductors. Being insulated, such lines are much less likely to cause danger.</p>

20. Fitting of insulators to stay wires

20	The requirement for high level insulators to be fitted to stay wires attached to supports carrying exposed conductors was phased in from 1988; these
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20 cont'd	<p>Regulations now require all such stay wires to be fitted with high level insulators by 2013 (see regulation 2(7)).</p> <p>The aim of this requirement is to prevent any part of a broken stay wire which is within reach of the ground from becoming live due to contact with exposed equipment attached to the support.</p>
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J. GENERATION (PART VI)

21. Switched alternative sources of energy

21	<p>This regulation deals with <i>islanded mode</i> only, i.e. a source of energy which operates as a switched alternative to the supply from the local distributor's network. An example of such an arrangement would be an emergency standby generator which is called upon to generate after loss of the supply from the distributor's network, and which is disconnected before the load is transferred back to the supply from the distributor's network following restoration. When supplying load, the switched alternative source of energy is never connected in parallel with the distributor's network, even for short durations.</p> <p>In these circumstances operators should ensure that the switched alternative source of energy cannot be paralleled with the distributor's network. In particular, operators should comply with the principles enshrined in BS7671 <i>Requirements for Electrical Installations</i> (see definition at regulation 1(5)) and the Electricity Association's Engineering Recommendation G.59/1 (Amendment 1, 1995) <i>Recommendations for the Connection of Embedded Generating Plant to the Regional Electricity Companies' Distribution Systems</i>.</p> <p>It should be noted that these Regulations do not deal with sources of energy supplying installations which are not connected to distributors' networks. Such installations should comply with BS7671.</p>
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22. Parallel operation

22(1)	<p>This regulation specifies requirements for parallel operation of all types of generation, i.e. large and medium scale generation as well as embedded or distributed generation. The term <i>parallel operation</i> is intended to mean situations where the source of energy is directly or indirectly connected to the grid or to the local distributor's network, including parallels of short duration to prevent interruption of supply during transfer of load from one source to the other.</p> <p>Operators must comply with the following 4 requirements:</p> <ul style="list-style-type: none"> (i) Ensure the plant and equipment is safe and will not cause interference with the supply to other consumers. The extent of facilities and arrangements to comply with this requirement would depend upon the size, type and complexity of the source of energy. For example a 50MW source would be equipped with sophisticated diagnostic and protection equipment, whereas for domestic CHP it would be sufficient for the householder to install
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<p>22(1) cont'd</p>	<p>type tested equipment which has been approved by a recognised body or authority. If the parallel with the distributor's network is intended to last only for short durations on an infrequent basis (for example to allow for uninterrupted changeovers of supply to back-up plant) the facilities to prevent danger need not be as extensive as those for continuous parallel operation.</p> <p>(ii) Employ competent staff able to operate the generating plant safely and have in place appropriate procedures addressing the health and safety matters relevant to the plant, particularly where there are implications for public safety.</p> <p>(iii) Implement the relevant requirements of BS7671 <i>Requirements for Electrical Installations</i> (see definition in regulation 1(5)). Operators should also comply with the requirements of the Electricity Association's Engineering Recommendation G.59/1 (Amendment 1, 1995) <i>Recommendations for the Connection of Embedded Generating Plant to the Regional Electricity Companies' Distribution Systems</i>.</p> <p>(iv) Consult with the local distributor and agree technical and safety arrangements for the connection including: synchronisation, protection, isolation, earthing, control and cooperation.</p>
<p>22(2)</p>	<p>Persons installing or operating a source of electrical energy in domestic situations (i.e. output not more than 16 amps per phase) need not comply with paragraphs 22(1)(b) and 22(1)(d) provided the equipment is configured to disconnect itself from the distributor's network in the event of a local fault on that network, and provided the distributor is advised about the parallel source of energy.</p> <p>The means of disconnection should preferably be by mechanical separation of contacts. However, a suitably rated solid-state switching device is permitted provided it is equipped with fail-safe monitoring to ensure that the phase to neutral voltage on the mains side of the device reduces to less than 50 volts within 0.5 seconds of the device failing to operate when required to do so. The means of isolation of the generating plant (for the purposes of working either on the consumer's system or the distributor's network as required) should be by an accessible all phases and neutral manually-operated electromechanical isolating switch in all circumstances.</p> <p>The distributor should be advised concerning the source of energy before the source is commissioned or on the same day as commissioning, whether by letter, fax, email or other form of electronic writing, or by telephone. Duty holders should note that equipment installers need only notify the local distributor, i.e. they do not need to ask permission to connect the equipment and regulation 22(2)(c) does not give distributors opportunity to refuse such equipment being connected.</p> <p>It should be noted that a domestic source of electrical energy equipment</p>

22(2) cont'd	must be type tested (regulation 22(1)(a)) and that the consumer's installation must still comply with BS7671 <i>Requirements for Electrical Installations</i> (regulation 22(1)(c)).
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K. SUPPLIES TO INSTALLATIONS AND TO OTHER NETWORKS (PART VII)

23. Precautions against supply failure

23(1)	<p>This paragraph requires distributors to design and operate networks equipped with protective devices so as to limit the number of consumers affected by a fault in the network.</p> <p>Where appropriate, licensed distributors should comply with the Electricity Association's Engineering Recommendation P.2/5 <i>Security of Supply</i> dated 1978.</p>
23(2)	<p>Distributors should avoid interruptions due to their own acts, e.g. switching errors and interruptions due to incorrect protection settings.</p>

24. Equipment on a consumer's premises

24(1)	<p>Equipment belonging to distributors and meter operators which is installed on consumers' premises must be suitable for its purpose and safe. Examples of such equipment include: cables, meters, distribution boards, isolators and switches.</p> <p>Such equipment must also be electrically protected by fuses, cut-outs or circuit breakers. For safety and technical reasons the protective device should be situated as close as reasonably practicable to the supply terminals. Where flats are supplied by rising mains, duty holders should ensure that all equipment upstream of the supply terminals at each flat benefit from adequate electrical and mechanical protection.</p> <p>In order to demonstrate compliance with the requirements of regulation 24(1) duty holders should adopt the standards of construction and installation necessary to comply with BS7671 <i>Requirements for Electrical Installations</i>.</p>
24(2)	<p>This paragraph requires cut-out fuses to be locked or sealed in position to prevent them being removed or the supply being interfered with by unauthorised persons.</p> <p>Duty holders should note that the locked or sealed container should be adequate for the circumstances, i.e. cut-outs fixed to external walls of buildings should normally benefit from a secure weatherproof enclosure in addition to the cut-out fuse being sealed.</p>
24(3)	<p>Phase and neutral conductors must be separately identified and marked close to the supply terminals.</p>

24(3) cont'd	In view of the potentially serious consequences of the neutral and phase conductors being transposed at or near the supply terminals, distributors and meter operators should take precautions to make sure that the polarity as indicated is correct.
24(4) & (5)	<p>For a new connection the distributor would normally be expected to offer to connect his combined neutral and protective conductor (or protective conductor) to the consumer's earth terminal.</p> <p>In certain circumstances the distributor may take the view that such connection to the consumer's protective conductor could result in danger, and therefore not connect his combined neutral and protective conductor to the consumer's protective conductor via the earthing terminal. Examples of situations where caution would be warranted are included in comments for regulation 9 <i>Protective Multiple Earthing</i>.</p> <p>Where the distributor does not offer to connect his protective conductor to the consumer's earthing terminal he should advise the consumer in writing of the reasons for not offering such a connection. In these circumstances the consumer should install his own earthing arrangements and protective devices in accordance with the requirements of <i>BS7671 Requirements for Electrical Installations</i>.</p>

25. Connections to installations or to other networks

25(1) & (2)	<p>Regulation 25 is targeted at persons physically connecting a supply on site, and hence there is no reference to the role of supplier. Duty holders should note that these requirements are for safety and supply continuity purposes only, and they do not usurp in any way the commercial arrangements for provision of new connections involving distributors, suppliers, meter operators, developers and consumers. This regulation should be seen as an additional requirement involving duty holders installing equipment used to provide a connection to consumers' installations, street furniture or other networks.</p> <p>Regulation 25(1) requires that persons installing or altering connections to consumers' installations, street furniture or other networks must have consent from the local distributor in order to do so.</p> <p>There are two circumstances in which the distributor must withhold his consent insofar as the requirements of these Regulations are concerned; those are where he has reason to believe that:</p> <p>(i) There is or may be a technical or safety problem with the installation or new network to be connected to the local distributor's network. The consumer or other distributor may have to satisfy the local distributor that the equipment or new network is safe and technically sound by providing evidence that the equipment or new</p>
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<p>25(1) & (2) cont'd</p>	<p>network complies with <i>BS7671 Requirements for Electrical Installations</i> (for consumers' installations) or complies with these Regulations (for new networks). Consent for the connection of a new network may take the form of an agreement between the distributor and developer covering important areas such as design, planning, materials, installation and records.</p> <p>(ii) There is or may be a technical or safety problem with the point of connection, i.e. the cable joint or other electrical equipment used to connect the local distributor's network to the installation, street electrical fixture or other network. The local distributor may require evidence that the person making this joint or fitting appropriate electrical equipment is technically competent, can do the work safely and will comply with the local distributor's safety and technical requirements. Such evidence may include reference to an approved registration scheme for craftsmen, e.g. the Lloyds Register. (Where a distributor engages his own staff or contractors to install such connections those persons are already deemed to have consent for the connection work.)</p> <p>If the distributor withholds his consent for the connection for any other reason, then he will have to be acting reasonably in so doing (paragraph 25(2)).</p> <p>Duty holders or persons not complying with the requirements of regulation 25 may be subject to prosecution – see regulation 35 <i>Offences</i>.</p>
<p>25(3) & (4)</p>	<p>These paragraphs allow the Secretary of State to intervene in any disputes arising from delay in giving or refusal to give the necessary consent. In practice, the Secretary of State would be likely to appoint a DTI Inspector to investigate the circumstances and bring the dispute to a conclusion.</p> <p>Duty holders should note that, if necessary, Ofgem may intervene in the event of any apparently anti-competitive behaviour by distributors and may enforce particular arrangements through a new licence condition or through provisions of the Competition Act 1998 or the Electricity Act 1989 (as amended by the Utilities Act 2000).</p>

26. Disconnection of supply, refusal to connect and resolution of disagreements

<p>26(1)</p>	<p>This regulation permits distributors to challenge consumers in circumstances where their installations are unsafe or are causing unacceptable electrical interference on the distributor's network. Duty holders should note that the provisions of this regulation may be applied to consumers' installations and to other installations or networks, including street furniture, connected to the local distributor's network.</p>
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26(1) cont'd	<p>Essentially, this regulation requires that in the first instance distributors issue instructions to consumers to carry out remedial works within a reasonable period. For example, a consumer unit may be damaged causing live conductors to be exposed; the distributor who becomes aware of the problem (possibly via a meter operator) may write to the consumer advising him to repair or replace his consumer unit within ten days.</p> <p>In addition to following the procedure outlined in this regulation, distributors should report unsafe working practices or faults, on the consumer's side of the supply terminals, that create a serious risk to the health and safety of workers or members of the public to HSE.</p> <p>Distributors and suppliers should note that they have certain powers to enter premises containing their equipment under paragraphs 7, 8, 9 and 10 of Schedule 4 of the Utilities Act 2000.</p>
26(2)	<p>If after the expiry of the specified period the defective equipment has not been repaired or replaced, the distributor may disconnect the supply to the premises or other network or refuse to connect the supply until the problem is rectified.</p>
26(3)	<p>This paragraph allows the distributor to carry out immediate disconnection if this action is warranted on safety grounds.</p>
26(4)	<p>The distributor must restore supply as soon as practical after the problem has been rectified.</p>
26(5) to (8)	<p>These paragraphs outline the process for resolution by the Secretary of State of outstanding disputes. In practice the Secretary of State will usually delegate these powers to a DTI Inspector who will investigate the circumstances and bring the dispute to a conclusion.</p> <p>In judging the suitability of connections, installations or other networks the Inspector appointed by the Secretary of State may, if appropriate in the circumstances, take into account the following factors:</p> <ul style="list-style-type: none"> (i) the previous performance or operation of the equipment, particularly in regard to interference or the risk of danger; (ii) the suitability or adequacy of the equipment to continue in service in the future without risk of danger or causing interference; and (iii) whether or not the connection or installation is being used, or will continue to be used, within the limits of the maximum power for which it was intended.

27. Declaration of phases, frequency and voltage at supply terminals

27(1)	<p>This paragraph states two circumstances in which suppliers must make declarations of a technical nature to consumers - a new connection and a change in supply capacity of the existing connection.</p> <p>Suppliers should note that declarations need not be made for each change of supplier by consumers.</p> <p>Distributors should note that they may be required to provide this and other information separately to consumers if requested – see regulation 28 <i>Information to be provided on request</i>.</p>
27(2) to (7)	<p>These paragraphs specify nominal values of frequency and voltage that should be declared to consumers, together with permitted tolerances.</p> <p>Distributors should note that the declared values and tolerances are an absolute requirement, and any variation beyond the voltage limits (apart from exceptional circumstances) without the agreement of the consumer would be treated by DTI as a breach of this regulation.</p> <p>All duty holders should note that in 1993 the UK government committed to harmonisation of low voltage tolerances across the European Community in accordance with CENELEC document HD 472 S1. In July 2001 the CENELEC Technical Board decided to extend the existing tolerance for low voltage systems (see regulation 27(3)(b)) to 2008, at which time it is possible that further consolidation of voltage tolerances across Europe will take place.</p>

28. Information to be provided on request

28	<p>This regulation specifies certain safety and technical information, which is relevant to the consumer's installation, that distributors are required to provide on request. Since this is a statutory obligation on the distributor, such information should be provided free of charge (charging for maps is allowed at regulation 15 only because of the specific provision in section 29(2)(c) of the Electricity Act 1989 (as amended by the Utilities Act 2000)).</p> <p>Distributors should note that this information need not be provided with each change of supplier by consumers (unless the information is specifically requested by the consumer).</p>
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29. Discontinuation of supplies

29(1)	<p>This regulation deals with deliberate essential discontinuation of supply by distributors.</p> <p>Disconnections for reasons of danger on consumers' premises or to prevent electrical interference should be dealt with in accordance with regulation 26 <i>Disconnection of supply, refusal to connect and resolution of disagreements</i>. Duty holders should note that regulation 29 does not address interruption of supply due to faults, cable damage, effects of weather, force majeure, etc. (see regulation 3(1)(b) and regulation 23 <i>Precautions against supply failure</i>).</p>
29(2)	<p>Discontinuations should be for the minimum period necessary, and at least two days notice should be given to consumers and to other persons affected.</p>
29(3) & (4)	<p>This paragraph specifies circumstances in which distributors or meter operators may discontinue the supply when notice has not been received by the relevant persons. Examples include:</p> <ul style="list-style-type: none"> (i) load management schemes; (ii) isolation of a low voltage main to remove a tool causing accidental damage to the main; (iii) emergency instructions under the Grid code; and (iv) the notice issued to the consumer was lost in the post.

L. MISCELLANEOUS (PART VIII)

30. Inspections, etc. for the Secretary of State

30	<p>Under powers in the Electricity Act 1989 (as amended by the Utilities Act 2000), the Secretary of State has appointed Inspectors to enforce the requirements of these Regulations. In discharging their duties Inspectors are required, under the terms of the 1989 Act, to be impartial.</p> <p>In practice, DTI Inspectors investigate serious accidents involving members of the public and complaints from consumers about the safety, quality and continuity of supply. They also carry out periodic safety audits of duty holders' procedures and policies to ensure compliance with these Regulations, and inspect the safety and security aspects of certain plant and equipment.</p> <p>Inspectors have authority under the primary legislation (Section 30(2) of the Electricity Act 1989 as amended by the Utilities Act 2000) to inspect and test duty holders' plant and equipment, and to examine the generation, transmission, distribution and supply of electricity. Under regulation 30, duty holders have a legal obligation to provide Inspectors with reasonable facilities and access for the purpose of their investigations, and to provide certain information (current or historical) as may be required.</p> <p>If any person becomes aware of a breach, or potential breach, of these Regulations, he or she should contact the Engineering Inspectorate at DTI at the soonest opportunity (telephone 020 –7215 5000 or write to the address on the front cover).</p>
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31. Notification of specified events

31(1)	<p>In order for the Secretary of State to investigate serious accidents and to monitor accident trends, duty holders are required to report certain types of unplanned events to the DTI.</p> <p>With the exception of reference to generators, distributors and meter operators, duty holders should note that this regulation is virtually unchanged from the equivalent regulation in the Electricity Supply Regulations 1988 as amended (regulation 34 <i>Notification of specified events</i>).</p> <p>For the avoidance of doubt it should also be noted that persons owning or operating domestic CHP equipment would not be expected to report incidents to DTI as required by this regulation.</p>
31(2)	<p>The types of incidents to be reported are as follows:</p>

31(2) cont'd	<p>(i) fatalities and injuries not involving employees or contractors of duty holders, fires or explosions. (Accidents involving employees or contractors of duty holders are reported to the HSE under different Regulations.) Examples include injuries due to contact with overhead lines by persons carrying masts or aerials, and fires in substations;</p> <p>(ii) domestic fatalities attributed to electrical equipment, e.g. a fatality due to a person interfering with electrical wiring or with an appliance which has not been isolated from the supply. This information is sought by the DTI to collate statistics on consumer safety, not to enforce these Regulations;</p> <p>(iii) overhead lines below the statutory height (see regulation 17(2)), e.g. a line brought down during a storm;</p> <p>(iv) cable damage incidents, e.g. contractors excavating in the street may damage an underground electric cable; and</p> <p>(v) other incidents which could have had serious consequences in the particular circumstances, e.g. collapse of a fence enclosing a substation containing exposed high voltage conductors and which is situated near a housing estate. Such incidents are often known as <i>near misses</i>.</p>
31(3) to (9)	<p>Fatalities (but not domestic fatalities) and serious injuries should be reported to the DTI as soon as possible. Other incidents should be reported in writing or on computer disc, as required.</p> <p>The information sought for each type of incident is listed in Schedule 3 <i>Notification of Specified Events</i>.</p> <p>The publication entitled (under the heading <i>Electricity Safety, Quality and Continuity Regulations 2002</i>) <i>Computerisation of the Notification of Certain Specified Events under Regulation 31 – Specification of the Data Files</i> is available on DTI's website at www.dti.gov.uk/?????. Duty holders should note that this publication is virtually unchanged from the equivalent publication mentioned in regulation 34(9)(a) of the Electricity Supply Regulations 1988 (as amended).</p>

32. Notification of certain interruptions of supply

32(1)	<p>In order for the Secretary of State to monitor major supply interruptions, distributors must notify the DTI concerning certain interruptions affecting one or more consumers, which are specified in regulation 32(1) in terms of the load and number of consumers affected and the duration of the interruptions.</p>
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32(1) cont'd	<p>This requirement is targeted at interruptions of supply due to faults, accidents or other unplanned events. Duty holders need not report deliberate discontinuation of supplies carried out under regulation 29 <i>Discontinuation of supplies</i>.</p> <p>With the exception of the references to distributors and the minimum duration of interruption (now 3 minutes - see paragraph 32(1)(a)), duty holders should note that this regulation is virtually unchanged from the equivalent regulation in the Electricity Supply Regulations 1988 as amended (regulation 35 <i>Notification of supply failure</i>).</p>
32(2)	<p>The information sought is listed in Schedule 4 <i>Notification of certain interruptions of supply</i>.</p>

33. Exemption from requirements of Regulations

33(1)	<p>On rare occasions it may not be possible or reasonable for duty holders to comply with one or more requirements of these Regulations. In these circumstances duty holders must write to the Secretary of State and present their case.</p>
33(2) & (3)	<p>Provided that the safety of the public is not compromised and that there will be no noticeable electrical interference on the network, the Secretary of State may issue an exemption which will be subject to certain conditions and for such period as necessary.</p> <p>For example, if a distributor's overhead line network suffers severe and widespread damage due to a winter storm it may not be practical for the distributor to issue individual notices to the DTI for each line below statutory height in accordance with regulation 31(2)(c). If the distributor writes to the Secretary of State stating the reasons for requesting an exemption to the reporting requirements of regulation 31 <i>Notification of specified events</i>, an exemption may be issued for the period of the storm subject to the Secretary of State receiving confirmation of the number of incidents at each voltage level.</p>

34. Networks, equipment or installations in breach of Regulations

34(1) to (3)	<p>If any network or equipment is in breach of these Regulations (or the terms of any exemption given under them) and is, or may become, a source of danger to the public or is causing electrical interference or interruption of supply, the Secretary of State may serve a notice on the duty holder requiring him to carry out remedial works within a specified period. The Secretary of State may also issue such a notice to a consumer if that part of the consumer's installation outside a building is, or may become, a source of</p>
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34(1) to (3) cont'd	<p>danger to the public or is causing electrical interference or interruption of supply.</p> <p>For example if, in the circumstances in which it is used, an overhead line becomes a source of danger, the Secretary of State may serve a regulation 34 notice on the relevant distributor instructing him to remove the line within a specified period.</p>
34(4) to (10)	<p>In the event of a dispute between the duty holder and the Secretary of State arising from the notice, an independent person will listen to both views and either uphold the notice or recommend to the Secretary of State that the notice should be withdrawn or amended. The independent person will also decide which party will bear the costs of the hearing or investigation.</p>

35. Offences

35	<p>This regulation permits the Secretary of State to bring prosecutions against the following groups of duty holders and persons:</p> <ul style="list-style-type: none"> (i) any generator, distributor, supplier, or meter operator or any agent, contractor or sub-contractor of his who is in breach of the duties he has under these Regulations; (ii) any consumer not complying with paragraph 8(4) relating to combined neutral and protective conductors; (iii) persons not complying with paragraph 18(3) relating to the erection of buildings or structures near overhead lines; (iv) persons not complying with the requirements of Part VI <i>Generation</i>; (v) persons not complying with the requirements of regulation 25 <i>Connections to installations or other networks</i>; and (vi) any consumer not complying with a regulation 34 notice issued to him by the Secretary of State. <p>Duty holders should note that under certain provisions in the Electricity Act 1989 (as amended by the Utilities Act 2000) they may bring private prosecutions against other persons. An example would be persons intentionally damaging a distributor's plant and equipment – see paragraph 6 <i>Damage to electrical plant etc.</i> of Schedule 4 of the Utilities Act 2000.</p>
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36. Revocation

36	By this regulation the Electricity Supply Regulations 1988 and all subsequent amendments are revoked (see Schedule 5 <i>Revocations</i>).
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M. SCHEDULES 1 TO 5

Schedule 1 – Design, colours and proportions of the safety sign

Duty holders should note that the specification of the safety sign is unchanged from the equivalent schedule in the Electricity Supply Regulations 1988 as amended (Schedule 1 *Design, colours and proportions of the safety sign*). The triangle, symbol and text should be shown in black on a yellow background; the entire background of the sign should be yellow, i.e. inside the triangle and outside the triangle to the edge of the sign.

The position, quantity and physical dimensions of the sign should be selected with regard to the circumstances in which it is used (see regulations 11(c)(i) and 19(2)). For example, a substation containing exposed conductors and located within a housing estate, which is likely to be a high risk situation, may require numerous large signs attached at frequent intervals around the boundary of the site.

Schedule 2 – Minimum height above ground of overhead lines

Duty holders should note that the minimum heights of overhead lines are unchanged from the equivalent schedule in the Electricity Supply Regulations 1988 as amended (Schedule 2 *Minimum height above ground of overhead lines*).

Schedule 3 – Notification of specified events

Duty holders should note that the information requirements associated with regulation 31 *Notification of specified events* are virtually unchanged from the equivalent schedule in the Electricity Supply Regulations 1988 as amended (Schedule 4 – *Notice of specified events*).

Schedule 3 is broken down into four parts relating to types of incident:

- Part I** Fatalities and injuries not involving employees or contractors of duty holders, fires or explosions (regulation 31(2)(a)).
- Part II** Domestic fatalities attributed to electrical equipment (regulation 31(2)(b)).
- Part III** Overhead lines below the statutory height (regulation 31(2)(c)), and other incidents which could have had serious consequences in the particular circumstances (sometimes known as *near misses* – see regulation 31(2)(e)).
- Part IV** Cable damage incidents (regulation 31(2)(d)).

Schedule 4 – Notification of certain interruptions of supply

Duty holders should note that the information requirements associated with regulation 32 *Notification of certain interruptions of supply* are unchanged from the equivalent schedule in the Electricity Supply Regulations 1988 as amended (Schedule 5 – *Notice of supply failure*).

Schedule 5 – Revocations

This schedule lists the statutory instruments revoked by these Regulations.

N. QUERIES

Any queries on the scope, application or interpretation of the Electricity Safety, Quality and Continuity Regulations 2002 or on the contents of these Guidance Notes should be addressed to the Chief Engineering Inspector at the DTI (telephone 020 – 7215 5000, or write to the address on the front cover).