

THE DISTRIBUTION CODE

and

THE GUIDE TO THE DISTRIBUTION CODE

OF LICENSED DISTRIBUTION NETWORK OPERATORS OF GREAT BRITAIN

Issue 3 September 2003

THE DISTRIBUTION CODE OF GREAT BRITAIN

DOCUMENT CONTENTS

GUIDANCE NOTE 1	1
DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)	2
DGD 1. EXPRESSIONS	3
DGD 2. CONSTRUCTION OF REFERENCES	13
ANNEX 1	15
DISTRIBUTION CODE INTRODUCTION (DIN)	17
DIN1 INTERPRETATION	18
DIN2 DISTRIBUTION LICENCE DUTY	18
DIN3 SCOPE	18
DIN4 GENERAL REQUIREMENTS	19
DIN5 CODE RESPONSIBILITIES	19
DIN6 CONFIDENTIALITY	20
DIN7 PUBLICATIONS	20
DISTRIBUTION GENERAL CONDITIONS (DGC)	21
DGC1 INTRODUCTION	22
DGC2 SCOPE	22
DGC3 UNFORESEEN CIRCUMSTANCES	22
DGC4 THE DISTRIBUTION CODE REVIEW PANEL	22
DGC5 COMMUNICATION BETWEEN THE DNO AND USERS	23
DGC6 DATA AND NOTICES	24
DGC7 OWNERSHIP OF PLANT AND/OR APPARATUS	24
DGC8 SYSTEM CONTROL	24
DGC9 EMERGENCY SITUATIONS	24
DGC10 DISTRIBUTION CODE RESPONSIBILITIES	24
DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)	25
DPC1 GENERAL INTRODUCTION	26
DPC2 OBJECTIVES	30
DPC3 SCOPE	31
DPC4 DESIGN PRINCIPLES AND STANDARDS	32
DPC5 GENERAL REQUIREMENTS FOR CONNECTION	38
DPC6 TECHNICAL REQUIREMENTS FOR CONNECTIONS	42
DPC7 REQUIREMENTS FOR EMBEDDED GENERATORS	45
DPC8 TRANSFER OF PLANNING DATA	53

DISTRIBUTION OPERATING CODE (DOC)	56
DOC1 DEMAND FORECASTS	57
DOC 1 - APPENDIX 1	61
DOC 1 - APPENDIX 2	62
DOC2 OPERATIONAL PLANNING	63
DOC 2 - APPENDIX 1	67
DOC 2 - APPENDIX 2	68
DOC 2 - APPENDIX 3	69
DOC5 TESTING AND MONITORING	71
DOC6 DEMAND CONTROL	73
DOC7 OPERATIONAL LIAISON	77
DOC8 SAFETY CO-ORDINATION	82
DOC9 CONTINGENCY PLANNING	86
DOC10 OPERATIONAL EVENT REPORTING AND INFORMATION SUPPLY	92
DOC 10 - APPENDIX 1	95
DOC11 NUMBERING AND NOMENCLATURE OF ELECTRICAL APPARATUS AT OWNERSHIP BOUNDARIES	96
DOC12 SYSTEM TEST	98
DISTRIBUTION DATA REGISTRATION CODE (DDRC)	103
DDRC1 INTRODUCTION	104
DDRC2 OBJECTIVE	104
DDRC3 SCOPE	104
DDRC4 DATA CATEGORIES	104
DDRC5 PROCEDURES AND RESPONSIBILITIES	106
DDRC6 DATA TO BE REGISTERED	107
Schedule 5a	109
Schedule 5c (i)	112
Schedule 5c (ii)	114
Schedule 5c (ii)	115
Schedule 5c (iii)	117
Schedule 5c (iv)	118
Schedule 5c (v)	119
Schedule 5d	120
Schedule 6	122
Schedule 7a	125
Schedule 7b	127

	Schedule 7c	128
	Schedule 7d	129
	Schedule 8	130
	Schedule 9	133
	GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN	134
1.	ELECTRICITY SUPPLY INDUSTRY	135
	1.1 Generation	135
	1.2 Transmission	135
	1.3 Distribution	135
	1.4 Supply	135
	1.5 Metering	136
2	PRINCIPAL ORGANISATIONS	136
3	PRINCIPLES OF AN INTERCONNECTED SYSTEM	136
	3.1 General	136
	3.2 Demand Forecasting	137
	3.3 System Security	137
	3.4 Industry Structure	137
4	GRID AND DISTRIBUTION CODES	138
5	DISTRIBUTION CODE	138
	5.1 General	138
	5.2 Distribution Code Review Panel	139
	5.3 Distribution Code Sections	139
	5.4 Distribution Planning and Connection Code	140
	5.4.1 Design Principles and Standards (DPC4)	140
	5.4.2 Network Statements (DPC4.5)	140
	5.4.3 Charges for Information	141
	5.4.4 Exchange of Information (DPC5)	141
	5.4.5 Embedded Generators (DPC7)	141
	5.4.6 Application for Connection Procedures	141
	5.4.7 Typical Areas for Discussion	142
	5.4.8 Requirement to Offer Terms	142
	5.4.9 Right to Reject an Application	143
	5.4.10 Information Provided by the DNO	143
	5.4.11 Information Required From Users	143
	5.4.12 Status of Planning Data	144
	5.5 Distribution Operating Code	144
	5.6 Distribution Data Registration Code	146

	5.6.1	Procedures and Responsibilities	146
6		CONNECTION TO THE DISTRIBUTION SYSTEM	146
	6.1	Electricity Suppliers	146
	6.2	Connection Types	146
	6.3	Connection Agreements and Use of System Agreements	147
	6.4	Consents and Statutory Obligations	148
	6.5	Approval to Connect	148
	6.5.1	Readiness to Connect	149
	6.5.2	Confirmation of Approval to Connect	150
		Figure 1a - Grid Code & Distribution Code Boundaries (Scotland)	151
		Figure 1b - Grid Code & Distribution Code Boundaries (England and Wales)	152
		APPENDIX 1 - CATEGORIES OF Users OF THE DISTRIBUTION System	153
ISSUE SUMMARY			155

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The following items do not form part of the approved Distribution Code and are for information only:

- Guidance Note 1
- The Introduction to the Distribution Code, ie DIN1 to DIN 7
- The Guide to the Distribution Code of Great Britain

GUIDANCE NOTE 1

(Dated 01.04.1993 England and Wales Distribution Code

Adopted for the Distribution Code of Great Britain)

ENGINEERING RECOMMENDATION P2/5

The **Distribution Code Review Panel** has reviewed Engineering Recommendation P2/5 and for **Customers** falling within the remit of the **Distribution Code** has agreed that:-

The main section of this document deals with the establishment of recommendations for the security of electricity transmission and distribution systems of network operators. It does not apply to the supply connection of a **Customer**.

Each **Customer** supply connection needs to be considered on its own merits by discussion between the **Customer** and the network operator. The costs of providing a **Customer** supply connection by the network operator will be partly dependent upon the nature of the network operator's electrical system and the location of the **Customer's** premises. It will be for the **Customer** to decide, in negotiations with the network operator, the level of security required for the electricity supply to be provided to the **Customer's** premises. In general, the greater the level of security of supply required by the **Customer**, the greater the capital investment required by the network operator, as a consequence this will require the **Customer** to meet a higher level of supply connection charge.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

DGD 1. EXPRESSIONS

In this **Distribution Code** the following words and expressions shall, unless the subject matter or context otherwise requires or is inconsistent therewith, bear the listed meanings:-

Act	The Electricity Act 1989, including any modification, extension or re-enactment thereof and any subordinate legislation made thereunder.
Active Power	The multiple of the components of alternating current and voltage that equate to true power. Normally measured in kilowatts (kW) or megawatts (MW).
Annual Average Cold Spell (ACS) Conditions	A particular combination of weather elements that give rise to a level of Peak Demand within a financial year which has a 50% chance of being exceeded as a result of weather variation alone.
Apparatus	All Equipment in which electrical conductors are used, supported or of which they may form a part.
Authorised Electricity Operator or AEO	Any person (other than the DNO) who is authorised to generate, transmit or supply electricity and shall include any person who has made application to be so authorised which application has not been refused and any person transferring electricity to or from or across an interconnector or Scottish interconnection or who has made an application for use of an interconnector or Scottish interconnection which has not been refused, where "authorised" means, in relation to any business or activity, authorised by licence granted or treated as granted under section 6 or by exemption granted under section 5 of the Act
Authority	The Gas and Electricity Markets Authority established under Section 1 of the Utilities Act 2000
Average Conditions	That combination of weather elements within a period of time which is the average of the observed values of these weather elements during equivalent periods over many years (Sometimes referred to as normal weather).
Balancing and Settlement Code (BSC) (England and Wales)	The code of that title which determines the rules governing the Balancing Mechanism and settlement process for electricity trading in England and Wales as from time to time amended.
Balancing Mechanism (England and Wales)	Has the meaning set out in the Transmission Licence .
BM Unit (England and Wales)	A BM Unit means a unit of Plant and/or Apparatus established and registered (or to be established or registered) in accordance with the BSC .
BM Participant (England and Wales)	A person who is responsible for and controls one or more BM Units as specified in the BSC and may or may not be active in the Balancing Mechanism .
Black Start	The procedure necessary for a recovery from a Total Shutdown or Partial Shutdown .

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Black Start Generator (Scotland)	Power Stations which are registered by the Transmission Licensee as such.
Black Start Station (England and Wales)	Power Stations which are registered by the Transmission Licensee as such.
CENELEC	European Committee for Electrotechnical Standardisation.
Central Despatch (Scotland)	The process of Scheduling and issuing direct Despatch instructions to Generating Plant by the Transmission Grid Control Centre (GCC) pursuant to the relevant Grid Code .
Civil Emergency Direction	Directions given by the Secretary of State to AEOs for the purpose of mitigating the effects of any natural disaster or other emergency which, in the opinion of the Secretary of State , is or may be likely to disrupt electricity supplies.
Committed Project Planning Data	Data relating to a User Development once the offer for a Connection Agreement is accepted.
Connection Agreement	An agreement between the DNO and the User or any Customer setting out the terms relating to a connection with the DNO's Distribution System (excluding any such agreement with the Transmission Licensee).
CUSC (England and Wales)	The code of that title which determines the rules governing connection and use of NGC's Transmission System as required by the Transmission Licence
CUSC Framework Agreement (England and Wales)	The Agreement of the same name as required by NGC's Transmission Licence .
Connection Point	A point of supply to or from a User which may be an Entry Point or an Exit Point .
Control Centre	A central location for the control and operation of, or of part of a Distribution System , a Transmission System or the System of a User .
Control Person	A person who has been nominated by an appropriate officer of the DNO, Transmission Licensee or a User to be responsible for controlling and co-ordinating safety activities necessary to achieve Safety From The System .
Control Phase	The period 0-24 hours inclusive ahead of real time operation.
CUSC Bilateral Agreement (England and Wales)	An agreement pursuant to the CUSC Framework Agreement made between NGC and a User of the NGC Transmission System .
Customer	Any person supplied or entitled to be supplied with electricity at any premises within Great Britain but shall not include any Authorised Electricity Operator or AEO in its capacity as such.
CustomerWith Own Generation or CWOG	A Customer with one or more Generation Sets connected to the Customer's System , providing all or part of the Customer's electricity requirements, and which may use the DNO's Distribution System for the transport of any surplus of electricity being exported.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

DNO's Distribution System	The System consisting (wholly or mainly) of electric lines owned or operated by the DNO and used for the distribution of electricity between the Grid Supply Points or Generation Sets or other Entry Points (and Bulk Supply Points in Scotland) to the points of delivery to Customers or Authorised Electricity Operator or AEOs , or any Transmission Company within Great Britain in its capacity as operator of the Transmission System and includes any Remote Transmission Assets (owned by a Transmission Company within Great Britain), operated by the DNO and any electrical plant and meters and metering equipment owned or operated by the DNO in connection with the distribution of electricity, but shall not include any part of a Transmission System .
Decimal Week	The week numbering system where week 1 commences in the first week of January on a date as advised by the DNO .
Demand	The demand of MW or MVA _r of electricity (ie both Active Power and Reactive Power respectively) unless otherwise stated.
Demand Control	A procedure, pursuant to DOC6 (Demand Control), to ensure that System Stability is maintained in the event of insufficient Generating Plant being available to meet load requirements or, in the event of breakdown or overloading on any part of the Transmission System and/or the Distribution System .
Despatch (Scotland)	The issue of instructions for Generation Sets to achieve specific Active Power and Reactive Power outputs within Registered Data parameters and by stated times.
Detailed Planning Data (DPD)	Detailed additional data which the DNO requires under the Distribution Planning and Connection Code in support of Standard Planning Data .
Distribution Business	The authorised business of the DNO or any affiliate or related undertaking of the DNO (whether the business is undertaken by the DNO or another licence holder), comprising: (a) the distribution of electricity through the DNO's Distribution System , including any business in providing connections to such System ; and (b) the provision of Distributor Metering and Data Services as defined in the Distribution Licence .
Distribution Code	A code required to be prepared by a DNO pursuant to condition 9 (Distribution Code) of a Distribution Licence and approved by the Authority as revised from time to time with the approval of, or by the direction of, the Authority .
Distribution Code Review Panel or Panel	The standing body established under the Distribution Glossary and Definitions .
Distribution Data Registration Code	That portion of the Distribution Code which is identified as the Distribution Data Registration Code .

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Distribution General Conditions or DGC	That portion of the Distribution Code which is identified as the Distribution Glossary and Definitions .
Distribution Glossary and Definitions	That portion of the Distribution Code which is identified as the Distribution Glossary and Definitions .
Distribution Introduction (DIN)	That portion of the Distribution Code which is identified as the Distribution Introduction .
Distribution Licence	A distribution licence granted under Section 6(1)(c) of the Act .
Distribution Network Operator (DNO)	The person or legal entity named in Part 1 of the Distribution Licence and any permitted legal assigns or successors in title of the named party.
Distribution Operating Code (DOC)	That portion of the Distribution Code which is identified as the Distribution Operating Code .
Distribution Planning and Connection Code (DPC)	That portion of the Distribution Code which is identified as the Distribution Planning and Connection Code .
Distribution System	The electrical network operated by an Other Authorised Distributor .
Distribution Use of System Agreement	The standard form agreement of that name, as amended from time to time.
Earthing Device	A means of providing connection between an Isolated conductor and earth.
Electricity Supply Regulations	The statutory instrument entitled The Electricity Supply Regulations 1988 as amended from time to time and including any further statutory instruments issued under the Act in relation to the supply of electricity.
Embedded	Having a direct electrical connection to a Distribution System .
Embedded Generator	A person who generates electricity including Customers With Own Generation and whose Generation Sets are directly connected to Distribution System of the DNO or Other Authorised Distributor connected to the DNO's Distribution System .
Entry Point	The point at which an Embedded Generator or other Users connect to the DNO's Distribution System where power flows into the DNO's Distribution System under normal circumstances.
Equipment	Plant and/or Apparatus .
Electricity Supply Industry (ESI)	Electricity Supply Industry.
Event	An unscheduled or unplanned (although it may be anticipated) occurrence on or relating to a System including, without limiting that general description, faults, incidents and breakdowns and adverse weather conditions being experienced.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Exit Point	The point of supply from the DNO's Distribution System to a User where power flows out from the DNO's Distribution System under normal circumstances.
External Interconnection	A connection to a party outside the Total System .
Fault Level	Prospective current that would flow into a short circuit at a stated point in the System and which may be expressed in kA or, if referred to a particular voltage, in MVA.
Feasibility Project Planning Data	Data relating to a proposed User Development until such time that the User applies for a Connection Agreement .
Fuel Security Code	The document of that title designated as such by the Secretary of State , as from time to time amended.
Gas and Electricity Consumer Council	The body established under section 2 of the Utilities Act 2000.
Generating Plant	A Power Station including any Generation Set therein.
Generating Plant Output	That portion of the output of Generating Plant which is contributing to meeting Demand .
Generation Set	Any Apparatus which produces electricity.
Generator	A person who generates electricity under licence or exemption under the Act .
Grid Code	The code which each Transmission Company is required to prepare and have approved by the Authority as from time to time revised with the approval of, or by the direction of, the Authority .
Grid Control Centre	A central location used for the purpose of control and operation of the Transmission System .
Grid Supply Point	Any point at which electricity is delivered from a Transmission System to the DNO's Distribution System .
High Voltage (HV)	A voltage exceeding 1000 Volts.
High Voltage Customer	A Customer connected to a part of the Distribution System which is operating at HV .
Implementing Control Person	Pursuant to DOC8, the person implementing Safety Precautions at an Operational Boundary.
IEC	International Electrotechnical Commission.
Isolated	Disconnected from associated Plant and Apparatus by an Isolating Device(s) in the isolating position or by adequate physical separation or sufficient gap.
Isolating Device	A device for rendering Plant and Apparatus Isolated .
Joint System Incident	Is an Event occurring on the System or installation, which, in the opinion of the DNO , has or may have a serious and/or widespread effect on the System or installation of another.
Large Power Station (England and Wales)	A Power Station with a Registered Capacity of 100 MW or more.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Load Managed Area	Has the meaning given to that term in the Distribution Use of System Agreement .
Low Voltage or LV	In relation to alternating current a voltage exceeding 50 volts but not exceeding 1 000 volts.
Maximum Generation	The additional output obtainable from Generating Plant in excess of Registered Capacity .
Medium Power Station (England and Wales)	A Power Station with a Registered Capacity of 50 MW but less than 100 MW.
Meter Operation Code of Practice Agreement	The agreement of that name, as amended from time to time.
Meter Operator	A person, registered with the Registration Authority , appointed by either a Supplier or Customer to provide electricity meter operation services. (This Distribution Code does not place any direct obligation on Meter Operators other than through the appointment by either a Supplier or a Customer .)
Minimum Generation	The minimum output which a Generation Set can reasonably generate as registered under the Distribution Data Registration Code ,
Negative Phase Sequence	A term used within the theory of symmetrical components which is a method of analysing an AC multiphase System .
NGC (England and Wales)	The National Grid Company plc.
NGC Demand (England and Wales)	Demand on the Total System less the output of Medium Power Stations and Small Power Stations
Normal Operating Frequency	The number of Alternating Current cycles per second, expressed in Hertz at which the System normally operates, ie 50 Hertz.
Operation	A scheduled or planned action relating to the operation of the System .
Operation Diagrams	Diagrams which are a schematic representation of the HV Apparatus and the connections to all external circuits at a Connection Point , incorporating its numbering, nomenclature and labelling.
Operational Boundary	The boundary between the Apparatus operated by the DNO or a User and the Apparatus operated by Other Authorised Distributor(s) or other User(s) , as specified in the relevant Site Responsibility Schedule .
Operational Data (OD)	Information to be supplied pursuant to the Distribution Operating Codes and as set out in the Schedules to the DDRC .
Operational Day (England and Wales)	The period from 0500 hours on one day to 0500 on the following day.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Operational Effect	Any effect on the Operation of the relevant other System which causes the Systems of the DNO, Transmission Licensee or other Users , as the case may be, to operate (or be at a materially increased risk of operating) differently from the way in which they would or may have operated in the absence of such an effect.
Operational Planning	The procedure set out in Distribution Operating Code DOC2 comprising, through various timescales, the co-ordination of planned outages of Users' Plant and Apparatus .
Operational Planning Phase	The period from 9 weeks to 3 years inclusive ahead of real time operation.
Other Authorised Distributor	A User authorised by Licence or exemption to distribute electricity and having a User Distribution System connected to the DNO's Distribution System .
Output Usable or OU	That portion of Registered Capacity which is not unavailable due to a Planned Outage or breakdown.
Ownership Boundary	The electrical boundary between the Equipment owned by one DNO or User and the Equipment owned by another User .
Partial Shutdown	The same as a Total Shutdown except that all generation has ceased in a separated part of the Total System and there is no electricity supply from External Interconnections or other parts of Total System to that part of Total System with the result that the separated part of the Total System is unable to operate normally and is shut down.
Peak Demand	The highest level of Demand recorded/forecast for a 12-month period, as specified in the relevant sections of the Distribution Code .
Planned Outage	An outage of Generating Plant or of part of the Transmission System or of part of a Distribution System .
Plant	Fixed and movable items used in the generation and/or supply and/or transmission of electricity other than Apparatus .
Power Factor	The ratio of Active Power to apparent power (apparent power being the product of voltage and alternating current measured in volt-amperes and standard multiples thereof, ie VA, kVA, MVA).
Power Island	Generation Sets at an isolated Power Station , together with complementary local Demand .
Power Station	An installation comprising one or more Generation Sets even where sited separately, which are owned and/or controlled by the same Generator and may reasonably be considered as being managed as one Power Station .
Preliminary Project Planning Data	Data relating to a proposed User Development at the time the User applies for a Connection Agreement but before an offer is made.
Programming Phase	The period 24 hours to 8 weeks ahead inclusive of real time operation.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Protection	The provisions for detecting abnormal conditions in a System and initiating fault clearance or actuating signals or indications.
Reactive Power	The product of voltage and current and the sine of the phase angle between them which is normally measured in kilovar (kVAr) or megavar (MVAR).
Registered Capacity	The normal full load capacity of a Generation Set as declared by the Generator less the MW consumed when producing the same. For a Customer With Own Generation this will relate to the level of output he expects to export to the DNO's Distribution System .
Registered Data	Data referred to in the schedules to the Distribution Data Registration Code .
Remote Transmission Assets.	Any electric lines, electrical plant or meters owned by a Transmission Company ("the Owner Transmission Company") which: <ul style="list-style-type: none">(a) are Embedded in the DNO's Distribution System or the Distribution System of any authorised distributor and are not directly connected by lines or plant owned by the Owner Transmission Company to a sub-station owned by the Owner Transmission Company; and(b) are by agreement between the Owner Transmission Company and the DNO or such authorised distributor operated under the direction and control of the DNO or such authorised distributor.
Renewable Generating Plant (Scotland)	An Embedded Generating Plant which derives its generating capacity from a renewable energy source.
Renewable Generator (Scotland)	A person who operates Renewable Generating Plant .
Requesting Control Person	Pursuant to DOC8, the person requesting Safety Precautions at an Operational Boundary .
Safety From The System	That condition which safeguards persons working on or testing Apparatus from the dangers which are inherent in working on items of Apparatus which are used separately or in combination in any process associated with the generation, transmission or distribution of electricity.
Safety Management System	The procedure adopted by the DNO or a User to ensure the safe Operation of the System and the safety of personnel required to work on that System .
Safety Precautions	The procedures specified within a Safety Management System .
Safety Rules	The rules or procedure of the DNO or a User to ensure Safety From The System .
Scheduling (Scotland)	The procedure for determining intended usage of Generating Plant .

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Secretary of State	Has the same meaning as in the Act .
Significant Incident	An Event on the Transmission System or DNO's Distribution System or in a User's System which has or may have a significant effect on the System of others.
Site Responsibility Schedule	A schedule defining the ownership, operation and maintenance responsibility of Plant and Apparatus at a Connection Point of the DNO .
Small Power Station (England and Wales)	A Power Station with a Registered Capacity of less than 50MW.
Standard Planning Data (SPD)	General information required by the DNO under the Distribution Planning Code .
Standard Review Period (England and Wales)	A defined length of time, as appropriate, expressed as one of the following intervals:- <ul style="list-style-type: none">(a) Week(b) Month(c) Quarter(d) Year
Standby	The supply of electricity by a Supplier to a Customer on a periodic or intermittent basis to make good any shortfall between the Customer's total supply requirements and that met by his own generation.
Superimposed Signals	Those electrical signals present on a Distribution System for the purposes of information transfer.
Supplier	All or any of a holder of a licence granted under section 6(1)(d) of the Act , and/or Exempt Supplier as the context requires.
Supply Agreement	An agreement for the supply of electricity made between a Supplier and a consumer of electricity.
System	An electrical network running at various voltages.
System Control	The administrative and other arrangements established to maintain as far as possible the proper safety and security of the System .
System Incident Centre	A centre set up by the DNO pursuant to the declaration of a Joint System Incident , under DOC 9, to assume control of the incident.
System Stability	The state of the System whereby predicted changes in load and generation can be accommodated without any detrimental effect on the System .
System Test	That test or tests which involve simulating conditions or the controlled application of irregular, unusual or extreme conditions on the Total System or any part of it, but not including routine testing, commissioning or recommissioning tests.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Test Coordinator	A suitably qualified person appointed to coordinate System Test pursuant to DOC12.
Test Panel	A panel, the composition of which is detailed in DOC12, and which will be responsible for formulating System Test proposals and submitting a test programme.
Top - Up	The supply of electricity by any Supplier to the Customer on a continuing or regular basis to make good any shortfall between the Customer's total supply requirements and that met from other sources.
Total Shutdown	The situation existing when all generation has ceased and there is no electricity supply from External Interconnections with the result that the Total System is unable to operate normally and has shutdown with the result that it is not possible for the Total System to begin to function again without directions from the Transmission Licensee pursuant to the Black Start procedure.
Total System	The Transmission System to which the DNO's Distribution System is connected and all Systems of Users of this Transmission System within the area comprised in Schedule 1 of the associated Transmission Licence .
Transmission Licence	The licence granted under Section 6(1)(b) of the Act .
Transmission Licensee	The holder of the Transmission Licence associated with the Transmission System to which the DNO's Distribution System is connected.
Transmission System	A System consisting (wholly or mainly) of HV electric lines owned or operated by a Transmission Licensee and used for the transmission of electricity from one generating station to a sub-station or to another generating station, or between sub-stations or to or from any Interconnector or Scottish interconnection in question, and includes any electrical plant and meters owned or operated by the Transmission Company in connection with the transmission of electricity but shall not include any Remote Transmission Assets .
Unmetered Supply	A supply of electricity to premises which is not, for the purposes of calculating charges for electricity supplied to the Customer at such premises, measured by metering equipment.
User	A term used in various sections of the Distribution Code to refer to the persons using the DNO's Distribution System , more particularly identified in each section of the Distribution Code , but excluding a Transmission Licensee .
User Development	Either a User's Plant and/or Apparatus to be connected to the DNO's Distribution System , or a modification relating to a User's Plant and/or Apparatus already connected to the DNO's Distribution System , or a proposed new connection or modification to the connection within the User's System .
Voltage Reduction	The method to temporarily control Demand by reduction of System voltage.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

Weekly Average Cold Spell (ACS) Condition That particular combination of weather elements that gives rise to a level of **Peak Demand** within a week, taken to commence on a Monday and end on a Sunday, which has a particular chance of being exceeded as a result of weather variation alone. This particular chance is determined such that the combined probabilities of **Demand** in all weeks of the year exceeding the annual **Peak Demand** under **Annual ACS Conditions** is 50%, and in the week of maximum risk the weekly **Peak Demand** under **Weekly ACS Conditions** is equal to the annual **Peak Demand** under **Annual ACS Conditions**.

DGD 2. CONSTRUCTION OF REFERENCES

In this **Distribution Code**:-

- (i) The Table of contents, the Guide and headings are inserted for convenience only and shall be ignored in construing the **Distribution Code**.
- (ii) Unless the context otherwise requires, all references to a particular paragraph, sub-paragraph, Annex, Appendix or Schedule shall be a reference to that paragraph, sub-paragraph, Annex, Appendix or Schedule in or to that part of the **Distribution Code** in which the reference is made.
- (iii) Unless the context otherwise requires the singular shall include the plural and vice versa, references to any gender shall include any individual, body corporate, unincorporated association, firm or partnership and any other legal entity.
- (iv) References to the words “include” or “including” are to be construed without limitation to the generality of the preceding words.
- (v) Unless there is something in the subject matter or the context which is inconsistent therewith, any reference to an Act of Parliament or any Section of or Schedule to, or other provision of an Act of Parliament shall be construed at the particular time, as including a reference to any modification, extension or re-enactment thereof then in force and to all instruments, orders and regulations then in force and made or deriving validity from the relevant Act of Parliament.
- (vi) References to “in writing” or “written” include typewriting, printing, lithography and other modes of reproducing words in a legible and non-transitory form and, except where otherwise stated, includes suitable means of electronic transfer, such as electronic mail. In all cases the form of notification and the nominated persons or departments and addresses of the sender and recipient of the data or information shall be agreed by the **DNO** and **User** and the sender shall be able to confirm receipt of the information by the recipient. In the case of electronic transfer the sender and recipient shall be able to reproduce the information in non-transitory form.
- (vii) Where the **Distribution Glossary and Definitions** refers to any word or term which is more particularly defined in a part of the **Distribution Code**, the definition in that part of the **Distribution Code** will prevail over the definition in the **Distribution Glossary and Definitions** in the event of any inconsistency.
- (viii) A cross reference to another document or part of the **Distribution Code** shall not of itself impose any additional or further or co-existent right in the part of the text where such cross-reference is contained.

DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

- (ix) Nothing in the **Distribution Code** is intended to or shall derogate from the **DNO's** statutory or licence obligations.

ANNEX 1

Distribution Glossary and Definitions

ELECTRICITY SUPPLY INDUSTRY PUBLICATIONS REFERRED TO IN THE DISTRIBUTION CODE

Copies of the Engineering Recommendations and Technical Specifications are available from the Electricity Association, 30 Millbank, London, SW1P 4RD on request. A copy of Engineering Memorandum 7907 is available from Scottish Hydro Electric Power Distribution Ltd on request.

- 1 **Engineering Recommendation G5/4**
Planning levels for harmonic voltage distortion and the connection of non-linear equipment to transmission and distribution systems in the United Kingdom.
- 2 **Engineering Recommendation G12/3**
Requirements for the application of protective multiple earthing to low voltage networks.
- 3 **Engineering Recommendation G59/1**
Recommendation for the connection of private generating plant to the Public Electricity Suppliers' distribution systems.
- 4 **Engineering Recommendation G75/1**
Recommendations for the connection of embedded generating plant to public distribution systems above 20kV or with outputs over 5MW.
- 5 (a) **Engineering Recommendation P2/5**
Security of Supply.
 (b) **EM7907**
Distribution planning standards of voltage and of security of supply. (Parts of Scottish Hydro Electric Power Distribution Ltd Area)
- 6 **Engineering Recommendation P14**
Preferred switchgear ratings.
- 7 **Engineering Recommendation P24**
AC traction supplies to British Rail.
- 8 **Engineering Recommendation P25**
The short circuit characteristics of electricity boards low voltage distribution networks and the co-ordination of overcurrent protective devices on 230V single phase supplies up to 100A.
- 9 **Engineering Recommendation P26/1**
The estimation of the maximum prospective short circuit current for three phase 415V supplies.
- 10 **Engineering Recommendation P28**
Planning limits for voltage fluctuations caused by industrial, commercial and domestic equipment in the United Kingdom.

ANNEX 1

- 11 **Engineering Recommendation P29**
Planning limits for voltage unbalance in the United Kingdom for 132kV and below.
- 12 **Technical Specification 41-24**
Guidance for the design, installation, testing and maintenance of main earthing systems in substations
- 13 **Engineering Recommendation S34**
A guide for assessing the rise of earth potential at substation sites.

DISTRIBUTION CODE INTRODUCTION (DIN)

DISTRIBUTION INTRODUCTION (DIN)

DIN1 INTERPRETATION

DIN1.1 This **Distribution Code** has been prepared by the **DNOs**. Words and expressions printed in bold type are listed in the **Distribution Glossary and Definitions**.

DIN1.2 The **DNO**, unless indicated otherwise, shall be construed as acting in its **Distribution Business** capacity.

DIN2 DISTRIBUTION LICENCE DUTY

DIN2.1 The **Distribution Licence** (Condition 9) requires the **DNO** in consultation with **Authorised Electricity Operator or AEO s** liable to be materially affected thereby to prepare and at all times have in force and implement and comply with a **Distribution Code** which:

- (a) Covers all material technical aspects relating to connections to and the operation and use of the **DNO's Distribution System** and the operation of electric lines and electrical **Plant and Apparatus** connected to the **DNO's Distribution System**. The **Distribution System** of any **Other Authorised Distributor** shall comply with the **Distribution Code** at the point of connection with the **DNO's Distribution System**.
- (b) Is designed so as to:
 - (i) Permit the development, maintenance, and operation of an efficient, coordinated and economical **System** for the distribution of electricity.
 - (ii) Facilitate competition in the generation and supply of electricity.

DIN2.2 The **Distribution Code** is in the same form for all **Users** of the same category. In drawing up and implementing the **Distribution Code**, the **Distribution Licence** requires that the **DNO** shall not discriminate against or prefer:

- (a) any one or any group of persons, or
- (b) the **DNO** in the conduct of any business other than the **Distribution Business**, in favour of or against any one other or any other group of persons.

DIN2.3 It is also a requirement of the **Distribution Licence** that the **DNO** shall comply with the provisions of the relevant **Grid Code** so far as applicable to the licensed business, and the **Distribution Code** is designed to ensure that these obligations can be met by the **DNO**.

DIN3 SCOPE

The **Distribution Code** shall be complied with by the **DNO** and by potential and existing **Generators, Suppliers and Customers** connected to or seeking connection to the **DNO's Distribution System** being referred to as **Users** as expressly defined in the various parts of the **Distribution Code**.

DISTRIBUTION INTRODUCTION (DIN)

DIN4 GENERAL REQUIREMENTS

DIN4.1 The **Distribution Code** contains procedures to permit equitable management of day to day technical situations in the Electricity Supply Industry, taking account of a wide range of operational conditions likely to be encountered under both normal and exceptional circumstances. It is nevertheless necessary to recognise that the **Distribution Code** cannot predict and address all possible operational situations. **Users** must therefore understand and accept that the **DNO**, in such unforeseen circumstances, will be required, in the course of the reasonable and prudent discharge of its responsibilities, to act in pursuance of any one or any combination of the following “General Requirements”:

- (a) The need to preserve or restore the integrity of the **DNO’s Distribution System** or the **Transmission System**.
- (b) The compliance by the **DNO** with its **Distribution Licence** obligations.
- (c) The compliance by others with obligations imposed by Licences issued under the **Act**.
- (d) The avoidance of breakdown, separation or collapse (total or partial) of the **DNO’s Distribution System** or the **Transmission System** or the **Total System**.
- (e) The preservation of safety under all circumstances, including the prevention of personal injury.
- (f) The prevention of damage to **Plant** and/or **Apparatus**.
- (g) The achievement of objectives specifically identified in the **Distribution Code**.
- (h) The compliance by the **DNO** with the relevant **Grid Code**.
 - (i) In the absence of an applicable provision of the **Distribution Code** or any of these General Requirements:
 - (i) The application of a policy aimed at the equitable sharing amongst **User** of any temporary restriction that might be necessary in exceptional circumstances, and
 - (ii) The application of then current industry practice.

DIN4.2 **Users** shall provide such reasonable co-operation and assistance as the **DNO** may reasonably request in pursuance of the above General Requirements.

DIN5 CODE RESPONSIBILITIES

DIN5.1 The **Distribution Code** sets out procedures and principles governing the **DNO’s** relationship with all **Users** of the **DNO’s Distribution System**.

DISTRIBUTION INTRODUCTION (DIN)

DIN5.2 The **DNO** and all **Users** have a duty under this **Distribution Code** to provide such information and resources as are necessary to facilitate compliance with and implementation of the **Distribution Code**. The **DNO** can only plan and operate the **DNO's Distribution System** and provide information for the planning and operation of the **Transmission System**, having regard to the requirements which **Users** have informed the **DNO** they wish to make of the **DNO's Distribution System**. The **DNO** must be able to rely upon the information which **Users** have supplied to it and will not be held responsible for any consequences which arise from its reasonable and prudent actions on the basis of such information supplied by any **User** or **Users**.

DIN6 CONFIDENTIALITY

The **Distribution Code** contains procedures under which the **DNO's Distribution Business**, in pursuance of its obligation as a **DNO**, will receive information from **Users** relating to the intentions of such **Users**. The **DNO** shall not, except in pursuance of specific requirements of the **Distribution Code**, disclose such information to any **User** or other person without the prior written consent of the provider of the information, subject to the requirements of the **Distribution Licence** (Condition 39).

DIN7 PUBLICATIONS

The **Distribution Code** contains references to various Electricity Supply Industry publications which provide guidance on planning and design criteria. A list of the publications referred to is included as an Annex 1 to the **Distribution Code**.

DISTRIBUTION GENERAL CONDITIONS **(DGC)**

DISTRIBUTION GENERAL CONDITIONS (DGC)

DGC1 INTRODUCTION

The **Distribution Glossary and Definitions** apply to all provisions of the **Distribution Code**. Their objective is to ensure, to the extent possible, that various sections of the **Distribution Code** work together and work in practice for the benefit of all **Users**.

DGC2 SCOPE

The **Distribution Glossary and Definitions** apply to the **DNO** and to all **Users**.

DGC3 UNFORESEEN CIRCUMSTANCES

If circumstances not envisaged by the provisions of the **Distribution Code** should arise, the **DNO** shall, to the extent reasonably practicable in the circumstances, consult promptly and in good faith with all affected **Users** in an effort to reach agreement as to what should be done. If agreement between the **DNO** and those **Users** cannot be reached in the time available, the **DNO** shall determine what is to be done.

Wherever the **DNO** makes a determination, it shall do so having regard, wherever possible, to the views expressed by **Users** and, in any event, to what is reasonable in all the circumstances. Each **User** shall comply with all instructions given to it by the **DNO** following such a determination provided that the instructions are consistent with the then current technical parameters of the particular **User's System** registered under the **Distribution Code**. The **DNO** shall promptly refer all such unforeseen circumstances and any such determination to the **Distribution Code Review** for consideration in accordance with DGC4.2(e).

DGC4 THE DISTRIBUTION CODE REVIEW PANEL

DGC4.1 The **DNOs** shall establish and maintain the **Panel**, which shall be a standing body, to carry out the functions referred to in paragraph DGC4.2.

DGC4.2 The **Panel** shall:-

- (a) Keep the **Distribution Code** and its working under review, including any necessary requirements for maintaining variations for Scotland and England and Wales;
- (b) to minimize the necessary differences in the treatment of issues in Scotland from their treatment in England and Wales;
- (c) review all suggestions for amendments to the **Distribution Code** which the **Authority** or any **User** may wish to submit to a **DNO** for consideration by the **Panel** from time to time;
- (d) publish recommendations as to amendments to the **Distribution Code** that a **DNO** or the **Panel** feels are necessary or desirable and the reasons for the recommendations;
- (e) issue guidance in relation to the **Distribution Code** and its implementation, performance and interpretation when asked to do so by any **User**; and

DISTRIBUTION GENERAL CONDITIONS (DGC)

- (f) consider what changes are necessary to the **Distribution Code** arising out of any unforeseen circumstances referred to it by the **DNO** under DGC3.

DGC4.3 The **Panel** shall consist of:-

- (a) A Chairman and up to 4 members appointed by the **DNOs**, at least one of whom will have an England and Wales **DNO** interest and be a member of the England and Wales Grid Code Review Panel and at least one of whom will have a Scottish **DNO** interest and be a member of the Scottish Grid Code Review Panel;
- (b) a person appointed by the **Authority**;
- (c) the following members:-
 - (i) 2 persons representing **Generators with Embedded Generating Plant** who are **BM Participants** and are active (ie submitting bid-offer data) in the **Balancing Mechanism** in England and Wales, or representing **Generators with Embedded Generating Plant** subject to **Central Despatch** in Scotland;
 - (ii) 2 persons representing **Generators with Embedded Generating Plant** other than those in (i) above; and
 - (iii) 2 persons, other than **Supplier**, representing **Users** without **Generating Plant**;
 - (iv) a person representing **Suppliers**; and
- (d) A person representing customers appointed by the **Gas and Electricity Consumer Council**.

At least one of the **User** representatives identified in DGC4.3(c) above shall represent a **User** of the Distribution System in Scotland.

Each of the above shall be appointed pursuant to the rules issued pursuant to DGC4.4.

DGC4.4 The **Panel** shall establish and comply at all times with its own rules and procedures relating to the conduct of its business, which rules and procedures shall be approved by the **Authority** and are set out in the “Constitution and Rules of the **Distribution Code Review**”.

DGC4.5 The **DNO** shall consult all **Authorised Electricity Operator or AEO s** liable to be affected in relation to all proposed amendments to the **Distribution Code** and shall submit all proposed amendments to the **Distribution Code** to the **Panel** for discussion prior to such consultation.

DGC5 COMMUNICATION BETWEEN THE DNO AND USERS

Unless otherwise specified in the **Distribution Code**, the methods of operational communication (other than relating to the submission of data and notices) shall be agreed between the **DNO** and **User** from time to time. The **DNO** shall operate an enquiry service for dealing with incidents on the **DNO’s Distribution System** and interruptions in supply.

DISTRIBUTION GENERAL CONDITIONS (DGC)

DGC6 DATA AND NOTICES

DGC6.1 Data and notices to be exchanged between the **DNO** and **User** under the **Distribution Code** (other than data which is the subject of a specific requirement of the **Distribution Code** as to the manner of its delivery) shall be delivered in writing in accordance with DGD2 (f).

DGC6.2 All data items, where applicable, will be referenced to nominal voltage and frequency unless otherwise stated.

DGC7 OWNERSHIP OF PLANT AND/OR APPARATUS

References in the **Distribution Code** to **Plant** and/or **Apparatus** of a **User** include **Plant** and/or **Apparatus** used by a **User** under an agreement with a third party.

DGC8 SYSTEM CONTROL

Where a **User's System** (or part thereof) is, by agreement, under the control of the **DNO**, then for the purposes of communication and co-ordination in operational timescales the **DNO** can (for those purposes only) treat that **User's System** (or part thereof) as part of the **DNO's Distribution System** but as between the **DNO** and **Users**, it shall remain to be treated as the **User's System** (or part thereof).

DGC9 EMERGENCY SITUATIONS

Users should note that the provisions of the **Distribution Code** may be suspended in whole or in part during a Security Period as more particularly provided for in the **Fuel Security Code**, or in accordance with a **Civil Emergency Direction** issued under a Civil Emergency in accordance with **Distribution Operating Code DOC9**.

DGC10 DISTRIBUTION CODE RESPONSIBILITIES

The **Distribution Code** sets out procedures and principles governing the relationship between the **DNO** and all **Users** of the **DNO's Distribution System**.

DISTRIBUTION PLANNING AND CONNECTION CODE **(DPC)**

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 1

DPC1 GENERAL INTRODUCTION

- DPC1.1 The **Distribution Planning and Connection Code** specifies the technical and design criteria and the procedures to be applied by the **DNO** in the planning and development of the **DNO's Distribution System** and to be taken into account by **Users**, as defined in DPC3 below, in the planning and development of their own **Systems** insofar as the latter affect the operation and use of the **DNO's Distribution System**. Developments on the **DNO's Distribution System** may have an impact on the **Transmission System** and this will be taken into account in the planning and development of the **DNO's Distribution System** and the conditions of the relevant **Grid Code** complied with as appropriate.
- DPC1.2 This **Distribution Planning and Connection Code** also specifies the technical, design and operational criteria which must be complied with by the **Users**, defined in DPC3 below connected to, or seeking connection to the **DNO's Distribution System**, in the planning and development of their **Systems** in so far as they affect the **DNO's Distribution System**.
- DPC1.3 A requirement for reinforcement or extension of the **DNO's Distribution System** or the **Transmission System** may arise due to the requirements of a **User** or for a number of other reasons including, but not limited to:
- (a) A development on a **User's System** already connected to the **DNO's Distribution System** as a **User Development**.
 - (b) The introduction of a new **Connection Point** between a **User's System** and the **DNO's Distribution System**.
 - (c) Transient, or steady state stability considerations.
 - (d) The development of an existing, or the connection of a new **Customer**.
 - (e) The cumulative effect of any combination of the above.
- DPC1.4 Accordingly, the reinforcement or extension of the **DNO's Distribution System** or the **Transmission System** may involve work:
- (a) At the **Connection Point** between a **User's System** and the **DNO's Distribution System**.
 - (b) On distribution or transmission lines or substations or other facilities which join the **Connection Point** to the remainder of the **DNO's Distribution System** or the **Transmission System**.
 - (c) At or between points on the **DNO's Distribution System** remote from the **Connection Point**.
- DPC1.5 The time required for the planning and development of the **DNO's Distribution System** and any consequential requirement of the **DNO's** interface with the **Transmission System**, will depend on the type and extent of the necessary reinforcement and/or extension work, the need or otherwise to obtain statutory or other consents by all parties, the associated possibility for a public inquiry and the degree of complexity in undertaking the new work whilst maintaining satisfactory security and quality of supply on the **DNO's Distribution System**. The **Distribution Licence** imposes appropriate timescales on the exchange of information between the **DNO** and **Users**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DPC1.6 **Planning Data**

DPC1.6.1 **Standard Planning Data**

Standard Planning Data is that data first to be provided by a User at the time of an application for a **Connection Agreement**. It comprises data, which is expected normally to be sufficient for the **DNO** to investigate the impact on the **DNO's Distribution System** of any **User Development** associated with an application by the **User** for a **Connection Agreement**. The **DNO** will inform **Users** where more detailed information is required.

DPC1.6.2 **Detailed Planning Data**

Detailed Planning Data comprises additional, more detailed, data not normally expected to be required by the **DNO** to investigate the impact on the **DNO's Distribution System** of any **User Development** associated with an application by the **User** for a **Connection Agreement**.

The **User** may, however, be required by the **DNO** to provide the **Detailed Planning Data** before the **DNO** can make an offer for a **Connection Agreement**. The **DNO** shall only request **Detailed Planning Data** where it considers the provision of such data to be necessary and in such cases the **DNO** shall specify which elements of **Detailed Planning Data** are required.

DPC1.6.3 **Standard Planning Data** and **Detailed Planning Data** requirements are specified for different **User Developments** of different types in DPC5 and DPC7 of this **Distribution Planning and Connection Code** and summarised in the **Distribution Data Registration Code**.

DPC1.6.4 **Estimated Data**

Where data is not available at the feasibility stage or preliminary stage of a **User Development** then the **User** may provide a reasonable estimate of the data to be requested by the **DNO** and in such cases the data shall be identified as estimated data by the **User**. Estimated data supplied by **Users** in pursuance of this **Distribution Planning and Connection Code** should, where practicable, be replaced by actual validated values prior to connection.

DPC1.6.5 **Assumed Data**

Where data is not available or has not been provided by the **User** at the feasibility stage or preliminary stage of a **User Development** then the **DNO** may make reasonable assumptions of the data required for assessment of the **User Development** and in such cases the **User** shall be notified of the assumed values adopted. Where the **DNO** has notified the **User** that assumed data has been adopted by the **DNO** in pursuance of this **Distribution Planning and Connection Code** then the **User** should, where practicable provide actual validated values to replace the assumed values prior to connection.

DPC1.7 **Status of Planning Data**

It is in the interests of all **Users** to initiate early discussion with the **DNO** regarding any proposed **User Development**, which may have an impact on the **DNO's Distribution System**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

For the purposes of this **Distribution Planning and Connection Code** it is considered that development will consist of four stages: -

(a) Feasibility Project Stage

At this optional stage the **User** will be considering a **User Development**. The **DNO** will be pleased to conduct a short meeting to discuss the **User's** requirements and provide guidance on the likely implications for the **DNO's Distribution System**.

If at this stage the **User** requires further information then the **DNO** will request **Standard Planning Data** from the **User** and provide a feasibility assessment identifying items of significant cost to the extent permitted by the information provided by the **User**. In accordance with the **DNO's** Statement of Charges a charge will be payable by any potential **User** for such an assessment.

At the feasibility project stage a number of iterative studies may be carried out by the **DNO** at the request of the **User** (or by the **User**) to identify opportunities for connection and corresponding costs and technical issues. The **Feasibility Project Data** requested by the **DNO** from the **User** to carry out these feasibility studies may include both **Standard Planning Data** and **Detailed Planning Data** depending on the complexity of the assessment studies required to be carried out by the **DNO**.

(b) Preliminary Project Stage

At this stage the **User** will have submitted an application for a **Connection Agreement**. The **Preliminary Project Planning Data** requested by the **DNO** from the **User** for assessing the connection and costs may include both **Standard Planning Data** and **Detailed Planning Data**.

(c) Committed Project Stage

At this stage a **Connection Agreement** will have been established. The **Committed Project Planning Data** on which the **Connection Agreement** is based may include both **Standard Planning Data** and **Detailed Planning Data**.

(d) Registered Project Stage

At this stage the connection will be physically established. The **Registered Data** for the connection shall include replacements for estimated and assumed values, where practicable, using validated actual values and updated forecasts for future data items.

DPC1.8 Reference is made in the **Distribution Planning and Connection Code** to the **DNO** supplying information or advice to **Users**. For the avoidance of doubt, unless the context otherwise requires, such information or advice will be furnished by the **DNO** upon request by the **User** (whether during the application for connection process or otherwise).

DPC1.9 The provisions of the **Distribution Planning and Connection Code** shall, subject to DPC1.8, be applicable to:

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

- (a) All existing connections as at the date of commencement of **DNO's Distribution Licence**.
- (b) All new or modified connections thereafter.

DPC1.10 In considering the approval of existing connections at the date of commencement of its **Distribution Licence**, the **DNO** shall have regard to the fact that previous changes in technical and design standards have not been applied retrospectively in every case, and the **DNO** shall not seek, under the terms of these **Distribution Planning and Connection Code** Conditions, to impose retrospective changes where these had not been required in the past, except where the **DNO** can reasonably demonstrate that significant change has occurred to conditions which existed when the matter was previously considered by the **DNO** or its predecessors.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 2

DPC2 OBJECTIVES

The objectives of the Distribution Planning and Connection Code are to:-

- (a) Enable the **DNO's Distribution System** to be planned, designed and constructed to operate economically, securely and safely.
- (b) Facilitate the use of the **DNO's Distribution System** by others and to specify a standard of supply to be provided.
- (c) Establish technical conditions which facilitate the interfacing of **Systems** at points of entry to and exit from the **DNO's Distribution System**.
- (d) Formalise the exchange of **System** planning data.
- (e) Provide sufficient information for a **User** to assess opportunities for connection and to plan and develop his **System** such as to be compatible with the **DNO's Distribution System**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 3

DPC3

SCOPE

- DPC3.1 The **Distribution Planning and Connection Code** specifies the planning, design and connection requirements for **Distribution Systems** owned by the **DNO** and for connections to those **Systems**.
- DPC3.2 The **Users** to whom the **Distribution Planning and Connection Code** applies are those who use or intend to use the **DNO's Distribution System** and comprise the following:-
- (a) **Embedded Generators.**
 - (b) **Suppliers.**
 - (c) **Customers** including those with **Unmetered Supplies** who are **Customers** including those with **Unmetered Supplies** who are connected to the **DNO's Distribution System**.
 - (d) **Other Authorised Distributors** connected to the **DNO's Distribution System**.
 - (e) **Meter Operators** which perform services in respect of **Equipment** connected to the **DNO's Distribution System**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 4

DPC4 DESIGN PRINCIPLES AND STANDARDS

DPC4.1 Introduction

DPC4.1.1 Planning criteria are based on the requirement to comply with statutory requirements, **Distribution Licence** conditions and other obligations placed on the **DNO** and **Users**.

DPC4.1.2 The **DNO** has a duty to develop and maintain an efficient, secure and co-ordinated **System** of electricity supply that is both economical and safe.

DPC4.1.3 **DPC4** sets out current principles and standards to be applied in the design of the **DNO's Distribution System** and any **User** connections to that **System**. Each scheme for reinforcement or modification of the **DNO's Distribution System** is individually designed in the light of economic and technical features associated with the particular **System** limitations under consideration.

DPC4.1.4 Nothing in **DPC4** is intended to inhibit design innovation. **DPC4** is, therefore, based upon the performance requirements of the **DNO's Distribution System** necessary to meet the above criteria.

DPC4.1.5 The technical and design criteria applied in the planning and development of the **DNO's Distribution System** are listed in Annex 1 to the **Distribution Code**. These standards may be subject to revision from time to time in accordance with the provision of the **Distribution Licence**.

DPC4.2 Standard of Supply

DPC4.2.1 Security

In accordance with the Condition 5 of the **Distribution Licence**, **DNOs** shall plan and develop their **DNO's Distribution Systems** to a standard not less than that set out in DGD Annex 1 Item 5, Engineering Recommendation P2/5 – “Security of Supply” or such other standard of planning as **DNOs** may, with the approval of the **Authority**, adopt from time to time

In accordance with the **Distribution Licence** Scottish Hydro Electric Power Distribution Ltd shall plan and develop its **DNO's Distribution System** in Scotland to a standard set out in EM7907. Engineering Recommendation P2/5 – “Security of Supply” has been modified by Scottish Hydro Electric Power Distribution Ltd as EM7907 and this is accepted by the **Authority**.

DPC4.2.2 Frequency and Voltage

DPC4.2.2.1 The **DNO's Distribution System** and any **User** connections to that **System** shall be designed to enable the **Normal Operating Frequency** and voltages supplied to **Customers** to comply with the **Electricity Supply Regulations**.

DPC4.2.2.2 The frequency of the **DNO's Distribution System** shall be nominally 50 Hz and shall normally be controlled within the limits of 49.5 - 50.5 Hz in accordance with principles outlined in the **Electricity Supply Regulations**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DPC4.2.2.3 In exceptional circumstances, **System** frequency could rise to values of the order of 52 Hz or fall to values of the order of 47 Hz. Sustained operation outwith the range 47 - 52 Hz is not taken into account in the design of **Plant** and **Apparatus**.

DPC4.2.2.4 Any extension or connection to the **DNO's Distribution System** shall be designed in such a way that it does not adversely affect the voltage control employed on the **DNO's Distribution System**. Information on the voltage regulation and control arrangements will be made available by the **DNO** if requested by the **User**.

DPC4.2.3 **Voltage Disturbances and Harmonic Distortion**

Distortion of the **System** voltage waveform, caused by certain types of **Equipment**, may result in annoyance to **Users** of the **DNO's Distribution System** or damage to connected **Apparatus**. In order to limit these effects the following shall apply to **Users'** loads connected to the **DNO's Distribution System**:-

- (a) Voltage fluctuations shall comply with the limits set out in DGD Annex 1, Item 10 Engineering Recommendation P28, "Planning limits for voltage fluctuations caused by industrial, commercial and domestic equipment in the United Kingdom".
- (b) The harmonic content of a load shall comply with the limits set out in DGD Annex 1, Item 1 Engineering Recommendation G5/4, "Planning levels for harmonic voltage distortion and the connection of non-linear equipment to transmission and distribution systems in the United Kingdom."
- (c) Voltage unbalance between phases shall comply with the levels laid down in DGD Annex 1, Item 11 Engineering Recommendation P29, "Planning limits for voltage unbalance in the United Kingdom for 132kV and below".
- (d) Traction supplies shall comply as appropriate with the requirements of DGD Annex 1, Item 7. Engineering Recommendation P24 "A.C. traction supplies to British Rail".

Under certain circumstances the **DNO** may agree to other limits or levels.

Under fault and circuit switching conditions the rated frequency component of voltage may fall or rise transiently. The fall or rise in voltage will be affected by the method of earthing of the neutral point of the **DNO's Distribution System** and voltage may fall transiently to zero at the point of fault. Sections 2 and 3 of BS EN 50160:1995 'Voltage Characteristics of Electricity Supplied by Public Distribution Systems', as amended from time to time, contain additional details of the variations and disturbances to the voltage which shall be taken into account in selecting **Equipment** from an appropriate specification for installation on or connected to the **System**.

DPC4.2.4 **Auto-reclosing and Single Phase Protection Operation**

In connecting to the **DNO's Distribution System** the **User** should be aware that auto-reclosing or sequential switching features may be in use on the **DNO's Distribution System**. The **DNO** will on request provide details of the auto-reclosing or sequential switching features in order that the **User** may take this into account in the design of the **User System**, including **Protection** arrangements.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

Users should be aware that the **Protection** arrangements on some **Distribution Systems** may cause disconnection of one phase or two phases only of a three phase supply for certain types of fault.

DPC4.3 **Design Principles**

This section sets out design principles for **Users** (excluding **Generators** and **Users with Unmetered Supply**), connected at **Low Voltage** and having single phase or three phase supplies protected by fuse(s) or other device(s) rated at 100 amps or less.

DPC4.3.1 Any **User's** installation which complies with the provisions of the Requirements of Electrical Installations BS 7671: 1992 (incorporating Amendment No1. 1994 (AMD 8536)) as amended from time to time, shall be deemed to comply with the requirements of the **Distribution Code** as regards design and safety.

DPC4.3.2 On the request of a **User** the **DNO** will provide such information, as may be reasonably required, on the design and other characteristics of the **DNO's Distribution System**.

Guidance on the short circuit characteristics of the **Low Voltage System** and associated supplies is provided in **Electricity Supply Industry** engineering publications, including Items 8 and 9 in Annex 1 Engineering Recommendation P25, "The short circuit characteristics of electricity board's low voltage distribution networks and the co-ordination of overcurrent protective devices on 230V Single Phase supplies up to 100 Amps", and Engineering Recommendation P26/1, "The estimation of the maximum prospective short circuit current for three phase 415V supplies".

Design practice for protective multiple earthing is detailed in the **Electricity Supply Industry** engineering publications (including Item 2 in Annex 1 Engineering Recommendation G12/3, "Application of protective multiple earthing to low voltage networks") and in the references contained in those publications.

The **DNO's** information requirements are detailed in DPC5.2.1.

DPC4.4 **Design Principles for all other Users not included in DPC4.3**

DPC4.4.1 **Specification of Equipment, Overhead Lines and Underground Cables**

(a) The principles of design, manufacture, testing and installation of distribution **Equipment**, overhead lines and underground cables, including quality requirements, shall conform to applicable statutory obligations and shall comply with relevant **CENELEC** standards, **IEC** publications, European and British Standards. Further advice will be made available upon request to the **DNO**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

- (b) The documents specified in paragraph (a) contain options for purchaser selection which together with other requirements that are necessary to meet **System** design needs, shall be specified so as to provide performances and ratings in line with **Electricity Supply Industry (ESI Technical Specifications)** (some of which are published as **Electricity Supply Industry (ESI Standards)**), British Electricity Board Specifications, Engineering Recommendations and Area Chief Engineers (ACE) Reports and Engineering Technical Reports and **Electricity Supply Industry (ESI documents)** as listed in Annex 1 of the **Distribution Code** or such other specifications as the **DNO** may adopt from time to time by agreement with the **Authority**.
- (c) The specifications of **Equipment**, overhead lines and cables shall be such as to permit **Operation** of the **DNO's Distribution System** within the **Safety Management System** of the **DNO**, details of which will be made available by the **DNO** upon request.
- (d) **Equipment** shall be suitable for use at the operating frequency, within the intended operating voltage range and at the design short-circuit rating of the **DNO's Distribution System** to which it is connected having due regard to fault carrying capabilities and making and breaking duties. In appropriate circumstances, details of the **System** to which connection is to be made will be provided by the **DNO**. Guidance on the short circuit characteristics of the three phase **Low Voltage** system and associated supplies is provided in **Electricity Supply Industry** engineering publications, including Item 9 in DGD Annex 1 Engineering Recommendation P26/1, "The estimation of the maximum prospective short circuit current for three phase 415V supplies".
- (e) Cables, overhead lines transformers and other **Equipment** shall be operated within the thermal rating conditions contained in the appropriate standards, specifications, and other relevant publications, taking into account the intended use. Such information will be made available by the **DNO** upon request.
- (f) The standards, publications and specifications referred to in paragraphs (a) to (e) above are such standards, publications and specifications current at the time that the **Plant** and/or **Apparatus** was manufactured (and not commissioned) in the case of **Plant** and/or **Apparatus** on the **Total System**, or awaiting use or re-use. If any such **Plant/Apparatus** is subsequently moved to a new location or used in a different way, or for a different purpose, or is otherwise modified then such standards, publications and specifications current at the time that the **Plant** and/or **Apparatus** was manufactured (and not commissioned) will apply provided that in applying such standards, publications and specifications the **Plant** and/or **Apparatus** is reasonably fit for its intended purpose having due regard to the obligations of the **DNO** and the **User** under their respective licences.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DPC4.4.2 Earthing

- (a) The arrangements for connecting the **DNO's Distribution System** with earth shall be designed to comply with the requirements of the **Electricity Supply Regulations** and relevant European and British Standards. Guidance as to the design of earthing systems is contained in **Electricity Supply Industry (ESI) Engineering publications**, including Items 12, and 13 in DGD Annex 1 Technical Specification 41-24, "Guidance for the design, installation, testing and maintenance of main earthing systems in substations" and Engineering Recommendation S.34, "A guide for assessing the rise of earth potential at substation sites".
- (b) The method of earthing of the **DNO's Distribution System**, for example, whether it is connected solidly to earth or through an impedance, shall be advised by the **DNO**. The specification of associated **Equipment** shall meet the voltages which will be imposed on the **Equipment** as a result of the method of earthing.
- (c) Design practice for protective multiple earthing is detailed in the **Electricity Supply Industry (ESI) Engineering publications** including Item 2 DGD Annex 1 Engineering Recommendation G12/3, "Application of protective multiple earthing to low voltage networks", and in the references contained in those publications.
- (d) **Users** shall take precautions to limit the occurrence and effects of circulating currents in respect of the neutral points of any interconnected system (eg where there is more than one source of energy.)

DPC4.4.3 Voltage Regulation and Control

Any extension or connection to the **DNO's Distribution System** shall be designed in such a way that it does not adversely affect the voltage control employed by the **DNO's Distribution System**. Information on the voltage regulation and control arrangements will be made available by the **DNO** if requested by the **User**.

DPC4.4.4 Protection

- (a) The **DNO's Distribution System** and the **System** of any **User** connected to the **DNO's Distribution System** shall incorporate protective devices in accordance with the requirements of the **Electricity Supply Regulations**.
- (b) In order to ensure satisfactory operation of the **DNO's Distribution System, Protection** systems, operating times, discrimination, and sensitivity at the **Ownership Boundary** shall be agreed between the **DNO** and the **User** during the application for connection process, and may be reviewed from time to time by the **DNO**, with the concurrence of the **User**.
- (c) In order to cover a circuit breaker, or **Equipment** having a similar function, failing to operate correctly to interrupt fault current on a **HV System**, back-up protection by operation of other circuit breakers or **Equipment** having a similar function must normally be provided. The **DNO** will advise the **User** if the same is not required. If the **Equipment** providing the back-up protection is owned by the **DNO**, then this **Protection** may be limited to that needed to meet statutory requirements in respect of the **DNO's Distribution System**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

- (d) Unless the **DNO** should advise otherwise, it is not acceptable for **Users** to limit the fault current infeed to the **DNO's Distribution System** by the use of **Protection** and associated **Equipment** if the failure of that **Protection** and associated **Equipment** to operate as intended in the event of a fault, could cause **Equipment** owned by the **DNO** to operate outside its short-circuit rating.

DPC4.4.5 **Superimposed Signals**

Where **Users** install mains borne signalling equipment it shall comply with European Standard EN50.065 as amended from time to time. Where a **User** proposes to use such equipment to superimpose signals on the **DNO's Distribution System**, the prior agreement of the **DNO** is required.

DPC4.5 **Network Statements**

DPC4.5.1 In accordance with Condition 4 of its **Distribution Licence** the **DNO**, on the request of a **User**, will prepare a statement showing present and future circuit capacity, forecast power flows and loading on the part or parts of the **DNO's Distribution System** specified in the request and **Fault Levels** at each distribution node covered by the request and containing:

- a) such further information as shall be reasonably necessary to enable such person to identify and evaluate the opportunities available when connecting to and making use of the part or parts of the licensee's distribution system specified in the request ;and
- b) if so requested, a commentary prepared by the licensee indicating the licensee's views as to the suitability of the part or parts of the licensee's distribution system specified in the request for new connections and the distribution of further quantities of electricity..

The **Distribution Licence** sets out conditions on the time scales and charges associated with providing such a statement

DPC4.5.2 In accordance with Condition 25 of its Distribution Licence the **DNO** will prepare on the request of the **Authority** a statement, also known as the Long Term Development Statement. The form and content of this statement will be specified by the **Authority** and will cover future years on a rolling basis. This statement gives information to assist any person who contemplates entering into distribution arrangements with the **DNO** to identify and evaluate the opportunities for doing so.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 5

DPC5 GENERAL REQUIREMENTS FOR CONNECTION

DPC5.1 Introduction

DPC5.1.1 **Distribution Planning and Connection Code (DPC5)** ensures that all **Users** of the **DNO's Distribution System** are subject to the same requirements for connection.

DPC5.1.2 Data exchange requirements specified in this **Distribution Planning and Connection Code** apply to any **User Development**, which has an impact on the **DNO's Distribution System**.

DPC5.1.3 DPC5.2.2 specifies the information required from **Users** by the **DNO** in order to ensure that adequate technical provision is made for new supplies or increases in existing load; DPC5.2.2 also applies to **Generators** who operate in parallel with the **DNO's Distribution System**, where a supply is required from the **DNO** under normal or emergency conditions. Information required from **Generators**, with connections at **HV** or **Low Voltage**, in respect of the import of energy to the **DNO's Distribution System**, is covered in DPC7. Transfer of Planning Data for **Users** connected at **HV** is set out in DPC 8.

DPC5.2 Declaration of Load Characteristics

DPC5.2.1 For supplies at **Low Voltage** under terms in the **Supply Agreement** it is possible in most cases to assess whether a proposed connection is acceptable, and to determine the necessary supply arrangements, from analysis of the following limited data:-

- (a) Maximum power requirements (kVA or kW);
- (b) Type and electrical loading of **Equipment** to be connected, eg number and size of motors, cookers, showers, space and water electrical heating arrangements, including details of equipment which is subject to switching by the **Supplier**; and
- (c) The date when the connection is required.

These requirements will be specified on the appropriate application for a connection form obtainable from the **DNO**.

Should a preliminary examination of this data indicate that more detailed information is required then it shall be provided to the **DNO** upon request if reasonably required.

Users, shall contact the **DNO** in advance if it is proposed to make any significant change to the connection, electric lines or electrical **Equipment**, install or operate any generating equipment or do anything else that could affect the **DNO's Distribution System** or require alterations to the connection.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

Users, shall provide the **DNO** with any information it asks for about the nature, or use by the **User**, of electrical equipment on the **User's** premises (including that specified in DPC5.2.1 (a), (b), and (c) above). The **DNO** will only ask for information that is needed by it in relation to its **Distribution Licence** or the **Distribution Code** or to comply with the **Electricity Supply Regulations** or the **Act**.

DPC5.2.2 The provisions of DPC5.2.1 also apply to supplies other than those at **Low Voltage**. It may be necessary for the following more comprehensive information, in addition to that detailed in DPC5.2.1, to be provided on request:-

DPC5.2.2.1 **Standard Planning Data**

It is possible in most cases to assess whether a proposed connection is acceptable, and to determine the necessary supply arrangements, from analysis of the following limited **Planning Data** which will be specified on the appropriate standard application form obtainable from the **DNO**:

- (a) Point of Connection to the **DNO's Distribution System** (geographical and electrical).
- (b) The date when connection is required.
- (c) Single line diagrams of existing and proposed arrangements of main **Plant** and **Apparatus** showing equipment rating.
- (d) Type and electrical loading of equipment to be connected, eg number and size of motors, electrical heating arrangements, etc.
- (e) Maximum power requirements MVA.
- (f) Maximum **Active Power Demand** (MW).
- (g) Maximum and minimum **Reactive Power** requirements (MVA_r).
- (h) The maximum phase unbalance which the **User** would expect the **Demand** to impose on the **DNO's Distribution System**.
- (i) The maximum harmonic content which will be imposed on the **DNO's Distribution System**.
- (j) Details of change of **Demand (Active Power and Reactive Power)**.
- (k) Details of any load management scheme to be applied by the **User** on the **User System**.
- (l) **Peak Demand** profiles at the **Exit Point**, both 2 hourly on day of **User's Peak Demand** and monthly **Peak Demand** variations.
- (m) Three phase short circuit infeed from all sources within the **User's System**, based on **Generation Set** sub-transient reactance and the minimum zero phase sequence impedance of the **User's System**.
- (n) Standard load profiles

Should a preliminary examination of this data indicate that more detailed information is required then it shall be provided to the **DNO** on request.

DPC5.2.2.2 **Detailed Planning Data**

It may be necessary for the **User** in addition to that in DPC5.2.2.1, to provide the following more comprehensive **Detailed Planning Data** on request.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

In relation to **Demand**:

- (a) Type of load and control arrangements (eg controlled rectifier or large motor drives and type of starter employed).
- (b) Maximum load on each phase at the time of **Peak Demand**
- (c) **Demand** profiles (48 x half hour average estimates) for **Active** and **Reactive Power Demand** for the day of the **Exit Point Peak Demand** and for the day of the **Transmission System Peak Demand at Annual Average Cold Spell (ACS) Conditions**.

In relation to fluctuating loads:-

- (a) The rates of change of **Demand (Active Power and Reactive Power)** both increasing and decreasing.
- (b) The shortest repetitive time interval between fluctuations in **Demand (Active Power and Reactive Power)**.
- (c) The magnitude of the largest step changes in **Active Power and Reactive Power**, both increasing and decreasing.

In some cases, more detailed information may need to be provided to permit a full assessment of the effect of the **User's** load on the **DNO's Distribution System**. Such information may include an indication of the pattern of build up of load and a proposed commissioning programme. This information will be specifically requested by the **DNO** when necessary.

DPC5.2.3 A **DNO** is only entitled to use any information provided by a **User** under this **Distribution Code** for the purpose of fulfilling its obligations in respect of its **Distribution System** required by the **Distribution Licence** or the **Distribution Code**, including operating the procedures for **Load Managed Areas** and associated Security Restriction Notices specified in the **Distribution Use of System Agreement**.

DPC5.3 **Connection Arrangements**

DPC5.3.1 The design of connections between the **DNO's Distribution System** and **Users** shall be in accordance with the principles set out in DPC4, subject to any modification to which the **DNO** may reasonably consent.

DPC5.3.2 During the application for connection process the **DNO** will agree with the **User** the voltage level to which a **User** will be connected in accordance with its normal practice for the type of load to be supplied. The **DNO** may on occasion specify a different connection voltage from normal in order to avoid potential disturbance caused by the **User's Apparatus** to other **Users** of the **DNO's Distribution System** or for other technical reasons or may agree alternative methods for minimising the effects of disturbing loads.

DPC5.3.3 Before entering into a **Connection Agreement** and before making a connection to a **User** at a **Connection Point**, it will be necessary for the **DNO** to be reasonably satisfied that the **User's System** at the boundary with the **DNO's Distribution System** will comply with all appropriate requirements of the **Distribution Code**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DPC5.3.4 The **User's** installation shall comply with the principles contained in Regulation 27(2) of the **Electricity Supply Regulations** or relevant European and British Standard as appropriate.

DPC5.4 **Ownership Boundaries**

DPC5.4.1 The point or points at which supply is given or taken between the **DNO's Distribution System** and **Users** will be agreed between the **DNO** and the **User** as required. For supplies at **Low Voltage** the general rule is that the point of supply will be at the **User's** terminals of the **DNO** owned metering equipment unless the metering equipment is owned by a **Meter Operator** where the point of supply is the outgoing terminals of the termination equipment. For **HV** supplies, including connections between the **DNO** and **User**, and where necessary busbar connected supplies at **Low Voltage**, the points of supply will be subject to specific agreement between the parties in each case.

DPC5.4.2 The respective ownership of **Plant** or **Apparatus** will be recorded in a written agreement between the **DNO** and the **User** as required. In the absence of a separate agreement between the parties to the contrary, construction, commissioning, control, operation and maintenance responsibilities follow ownership.

DPC5.4.3 For supplies at **HV**, and those covered by Regulation 26 and Parts 1 and 2 of Schedule 3 of the **Electricity Supply Regulations**, the **DNO** will with the **User's** agreement prepare a **Site Responsibility Schedule** and, where determined by the **DNO** during the application for connection process, an **Operation Diagram** showing the agreed **Ownership Boundary**.

The **Site Responsibility Schedule** shall detail the demarcation of responsibility for safety of persons carrying out work or testing at sites having a **Connection Point** to the **DNO's Distribution System** and/or circuits which cross an **Ownership Boundary** at any point.

More detailed information on procedures and responsibilities involved in the provision of safety at interfaces between the **DNO's Distribution System** and a **User's System** is set out in **Distribution Operating Code DOC8**.

Copies of these documents will be retained by the **DNO** and the **User**. Changes in the boundary arrangements proposed by either party must be agreed in advance and will be recorded on the **DNO Operation Diagrams**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 6

DPC6 TECHNICAL REQUIREMENTS FOR CONNECTIONS

DPC6.1 Introduction

Distribution Planning and Connection Code DPC6 specifies the technical arrangements required at the **Ownership Boundary** between the **DNO's Distribution System** and the **System** of the **User** and is applicable at all voltage levels, but excludes **Users** (including those with **Unmetered Supplies**) connected at **Low Voltage**, without Generation, and protected by fuse(s) or other device(s) rated at 100 amps or less.

DPC6.2 Equipment at the Ownership Boundary

All **Equipment** at the **Ownership Boundary** shall meet the design principles contained within DPC4.4.1. Connections for entry to and exit from the **DNO's Distribution System** shall incorporate a means of disconnection of the **User's** installation by the **DNO**.

DPC6.3 Protection Requirements

Protection requirements vary widely depending on established practices and the needs of the particular **DNO's Distribution System**. The basic requirement in all cases is that **Users'** arrangements for **Protection** at the **Ownership Boundary**, including types of **Equipment** and **Protection** settings, must be compatible with standards and practices on the **DNO's Distribution System**, maintaining necessary operating times, sensitivity, discrimination and co-ordination, as specified by the **DNO** during the application for connection process and which may be reviewed from time to time and complied with by the **User**.

In particular:-

- (a) Maximum fault clearance times (from fault current inception to arc extinction) must be within the limits established by the **DNO** in accordance with **Protection** and **Equipment** short circuit rating policy adopted for the **DNO's Distribution System**.
- (b) In connecting to the **DNO's Distribution System** the **User** should be aware that auto-reclosing or sequential switching features may be in use on the **DNO's Distribution System**. The **DNO** will on request provide details of the auto-reclosing or sequential switching features in order that the **User** may take this into account in the design of the **User System**, including **Protection** arrangements.
- (c) **Users** should also be aware that the **Protection** arrangements on some **DNO's Distribution Systems** may cause disconnection of one phase or two phases only of a three phase supply for certain types of fault.

DPC6.4 Earthing

Earthing of that part of the **User's System** that is connected to the **DNO's Distribution System** shall comply with the arrangements specified in **DPC4**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DPC6.5 **Fault Level Considerations**

DPC6.5.1 The short circuit rating of **User's Equipment** at the **Connection Point** should be not less than the design **Fault Level** of the **DNO's Distribution System** to which it is connected. The choice of **Equipment** for connection at **Low Voltage** may take into account attenuation in the service lines as specified in DGD Annex 1, Items 8 and 9, Engineering Recommendation P25, "The short circuit characteristics of electricity board's low voltage distribution networks and the co-ordination of overcurrent protective devices on 230V single phase supplies up to 100 Amps" and Engineering Recommendation P26/1, "The estimation of the maximum prospective short circuit current for three phase 415V supplies". The **DNO** in the design of its **System** will take into account the contribution to **Fault Level** of the **User's** connected **System** and **Apparatus**.

DPC6.5.2 In order to permit these assessments to be carried out information should be exchanged on prospective fault power infeed and X/R ratios where appropriate at points of entry to and exit from the **DNO's Distribution System**.

DPC6.6 **Capacitive and Inductive Effects**

The **User** shall, when applying to make a connection, provide the **DNO** with information as detailed in DPC8. Details will be required of capacitor banks and reactors connected at **HV** which could affect the **DNO's Distribution System** and which it is proposed to connect if agreed by the **DNO**. When requested by the **DNO** details shall also be provided of distributed circuit capacitance and inductance. Sufficient detail is required for the following:-

- (a) To verify that controlling **Equipment** of the **DNO's Distribution System** is suitably rated.
- (b) To show that the performance of the **DNO's Distribution System** will not be impaired.
- (c) To ensure that arc suppression coils when used by the **DNO** for **System** earthing purposes are correctly installed and operated.

DPC6.7 **Communications and Telemetry Equipment**

DPC6.7.1 Where required by the **DNO** in order to ensure control of the **DNO's Distribution System**, communications between **Users** and the **DNO** shall be established in accordance with the following. **Users** shall provide and maintain those parts of the communications equipment within their location. Provision of any necessary communications requirements shall be in accordance with the **Connection Agreement** for a specific connection.

DPC6.7.2 **Primary Speech Facility**

Users at their own cost shall provide and maintain equipment approved by the **DNO** by means of which routine and emergency communications may be established between the **User** and the **DNO**.

Connection to the **DNO's** corporate telephone network and any circuit or circuits required to connect the **Users** with the point of connections shall be provided in accordance with the **Connection Agreement**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

The facilities to be provided by the connection and the signalling and logical requirements for the interface between the **Users** equipment and the connection to the **DNO's** corporate telephone network will be specified in the **Connection Agreement**.

DPC6.7.3 **Telemetry**

The **User** shall provide such voltage, current, frequency, **Active Power** and **Reactive Power** pulses and outputs and status points from his **System** as are considered reasonable by the **DNO** to ensure adequate **System** monitoring. The telemetry outstation in such a situation will be provided, installed and maintained by the **DNO**.

DPC6.7.4 **Telecontrol Outstation**

If it is agreed between the parties that the **DNO** shall control the switchgear on the **User's System**, the **DNO** shall install the necessary telecontrol outstation. Notwithstanding the above, it shall be the responsibility of the **User** to provide the necessary control interface for the switchgear of the **User** which is to be controlled.

DPC6.7.5 **Instructor Facilities**

Where required by the **DNO**, the **User** shall provide accommodation for special instructor facilities specified by **DNO** for the receipt of operational messages.

DPC6.7.6 **Data Entry Terminals**

The **User** shall accommodate the **DNO's** data entry terminals for the purpose of information exchange.

DPC6.7.7 **System Monitoring**

Monitoring equipment is provided on the **DNO's Distribution System** to enable the **DNO** to monitor dynamic performance conditions. Under the requirements of the relevant **Grid Code**, **Generation Sets** and **Power Stations** will need to provide signals for monitoring purposes. Where this monitoring equipment requires input signals from the **User's** side of the **DNO/User Ownership Boundary**, the **User** shall be responsible for the provision of suitable signals in accordance with the **Connection Agreement**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 7

DPC7 REQUIREMENTS FOR EMBEDDED GENERATORS

DPC7.1 Introduction

DPC7.1.1 This **Distribution Planning and Connection Code DPC7** is applicable to all existing or prospective **Generators**, including **Customer With Own Generation** and **Other Authorised Distributor**, having **Generating Plant** operating or capable of operating in parallel with the **DNO's Distribution System**. It is recognised that some existing **Generators** may not comply at present with all of the requirements of this section and in such cases the **DNO** will advise the **Generator** which requirements are necessary for the **Operation** of the **DNO's Distribution System**.

DPC7.1.2 In addition to meeting the requirements of DPC7, **Embedded Generators** will need to meet the requirements of other relevant sections of the **Distribution Code**.

DPC7.2 General Requirements

Embedded Generators connected at or below 20kV and with an output not in excess of 5MW shall, as a minimum requirement, comply with the requirements of Item 3, DGD Annex 1 Engineering Recommendation G59/1, "Recommendations for the connection of private generating plant to the Public Electricity Suppliers' distribution systems".

Embedded Generators connected at a higher voltage or of a larger capacity shall comply with the general principles of Item 4, DGD Annex 1 Engineering Recommendation G75/1 "Recommendations for The Connection of embedded generating plant to public distribution systems above 20kV or with outputs over 5MW", subject to the particular requirements of the **DNO** necessitated by the adjacent **DNO's Distribution System** conditions, which will be made known by the **DNO** during the connection application process DPC7.3 "Provision of Information".

DPC7.3 Provision of Information

Embedded Generators can have a significant effect on the **DNO's Distribution System** and as a result its **Users**. To enable the **DNO** to assess the impact **Embedded Generating Plant** will have on the **DNO's Distribution System**, the proposed **Generator** will be required to supply information to the **DNO**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

Embedded Generators will fall within three basic classes for which the following minimum information shall be provided to the **DNO** by the **Generator** during the connection application process or otherwise as requested by the **DNO**:-

Relevant Sections:

- | | |
|---|---|
| (a) Power Station and site data for all Embedded Generators . | DPC7.3.1 and Schedule 5a of the DDRC |
| (b) Generation Set data for all Embedded Generating Plant connected at a voltage level of 20kV or below or with a capacity less than 5MW (Item 3, DGD Annex 1) | DPC7.3.2 and Column 3 of Schedules 5b of the DDRC |
| (c) Generation Set data for specified types of Embedded Generating Plant connected at a voltage level of 20kV or below or with a capacity less than 5MW (Item 3, DGD Annex 1)
5c(i) Synchronous generators
5c(ii) Fixed speed induction generators | DPC7.3.2 and column 3 of Schedules 5c(i) and 5c(ii) of the DDRC |
| (d) Generation Set data for all Embedded Generating Plant connected at a voltage level greater than 20kV or with a capacity greater than 5MW and up to 30 MW in Scotland and 50MW in England and Wales (Item 4, DGD Annex 1) | DPC7.3.2 and Column 4 of Schedules 5b of the DDRC |
| (e) Generation Set data for specified types of Embedded Generating Plant connected at a voltage level greater than 20kV or with a capacity greater than 5MW and up to 30 MW in Scotland and 50MW in England and Wales (Item 4, DGD Annex 1)
5c(i) Synchronous generators
5c(ii) Fixed speed induction generators | DPC7.3.2 and column 4 of Schedules 5c(i) and 5c(ii) of the DDRC |
| (f) Generation Set data for specified types of Embedded Generating Plant connected at a voltage level greater than 20kV or with a capacity greater than 5MW and up to 30 MW in Scotland and 50MW in England and Wales (Item 4, DGD Annex 1)
5c(iii) Double fed induction generators
5c(iv) Converter connected generators | DPC7.3.2 and Schedules 5c(iii) and 5c(iv) of the DDRC |
| (g) Transformers associated with Power Station and Generation Sets | DPC7.3.2 and Schedule 5c(v) of the DDRC |
| (h) Power Station data and Generation Set data for all Embedded Generating Plant in excess of 5 MW for Scottish Hydro Electric Power Distribution Ltd, 30 MW for SP Distribution Ltd and 50MW in England and Wales (Item 4, DGD Annex 1) | DPC7.3.1, DPC7.3.2 and DPC7.3.3 |

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

When applying for connection to the **DNO's Distribution System Generators** shall also refer to DPC5.

The **DNO** will use the information provided to model the **DNO's Distribution System** and to decide what method of connection will need to be employed and the voltage level to which the connection should be made. If the **DNO** reasonably concludes that the nature of the proposed connection or changes to an existing connection requires more detailed consideration then further information may be requested. It is unlikely that more information than that specified in DPC7.3.1 will be required for **Embedded Generators** who are to be connected at **Low Voltage** and have less than 50kVA in capacity, or connected at other than **Low Voltage** and have less than 300kVA in capacity.

DPC7.3.1 **Information Required from all Embedded Generators**

It will be necessary for each **Generator** to provide to the **DNO** information on

physical and electrical characteristics of the **Power Station** and site as a whole as set out in Schedule 5a of the **Distribution Data Registration Code** before entering into an agreement to connect any **Generating Plant** onto the **DNO's Distribution System:-**

The information required includes:

- (a) Details of the proposed connection point (geographical and electrical) and connection voltage.
- (b) The number and types of generators and the total capacity of the power station and auxiliary supplies under various operating conditions.
- (c) Sketches of **System** Layout:
Operation Diagrams showing the electrical circuitry of the existing and proposed main features within the **User's System** and showing as appropriate busbar arrangements, phasing arrangements, earthing arrangements, switching facilities and operating voltages.
- (d) Interface Arrangements
 - (i) The means of synchronisation between the **DNO** and **User**;
 - (ii) Details of arrangements for connecting with earth that part of the **Generator's System** directly connected to the **DNO's Distribution System**.
 - (iii) The means of connection and disconnection which are to be employed.
 - (iv) Precautions to be taken to ensure the continuance of safe conditions should any earthed neutral point of the **Generator's System** operated at **HV** become disconnected from earth.

More or less detailed information than that contained above might need to be provided, subject to the type and size of generation or the point at which connection is to be made to the **DNO's Distribution System**. This information will need to be provided by the **Generator** at the reasonable request of the **DNO**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DPC7.3.2 **Additional Generation Set and Plant and Equipment Data Required from Embedded Generators.**

This section details the technical and design information requirements for **Embedded Generators** covered by:

- (a) **Embedded Generators** connected at a voltage level of 20kV or below or with a capacity less than 5MW, Item 3 of Annex 1
- (b) **Embedded Generators** connected at a voltage level greater than 20kV or with a capacity greater than 5MW and up to 30 MW in Scotland and 50MW in England and Wales (Item 4 Annex 1).

The **Standard Planning Data** and **Detailed Planning Data** specified in Schedule 5b and Schedule 5c of the **Distribution Data Registration Code** may be requested by the **DNO** from the **User** before entering into an agreement to connect any **Generating Plant** onto the **DNO's Distribution System**.

The information specified in Schedule 5b of the **Distribution Data Registration Code** includes generic data for all **Embedded Generation Sets**.

The information specified in Schedule 5c of the **Distribution Data Registration Code** includes the electrical parameters of individual **Generation Sets** and associated plant such as transformers, power factor correction equipment. The information required is classified as **Standard Planning Data** and **Detailed Planning Data** for each of the following categories of **Embedded Generation Set**:

- (i) Synchronous generators
- (ii) Fixed speed induction generators
- (iii) Doubly fed induction generators
- (iv) Series converter connected generators.
- (v) Transformers

Under certain circumstances either more or less detailed information than that specified above might need to be provided and will be made available by the **Generator** at the request of the **DNO**.

DPC7.3.3 **Extra Information From Embedded Generators to be Provided to Meet Grid Code Requirements**

DPC 7.3.3 (a) (Applicable to connections to a Distribution System in Scotland only)

Embedded Generators in excess of 30MW (Connected to the Distribution System of SP Distribution Ltd) and 5MW (Connected to the Distribution System of Scottish Hydro Electric Power Distribution Ltd) will normally be subject to **Central Despatch** and with other **Embedded Generating Plant** subject to **Central Despatch** shall supply to the **DNO** any information requirements detailed in the relevant **Grid Code**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DPC7.3.3 (b) (Applicable to connections to a Distribution System in England and Wales only)

In addition to supplying the **DNO** with details of **Embedded Generating Plant** there is a requirement to provide information to the **Transmission Licensee**, under the relevant **Grid Code**. The categories of **Embedded Generating Plant** are as follows:-

- (a) **Embedded Generation Plant** which is a **Medium Power Station** will provide extra information direct to the **Transmission Licensee**.
- (b) **Embedded Generation Plant** which is a **Small Power Station** will provide extra information via the **DNO** to the **Transmission Licensee** if:-
 - (i) It falls to be supplied to the **Transmission Licensee** pursuant to the accession of the **Embedded Generation Plant** owner into the **CUSC Framework Agreement** or for modification of an existing **CUSC Bilateral Agreement**, in both cases for the **Small Power Station** concerned.
 - (ii) Where the **Generating Plant** is in a contract, with a party, which makes or proposes to make use of an **External Interconnection**; or
 - (iii) It has been specifically requested by the **Transmission Licensee** in the circumstances provided for under the **Grid Code**.
- (c) **Embedded Generating Plant** which comprises or contains a **BM Unit** and is active (ie submitting bid-offer data) in the **Balancing Mechanism** will provide extra information direct to the **Transmission Licensee**.

DPC7.3.4 **Information Provided by the DNO to Users**

In accordance with Condition 4 and Condition 25 of its **Distribution Licence** the **DNO** is required to provide certain information to **Users** so that they have the opportunity to identify and evaluate opportunities to connect to the **DNO's Distribution System** as set out in DPC4.5. Comprehensive information on the **DNO's Distribution System** operating at 33kV and above is made available to **Users** through the Long Term Development Statements provided under Condition 25 of the **Distribution Licence**. Schedule 5d of the **Distribution Data Registration Code** is indicative of the type of network data the **DNOs** is required to provide to **Users** for identifying opportunities for connection of generation at voltages below 33kV. On the production of Schedule 5d data for a **User**, the **DNO** will update any relevant data that would otherwise be provided from the Long Term Development Statement.

DPC7.4 **Technical Requirements**

DPC7.4.1 **Generating Plant Performance Requirements**

For **Embedded Generating Plant**, which is not subject to **Central Despatch** in Scotland or does not constitute or contain **BM Units** that are active (ie. submitting bid-offer data) in the **Balancing Mechanism** in England and Wales, the electrical parameters required to be achieved at the **Generation Set** terminals are defined according to the connection method and will be specified by the **DNO** with the offer for connection. A **Generation Set** or **Power Station** must be capable of supplying its **Registered Capacity** within the **System** frequency range 49.5 to 50.5 Hz. The output power should not be affected by voltage changes in the permitted operating range.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DPC7.4.2 Control Arrangements

The **DNO** will specify in writing if a continuously acting fast response automatic excitation control system is required to control the **Generation Set** voltage without instability over the entire operating range of the **Generation Set** or **Power Station**. This will be dependent on the size and type of **Generating Plant** or **Power Station** and the adjacent part of the **DNO's Distribution System** to which it is connected.

DPC7.4.3 Co-ordinating with Existing Protection

It will be necessary for the **Protection** associated with **Embedded Generating Plant** to co-ordinate with the **Protection** associated with the **DNO's Distribution System** as follows:-

- (a) For **Generating Plant** directly connected to the **DNO's Distribution System** the **Generator** must meet the target clearance times for fault current interchange with the **DNO's Distribution System** in order to reduce to a minimum the impact on the **DNO's Distribution System** of faults on circuits owned by **Generators**. The **DNO** will ensure that the **DNO Protection** settings meet its own target clearance times.

The target clearance times are measured from fault current inception to arc extinction and will be specified by the **DNO** to meet the requirements of the relevant part of the **Distribution System**.

- (b) The settings of any **Protection** controlling a circuit breaker or the operating values of any automatic switching device at any point of connection with the **DNO's Distribution System** shall be agreed between the **DNO** and the **User** in writing during the connection consultation process.

The **Protection** settings or operating values shall not be changed without the express agreement of the **DNO**.

- (c) It will be necessary for the **Generating Plant Protection** to co-ordinate with any auto-reclose policy specified by the **DNO**.

DPC7.4.4 Negative Phase Sequence Loadings

Any **Generating Unit** or **Power Station** connected to the **DNO's Distribution System** will be required to withstand, without tripping, the **Negative Phase Sequence** loading incurred during the clearance of a close-up phase-to-phase fault by **System back-up Protection** which will be within the **Plant** short time rating on the **DNO's Distribution System**. The **DNO** will advise the **Generator** of the expected **Negative Phase Sequence** loadings during the **Connection Agreement** process.

DPC7.4.5 Neutral Earthing

The winding configuration and method of earthing connection shall be agreed with the **DNO**.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DPC7.4.6 Frequency Sensitive Relays (Islanding)

It is conceivable that a part of the **DNO's Distribution System**, to which **Embedded Generators** are connected can, during emergency conditions, become detached from the rest of the **System**. It will be necessary for the **DNO** to decide, dependent on local network conditions, if it is desirable for the **Embedded Generators** to continue to generate onto the islanded **DNO's Distribution System**.

If no facilities exist for the subsequent resynchronisation with the rest of the **DNO's Distribution System** then the **Embedded Generator** will under **DNO** instruction, ensure that the **Generating Plant** is disconnected for re-synchronisation.

Under emergency conditions there is an expectation that some generation will continue to operate outside the statutory frequency limits. However, for **Embedded Generators** connected to the **DNO's Distribution System** at a voltage level less than 132kV it is likely that this could mean connection within an automatic low frequency load disconnection zone. Consequently, **Embedded Generators** should ensure that all **Protection on Generating Plant** should have settings to co-ordinate with those on the automatic low frequency load disconnection equipment which will be detailed by the **DNO** on request of the **User**.

DPC7.4.7 Black Start Capability

The **Transmission System** will be equipped with **Black Start Generators** in Scotland and **Black Start Stations** in England and Wales (in accordance with the **Distribution Operating Code DOC 9**). It will be necessary for each **Embedded Generator** to notify the **DNO** if its **Generating Plant** has a restart capability without connection to an external power supply, unless the **Embedded Generator** shall have previously notified the **Transmission Licensee** accordingly under the relevant **Grid Code**. Such generation may be registered by the **Transmission Licensee** as a **Black Start Generator** in Scotland or **Black Start Station** in England and Wales.

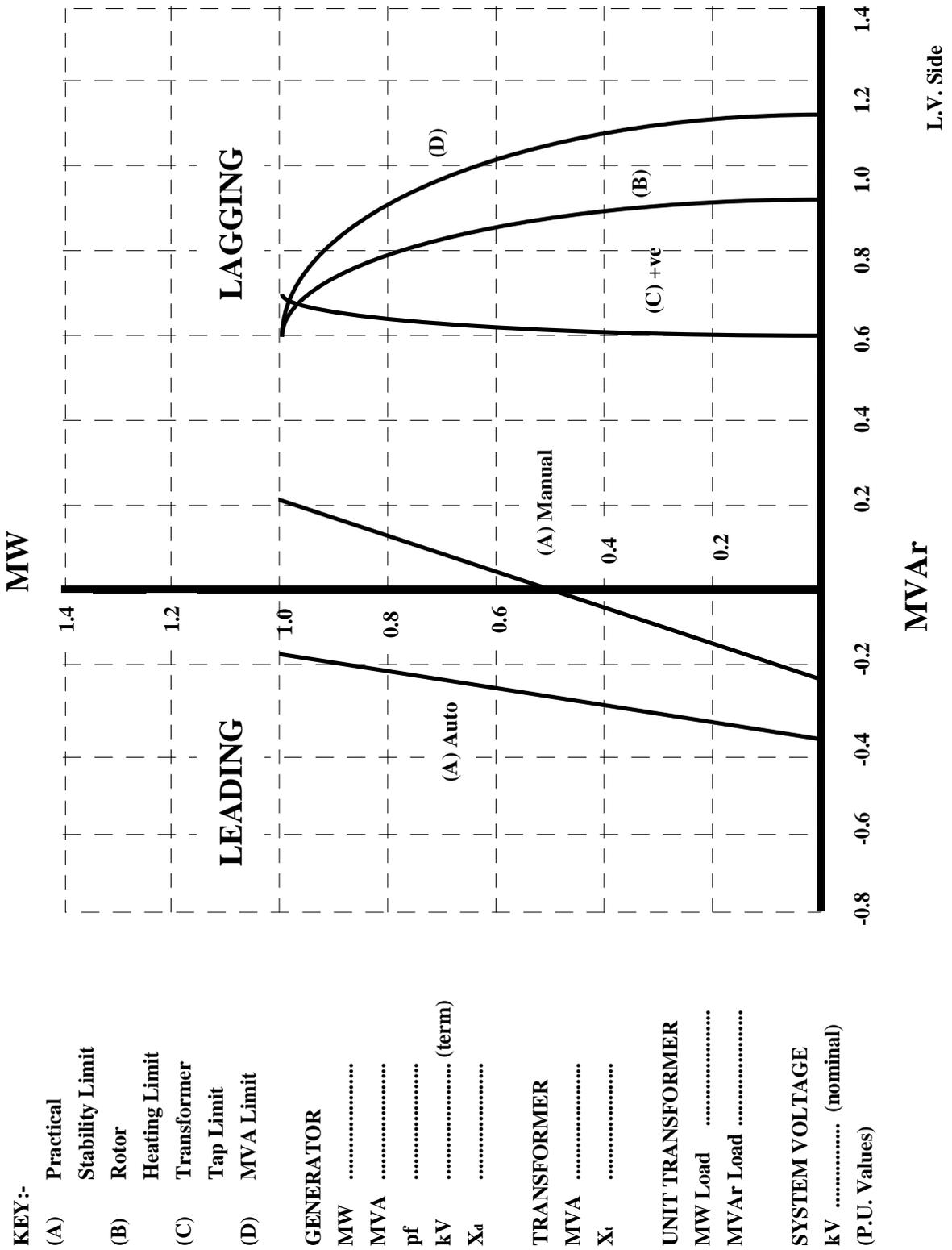
DPC7.4.8 Generating Plant Commissioning Tests

Where **Generating Plant** requires connection to the **DNO's Distribution System** in advance of the commissioning date, for the purposes of testing, the **Generator** must comply with the requirements of the **Connection Agreement**. The **Generator** shall provide the **DNO** with a commissioning programme, approved by the **DNO** if reasonable in the circumstances, to allow commissioning tests to be co-ordinated.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

FIGURE 1

GENERATOR PERFORMANCE CHART



DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 8

DPC8 TRANSFER OF PLANNING DATA

DPC8.1 Introduction

DPC8.1.1 **Distribution Planning and Connection Code** DPC8 details information to be exchanged between the **DNO** and **Users** that are connected at **High Voltage** including **Generators** and **Other Authorised Distributors**.

It includes data that is necessary in order for the **DNO's Distribution System** to be developed in an efficient, co-ordinated and economic manner, and to enable the **DNO** to comply with the conditions contained in its **Distribution Licence**.

DPC8.2 Planning Information to be Provided by Users

DPC8.2.1 Prospective and existing **Users** of the **DNO's Distribution System** must provide sufficient planning data/information as can reasonably be made available, when requested by the **DNO** from time to time to enable the **DNO** to comply with the requirements under its **Distribution Licence**. For those **Users** from whom **Demand** forecasts are required under **DOC1**, there will be a requirement to prepare an annual submission to the **DNO**. This submission, which is to be in accordance with **DOC1**, should include a development plan covering at least the subsequent 3 years and, where the **User** holds planning data or information relating to subsequent years up to 7 years ahead that data or information, including changes either increasing or decreasing in **Demand**, transfer requirements or generating capacity as appropriate.

DPC8.2.2 In addition to periodic updates of planning information a **User** should give adequate notice of any significant changes to the **User's System** or operating regime to enable the **DNO** to prepare its development plan, budget for, and implement any necessary **System** modifications. Such information should include any changes either increasing or decreasing in **Demand**, transfer requirements or generating capacity as appropriate. In the event of unplanned changes in a **User's System** or operating regime a **User** shall notify the **DNO** as soon as is practically possible to ensure any contingency measures, as necessary, can be implemented by the **DNO**.

DPC8.3 Information to be Provided to Users

DPC8.3.1 Where the **DNO** has received from a **User** any information or data under DPC8.3 or where the **DNO** proposes to make modifications to the **DNO's Distribution System** which, in either case, in the reasonable opinion of the **DNO**, may impact upon the **System** of any other **User**, the **DNO** will notify that **User** of the proposals subject to any constraints relating to the timing of release of information or confidentiality provisions.

DPC8.4 Reactive Compensation Plant

DPC8.4.1 A **User** shall provide the **DNO** with information on any reactive compensation **Plant** directly or indirectly connected to a **DNO's Distribution System**, other than at **Low Voltage**, including:-

- (a) The MVA_r capacitive or inductive rating of the **Equipment** and operating range if variable;

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

- (b) Details of any automatic control logic such that the operating characteristics can be determined; and
- (c) The point of connection to the **DNO's Distribution System**.

DPC8.5 **Lumped Network Susceptance**

DPC8.5.1 Under certain circumstances it will be necessary for the **User** to provide, at the request of the **DNO**, details of the equivalent lumped network susceptance at **Normal Frequency** of the **User's System** at nominal frequency referred back to the connection with the **DNO's Distribution System**. This should include any shunt reactors which are an integrated part of a cable system and which are not normally in or out of service independent of the cable (ie. they are regarded as part of the cable).

DPC8.5.2 It should not include:-

- (a) Independently switched reactive compensation plant connected to the **User's System** (covered in DPC8.4.1)
- (b) Any susceptance of the **User's System** inherent in the **Reactive Power Demand**.

DPC8.6 **Short Circuit Infeed to the DNO's Distribution System**

DPC8.6.1 Information shall be exchanged between the **DNO** and the **User** on fault infeed levels at the point of connection with the **DNO's Distribution System** in the form of:-

- (a) The maximum and minimum 3-phase symmetrical and phase earth short circuit infeed.
- (b) The X/R ratio under short circuit conditions.
- (c) In the case of interconnected **Systems**, adequate equivalent network information.

DPC8.7 **Interconnection Impedance**

DPC8.7.1 For **User** interconnections that operate in parallel with the **DNO's Distribution System** details of the interconnection impedance shall be exchanged between the **DNO** and the **User**. This information shall include an equivalent single impedance (resistance, reactance and shunt susceptance) of the parallel **User** or **DNO's Distribution System**.

DPC8.8 **Demand Transfer Capability**

DPC8.8.1 Information shall be exchanged on **Demand** transfer capability where the same **Demand** may be supplied from alternative **DNO** or **User** points of supply. This shall include the proportion of **Demand** normally fed from each point of supply and the arrangements (manual or automatic) for transfer under planned/fault outage conditions.

DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DPC8.9 **Other Authorised Distributor's Distribution System Data**

DPC8.9.1 **Other Authorised Distributor's** shall provide the **DNO** with detailed data relating to the interface between their **Distribution System** and that of the **DNO**, covering circuit parameters, switchgear and **Protection** arrangements of equipment directly connected to or affecting the **Distribution System** to enable the **DNO** to assess any implications associated with these points of connection. Reciprocal arrangements will apply between the **DNO** and its **Users**.

DPC8.10 **Transient Overvoltage Effects**

DPC8.10.1 For **User's** busbars connected to the **DNO's Distribution System** sufficient details may need to be exchanged with respect to the **User/DNO Ownership Boundary** to enable an assessment, where necessary, of transient overvoltage effects to be made. This information may relate to physical and electrical layouts, parameters, specifications and **Protection** details.

DPC8.11 **More Detailed Information**

In certain circumstances more detailed information may be needed and will be provided upon the reasonable request of the **DNO**.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 1

DOC1 DEMAND FORECASTS

DOC1.1 Introduction

DOC1.1.1 In order for the **DNO** to operate the **DNO's Distribution System** efficiently and to ensure maximum **System** security and **System Stability**, there is a need for those **Users** specified in DOC1.3 to provide loading and generation output information to the **DNO**.

DOC1.1.2 The relevant **Grid Code** specifies the **Transmission Licensee's** requirements for **Demand** forecasting for **Generation Sets** subject to **Central Despatch** (Scotland) and **Generation Sets** which constitute or contain **BM Units** which are active (ie. submitting bid-offer data) in the **Balancing Mechanism** (England and Wales). This **Distribution Operating Code** DOC1 specifies the information to be provided by other **Generation Sets** and all **Users** of the **DNO's Distribution System** specified in DOC1.3 below.

DOC1.1.3 This **Demand** forecasting information is required to enable the **DNO** to maintain the integrity of the **DNO's Distribution System**. The **Licensee** under its **Distribution Licence** has an obligation under the relevant **Grid Code** to provide **Demand** forecast information to the **Transmission Licensee** in order that generation output can be matched with **Demand**. The information, required to be provided by **Users** (specified in DOC1.3 below) under this **Distribution Operating Code**, will enable the **Licensee** to comply with these requirements of the relevant **Grid Code**.

DOC1.1.4 Where **Demand** data is required from the **User**, this means the MW **Demand** of electricity at the **DNO** point of supply to the **User**. The **DNO** may, in certain cases, specify that the **Demand** data shall include the MVAr **Demand**.

DOC1.1.5 The information to be provided to the **DNO** shall be in writing as specified in DGD2 (f).

DOC1.1.6 In this **Distribution Operating Code** Year 0 means the current calendar year at anytime, Year 1 means the next calendar year at anytime, Year 2 means the calendar year after Year 1, etc

DOC1.1.7 References in this **Distribution Operating Code** to data to be supplied on a half-hourly basis refers to it being supplied for each period of 30 minutes ending on the hour and half-hour in each day.

DOC1.2 Objectives

The objectives of this Distribution Operating Code DOC1 are to:-

- (a) Set out the **Demand** forecast and **Generating Plant Output** information required to be provided by **Users** to enable the **DNO** to operate the **DNO's Distribution System**.
- (b) Specify the information required to be provided by **Users** to the **DNO** to enable it to comply with its obligations under the relevant **Grid Code**.

DISTRIBUTION OPERATING CODE (DOC)

DOC1.3 Scope

This **Distribution Operating Code** applies to the following **Users** of the **DNO's Distribution Systems** which are connected at **HV**:-

- (a) **Customers** with a **Demand** greater than 5 MW.
- (b) **Embedded Generators** whose output is greater than 5MW, or 1MW in the case of Scottish **Renewable Generating Plant**, where the **DNO** reasonably considers it appropriate.
- (c) **Other Authorised Distributors** connected to the **DNO's Distribution System**.
- (d) **Suppliers**, at the request of the **DNO**, on behalf of their **Customers**.

DOC1.4 Information Flow and Co-ordination

DOC1.4.1 Demand Forecast Information

The **DNO** will co-ordinate all **Demand** forecast information for each **Grid Supply Point** to meet the requirements of the relevant **Grid Code**. The **DNO** will aggregate forecast information provided by **Users**, where appropriate, and provide forecast information to the **Transmission Licensee** where the **Demand**, or change in **Demand**, is greater than 12 MW at any **DNO Connection Point**.

DOC1.4.2 Generation Output Information

Information relating to **Generating Plant Embedded** in the **DNO's Distribution System** or in the network of an **Other Authorised Distributor** shall, where specified be provided to the **DNO** in writing. **Customer With Own Generation** may be required to furnish such information should the **DNO** reasonably consider that it would affect its **Demand** forecasts.

DOC1.4.3 Information to be Provided by the DNO

Where reference is made to "as specified by the **DNO**" or "the **Transmission System** days or times of **Peak Demand** or minimum **Demand**", the **DNO** will provide each **User**, from whom **Demand** forecasts are required, with such information.

DOC1.5 Demand Forecast Data

DOC1.5.1 Planning Periods

Information shall be supplied by **Users** to the **DNO** for the following rolling timescales is required by the **DNO**:-

- (a) Operational Planning Phase – next three years ahead
- (b) Programming Phase – 24 hours to 8 weeks ahead
- (c) Control Phase – 0 to 24 hours ahead

The information supplied will be as specified below and as set out in the relevant Schedules of the **Distribution Data Registration Code**.

DISTRIBUTION OPERATING CODE (DOC)

DOC1.5.2 Operational Planning Phase (next 3 years ahead).

DOC1.5.2.1 The information required to be provided to the **DNO** during the **Operational Planning Phase** is specified in Appendix 1 of this **Distribution Operating Code**, DOC1.

DOC1.5.2.2 The information shall be provided to the **DNO** by Calendar week 35 each year.

DOC1.5.3 Programming Phase (24 hours to 8 weeks ahead inclusive).

DOC1.5.3.1 The information required to be provided by the **User** to the **DNO** during the **Programming Phase** is specified in Appendix 2 of this **Distribution Operating Code**, DOC1.

DOC1.5.3.2 For the period 2 to 8 weeks ahead the information shall be supplied to the **DNO** by 1600 hours each Friday.

DOC1.5.3.3 For the period 2 to 13 days ahead the information shall be updated and supplied to the **DNO** by 0900 hours each Wednesday.

DOC1.5.3.4 The **DNO** may require the information specified in Appendices 1 and 2 of this **Distribution Operating Code** to be updated if it reasonably considers it necessary and to be supplied to the **DNO** by 0800 hours each day (or such other time as specified by the **DNO** from time to time) for the next day (except that it may be for the next 3 days on Fridays and 2 days on Saturdays) and may be longer (as specified by the **DNO** at least one week in advance) to cover holiday periods.

DOC1.5.4 Control Phase (0 to 24 hours ahead)

The following information shall be supplied to the **DNO** at reasonable times to be specified by the **DNO** for the unexpired period covered by the **Control Phase**:-

- (a) Details of any differences of greater than 5MW from the schedules of operation of any **Embedded Generating Plant** on a half hourly basis which were supplied under DOC1.5.3.3;
- (b) Details from **Suppliers** of any differences of the amount and duration of their proposed use of **Customer Demand Control** aggregated to 5MW or more (averaged over any half-hour period) on a half-hourly basis which were supplied under DOC1.5.3.4.
- (c) Details from each **User** connected to the **Distribution System** of any change in aggregated **Demand** at the point of supply of greater than 5MW of the **Demand**.

DOC1.5.5 Post Control Phase

The following shall be supplied to the **DNO** by 0300 hours each day:-

- (a) Details of half-hour **Active Power** and **Reactive Power** output sent out to the **DNO's Distribution System** by **Embedded Generating Plant** where the **DNO** reasonably considers it appropriate during the previous day on a half-hourly basis.

DISTRIBUTION OPERATING CODE (DOC)

- (b) **Suppliers, and Other Authorised Distributor** connected to the **DNO's Distribution System** will provide details of the amount and duration of **Demand Control** at the **DNO Connection Point** aggregated to 5MW or more (averaged over any half-hour) which was implemented during the previous scheduled day (Scotland) or **Operational Day** (England and Wales).

DOC1.6 **Forecast Factors**

DOC1.6.1 The following factors will be taken into account by the **DNO** and **Users** when conducting **Demand** forecasts in the **Operational Planning Phase:-**

- (a) Historic **Demand** data and trends.
- (b) Weather forecasts (responsibility for weather correction of **User's Demand** rests with the **User**.)
- (c) Incidence of major events or activities
- (d) **Embedded Generation Set** Schedules.
- (e) **Demand** transfers.
- (f) Interconnection with adjacent **Other Authorised Distributors**.
- (g) **Demand Control** proposed to be operated by **Suppliers**.
- (h) Any other factor reasonably considered necessary.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 1

DOC 1 - APPENDIX 1

Demand FORECASTS - Operational Planning Phase (3 years ahead)

EACH CALENDAR YEAR BY WEEK 35:

For each of the next 3 years forecast information for:

- (a) Half-hour **Active Power** and **Power Factor** (or **Reactive Power**) at **Annual ACS Conditions** for the specified time of the annual peak half-hour at the associated **Grid Supply Points** and at the specified time of the **Transmission System Peak Demand**.
- (b) Half-hour **Active Power** and **Power Factor** (or **Reactive Power**) at **Average Conditions** at the specified half-hour of the **Transmission System** minimum **Demand**.
- (a) Half-hour **Active Power** output of **Embedded Generating Plant** at the specified half-hour of the **Transmission System Demand**.

In addition, where the loading or the generation output of a **User** may have a particular impact on the security or stability of the **System** then the **DNO** may on request require the following information from a **User**.

- (a) **Weekly ACS Conditions** and **Average Conditions Active** and **Reactive Power Demand** at the time of the specified **Transmission System Peak Demand** each week together with forecasts of **Demand** to be met and relieved by **Embedded Generating Plant Output** and planned **Demand Control** by other **Users**.
- (b) **Weekly ACS Conditions Active** and **Reactive Power Demand** at the time of the specified **Grid Supply Point Peak Demand** each week.

This additional information will, where requested by the **DNO**, be updated throughout the current year (Year 0) in the **Programming Phase**, the times to be notified by the **DNO** where this is necessary.

Where reference is made to “specified” or “**Transmission System Demand**”, the information will be provided by the **DNO** following the receipt of information provided by the **Transmission Licensee** in accordance with OC1 of the relevant **Grid Code**.

DISTRIBUTION OPERATING CODE (DOC)

DOC 1 - APPENDIX 2

Demand FORECASTS - Programming Phase (24 hours to 8 weeks ahead inclusive)

The following information shall be provided to the **DNO** in the timescales specified in DOC1.5.3:-

- (a) Schedules for the operation of **Embedded Generation Set** whose output is greater than 5MW or 1MW in the case of Scottish **Renewable Generating Plant** on a half-hourly basis where the **DNO** reasonably considers it appropriate
- (b) From **Suppliers**, details of their proposed use of **Demand Control** measures aggregated to 5MW or more (averaged over any half-hour) on a half hourly basis for each of the **DNO's Connection Points**;
- (c) From **Customers** and **Other Authorised Distributors** connected to the **DNO's Distribution System** whose operations are likely to result in an aggregated change in **Demand** at the **DNO's Connection Point** of supply of greater than 5MW of the **Demand** at that time on a half-hourly basis.
- (d) Any other relevant **Demand** forecast information reasonably required by the **DNO**.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 2

DOC2 OPERATIONAL PLANNING

DOC2.1 **Introduction**

DOC2.1.1 **Operational Planning** within the terms of the **Distribution Code** comprises the co-ordination through various timescales, of planned outages of **Plant** and **Apparatus** which affect the **Operation** of the **DNO's Distribution System** or require the commitment of the **DNO's** resources.

DOC2.1.2 This **Distribution Operating Code** also enables the **DNO** to meet its **Distribution Licence** obligation to provide certain information specified in the relevant **Grid Code** and establishes procedures to enable the collection of such data from **Users** specified in DOC2.3 below.

DOC2.1.3 Information to be provided to the **DNO** shall be in writing as specified in DGD2f).

DOC2.1.4 In order for the **DNO** to fulfil the requirements of this DOC2 it should be noted that the information set out in the relevant **Grid Code** OC2, to be provided by the **Transmission Licensee**, will form the basis of **Operational Planning** under this DOC2.

DOC2.1.5 In this **Distribution Operating Code** Year 0 means the current calendar year at any time, Year 1 means the next calendar year at any time, Year 2 means the calendar year after Year 1, etc. Where Week 52 is specified read Week 53 in appropriate years.

DOC2.2 **Objectives**

The objectives of this **Distribution Operating Code** are:

- (a) To set out the **DNO's Operational Planning** procedure and a typical timetable for the co-ordination of outage requirements of **Plant** and **Apparatus** to be provided by **Users** to enable the **DNO** to operate the **DNO's Distribution System**.
- (b) To specify the information to be provided by **Users** to the **DNO** to enable the **DNO** to comply with its obligations under the relevant **Grid Code**.

DOC2.3 **Scope**

This **Distribution Operating Code** applies to the **DNO** and the following **Users** of the **DNO's Distribution System** which are connected at **HV**:-

- (a) **HV Customers** where the **DNO** considers it appropriate.
- (b) **Customer With Own Generation** where the **DNO** reasonably considers it appropriate.
- (c) **Embedded Generating Plant** in the **DNO's Distribution System** whose **Registered Capacity** is greater than 5MW, or 1MW in the case of **Scottish Renewable Generating Plant**, where the **DNO** reasonably considers it appropriate.

DISTRIBUTION OPERATING CODE (DOC)

(d) Any **Other Authorised Distributor** connected to the **DNO's Distribution System**.

DOC2.4 **Information Flow and Co-ordination**

DOC2.4.1 **Embedded Generating Plant**

Information relating to **Embedded Generating Plant** where the **DNO** reasonably considers it appropriate whose **Registered Capacity** is greater than 5MW, or 1MW in the case of **Scottish Renewable Generating Plant**, shall where reasonably required by the **DNO** be provided by the **User** directly to the **DNO**. This may include **Customer With Own Generation** where the **DNO** considers it appropriate.

DOC2.4.2 **Other Plant and Apparatus**

Information relating to all **Plant** and **Apparatus** connected to the **DNO's Distribution System**, or that which may affect its **Operation**, shall be co-ordinated with the **DNO**.

DOC2.5 **Timescales and Data**

DOC2.5.1 Detailed implementation of data gathering and timescales will be agreed between the **DNO** and each **User**. Due recognition will be given by the **DNO** to voltage levels and capacities of **Plant** and **Apparatus** when assessing information requirements.

DOC2.5.2 All information shall be provided in **Decimal Weeks** as a minimum, where Week 1 commences in the first week of January as published from time to time.

DOC2.5.3 The rolling timescales involved in **Distribution Operating Code** DOC2 are illustrated in Figure 1 of this **Distribution Operating Code** and are as follows:-

(a) **Operational Planning Phase**

Long Term Planning Phase - Calendar year 3 ahead.

Medium Term - Calendar years 1 and 2 ahead

Short Term - The current calendar year 52 weeks ahead down to 9 weeks ahead

(b) **Programming Phase**

24 hours to 8 weeks ahead inclusive

(c) **Control Phase**

0 to 24 hours ahead

DOC2.6 **Operational Planning**

DOC2.6.1 **Long Term Programme** (Calendar Year 3 ahead - Appendix 1).

DOC2.6.1.1 Each year, the **DNO** will prepare a Long Term Programme covering year 3 ahead which will include those **Distribution System** outages and **Embedded Generating Plant** outages, where the **DNO** reasonably considers it appropriate, which may affect the performance of the **Total System**.

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- DOC2.6.1.2 **Users and Embedded Generators** where the **DNO** reasonably considers it appropriate will provide the **DNO** with information in accordance with Appendix 1. This information will be requested by the **DNO** in order to satisfy the requirements of DOC2.6.1.1.
- DOC2.6.2 **Medium Term Programme (Calendar years 1 - 2 ahead Appendix 2)**
- DOC2.6.2.1 The previous Long Term Programme will be updated to form the basis of the Medium Term Programme. The availability of **Embedded Generating Plant** will also be updated.
- DOC2.6.2.2 **Users and Embedded Generators** will provide the **DNO** with information in accordance with Appendix 2.
- DOC2.6.3 **Short Term Programme (Current year 52 weeks ahead down to 9 weeks ahead - Appendix 3).**
- DOC2.6.3.1 The previous Medium Term Programme will be updated to form the basis of the Short Term Programme. The **DNO** will continually review this programme as necessary and periodically discuss it with the relevant parties as appropriate.
- DOC2.6.3.2 It will take account of such review and discussions and any additional outages and the following further details of each outage proposed will be notified at this stage by the appropriate party:-
- (a) Return to service times of circuits (if different from programme).
 - (b) Specific **Plant** and **Apparatus** to be worked upon.
 - (c) Any other information that may be reasonably specified by the **DNO** from time to time.
- DOC2.6.3.3 At any time and from time to time during the current calendar year up to the **Programming Phase** (8 weeks ahead), **Users** may notify reasonable changes and additions to the outages previously notified during the Medium Term planning process. The **DNO** will consider whether the changes will adversely affect **System** security, stability or other parties, and will discuss with the party in question. Where the change is so discussed the **DNO** will inform the other affected **Users**.
- DOC2.6.4 **Programming Phase (24 hours to 8 weeks ahead inclusive)**
- DOC2.6.4.1 The Short Term Programme will form the basis of the **Programming Phase** and a rolling suggested programme for the following week and subsequent 7 week period respectively will be prepared weekly by the **DNO**.
- DOC2.6.4.2 The **DNO** will update the programme each week and take account of any additional or varied outages.
- DOC2.6.4.3 Any decision to depart from the outages and actions determined during this phase will immediately be notified to the **DNO**, who will inform other affected parties.

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- DOC2.6.5 **Generation Scheduling Information (Programming Phase 24 hours to 8 weeks ahead inclusive).**
- DOC2.6.5.1 The **DNO** will obtain **Scheduling** information from **Generators** for **Generating Plant** not subject to Central Despatch where it considers it appropriate.
- DOC2.6.5.2 The **Scheduling** information will specify the following on an individual **Generation Set** basis:
- (a) The period the set is required.
 - (b) The planned half hourly output.
 - (c) Any other information the **DNO** reasonably considers necessary.
- DOC2.6.6 **Control Phase (0 to 24 hours ahead)**
- During the real time **Operation** any changes to the outage programme for the day shall be at the discretion of the **DNO**.
- DOC2.7 **Nuclear Generating Plant**
- DOC2.7.1 The **DNO** will endeavour to give as much notice as possible to a **Generator** with Nuclear **Generating Plant** which may be operationally affected by an outage which is to be included in a programme referred to in DOC2.6.4.1.
- DOC2.7.2 Where a **Generator** with Nuclear **Generating Plant** which may be operationally affected by the **DNO's Distribution System** outage programme referred to in DOC2.6.4.1 (acting as a reasonable operator) is concerned on grounds relating to safety about the effect which an outage within such outage programme might have on one or more of its Nuclear **Generating Plant**, it may contact the **DNO** to explain its concerns and discuss whether there is an alternative way of taking that outage (having regard to technical feasibility). If there is such an alternative way, but the **DNO** refuses to adopt that alternative way in taking that outage, the **Generator** may involve the **Electricity Supply Industry (ESI)** disputes resolution procedure to decide on the way the outage should be taken. If there is no such alternative way, then the **DNO** may take the outage despite that **Generator's** concerns.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 2

DOC 2 - APPENDIX 1

Operational Planning - LONG TERM PLANNING PHASE (YEAR 3 AHEAD)

The requirements of the Long Term Programme apply to Embedded Generating Plant connected to the DNO's Distribution System specified in DOC2.3.

EACH CALENDAR YEAR BY:-

- WEEK 2 **Generators** provide the **DNO** with a provisional **Generating Plant** outage programme for Year 3 ahead specifying the **Generation Set** and MW concerned, the preferred date for each proposed outage, and where there is a possibility of flexibility, the earliest start date and latest finishing date where applicable.
- WEEK 12 The **DNO** will provide the **Generators** with details of constraints on the **DNO's Distribution System** and potential **DNO's Distribution System** requirements during each week of Years 3 ahead for an outage together with their perceived **Output Usable** requirements for Year 3 ahead.
- WEEK 25 **Generators** will provide the **DNO** with updated provisional **Generating Plant** outage programmes together with the **Registered Capacity** and neutral weekly **Output Usable** forecasts in both cases for Year 3 ahead.
- WEEK 28 The **DNO** after discussion with the **Generator** will notify each **Generator** with details of any suggested revisions the **DNO** proposes to the provisional **Generating Plant** outage programme previously supplied and the reasons for such proposed revisions including such information as provided in week 12.
- Users** will provide the **DNO** with details of proposed outages in Year 3 ahead which may affect the performance of the **DNO's Distribution System**. This information need not be limited to **Plant** and **Apparatus** at the **DNO** interface. Details will comprise general outage requirements, start and end dates.
- WEEK 42 The **DNO** after discussions with the **Generator** will notify each **Generator** with details of any suggested revisions necessary to maintain **DNO System** security to the updated provisional **Generating Plant** outage programme previously supplied.
- WEEK 43 Following consultation with **Users**, the **DNO** will include these outage proposals in the Long Term Programme.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 2

DOC 2 - APPENDIX 2

OPERATIONAL PLANNING - MEDIUM TERM PROGRAMME (YEARS 1 & 2)

The requirements of the Medium Term Programme apply to **Embedded Generating Plant** connected to the **DNO's Distribution System** as specified in DOC2.3.

EACH CALENDAR YEAR BY:-

- WEEK 2 **Generators** not included in the Long Term Programme shall provide the **DNO** with a provisional **Generating Plant** outage programme for Years 1 and 2 specifying the **Generation Set** and MW concerned, the preferred date for each proposed outage, where applicable earliest start date and latest finishing date.
- WEEK 10 **Generators** provide the **DNO** with estimates of **Output Usable** for each **Generating Plant** for Year 1 and 2 (weeks 1 to 52) and its proposed **Generation Set** outage programme for Years 1 and 2.
- WEEK 12 The **DNO** will after discussion with the **Generator** provide the appropriate **Generator** with details of **DNO's Distribution System** constraints and potential **DNO's Distribution System** requirements during each week of Years 1 and 2 for an outage together with any suggested changes to its proposed **Generation Set** outage programme.
- The **DNO** will notify each **Generator** of **Output Usable** requirements for Years 1 and 2 (weeks 1 to 52).
- WEEK 28 **Users** within the **DNO's** distribution services area will provide the **DNO** with details of outages due to take place during the Years 1 and 2 which may affect the performance of the **DNO's Distribution System**. This will comprise updating the programme for Years 3 ahead where appropriate and including any subsequent requests.
- In addition to outage proposals, the programme shall include Trip Testing, Risks of Trip, and other information where known which may affect the security and stability of the **DNO's Distribution System**.
- WEEK 41 Each **Generator** will provide the **DNO** with revised estimates of the **Output Usable** of each **Generating Plant** for Year 1 and 2 (weeks 1 to 52).
- WEEK 48 Following consultation with **Users**, the **DNO** will include their proposals in the Medium Term Plan.

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DISTRIBUTION OPERATING CODE 2

DOC 2 - APPENDIX 3

Operational Planning - SHORT TERM (CURRENT YEAR 52 WEEKS AHEAD DOWN TO 9 WEEKS AHEAD)

The Short Term Plan will be an update of the Medium Term Plan and comprise a receding period as the **Programming Phase** (24 hours to 8 weeks ahead inclusive) evolves through the current year.

EACH CALENDAR YEAR

- WEEK 2 **Generators** not included in the Medium Term Plan will provide the **DNO** with a provisional **Generating Plant** outage programme for the current calendar year specifying the **Generating Plant** and MW concerned, duration of the outage, earliest start date and latest finishing date where applicable. **Generators** will also provide the **DNO** with revised estimates of **Generating Plant Output Usable** for weeks 9 - 52.
- WEEK 4 **DNO** will inform **Generators** of **Output Usable** requirements for weeks 9 - 52.
- WEEK 10 **Generators** will provide the **DNO** with estimates of each **Generating Plant Output Usable** for weeks 18 - 52.
- WEEK 12 The **DNO** will inform **Generators** of their desired changes to **Output Usable** requirements for weeks 18 - 52 and will provide details of **DNO's Distribution System** constraints and **DNO's Distribution System** requirements.
- WEEK 25 **Generators** will provide the **DNO** with estimates of each **Generating Plant Output Usable** for weeks 28 - 52.
- WEEK 27 The **DNO** will inform **Generators** of changes to **Output Usable** requirements for weeks 31 - 52.
- WEEK 41 **Generators** will provide the **DNO** with estimates of each **Generating Plant Output Usable** for weeks 44 - 52.
- WEEK 43 The **DNO** will inform **Generators** of changes to **Output Usable** requirements for weeks 44 - 52.

An update of **Users** proposals agreed in the Medium Term Plan will be included in the Short Term Programming Phase.

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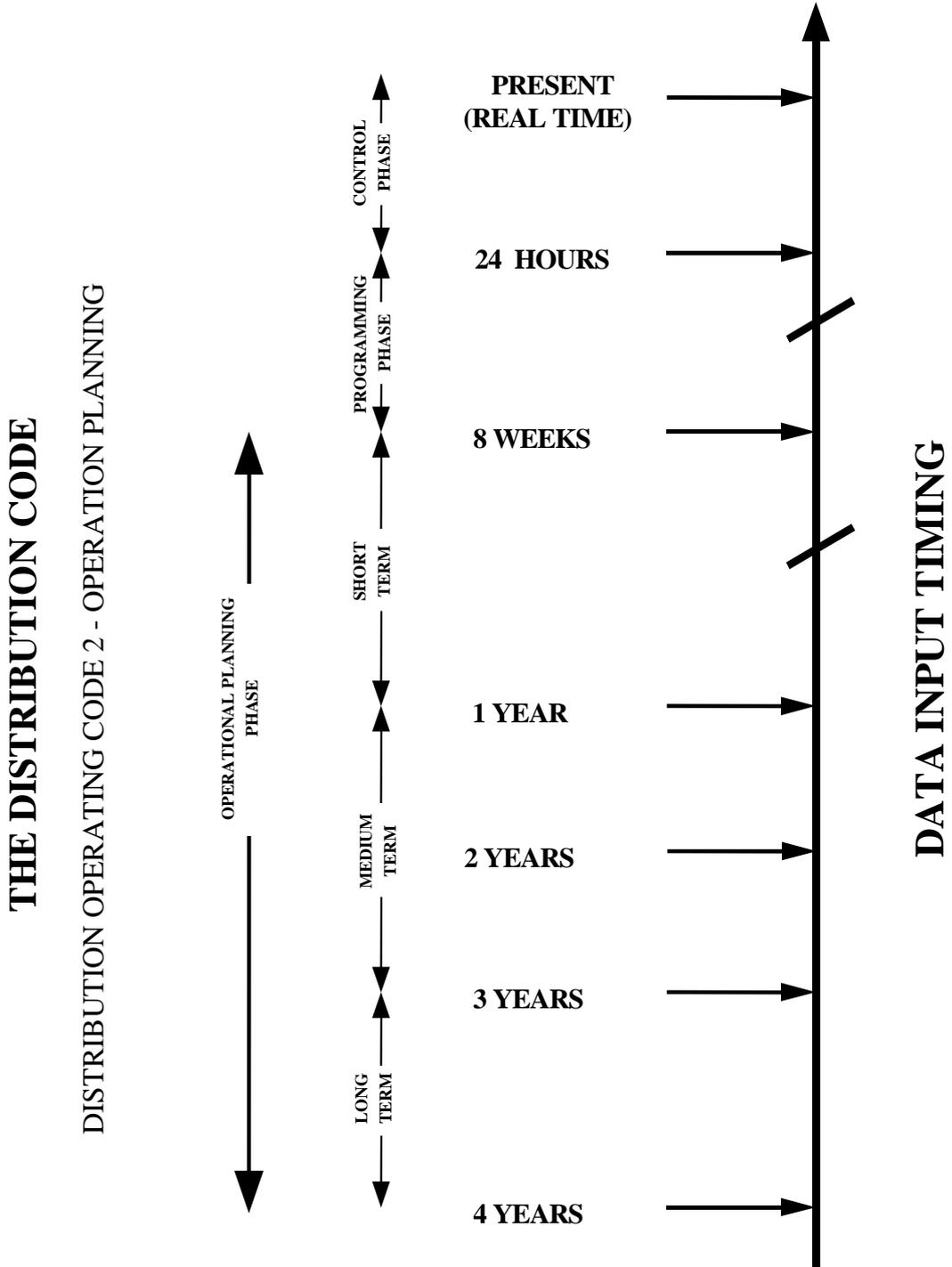


Figure 1

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 5

DOC5 TESTING AND MONITORING

DOC5.1 Introduction

DOC5.1.1 To ensure that the **DNO's Distribution System** is operated efficiently and within its licence standards and to meet statutory actions the **DNO** will organise and carry out testing and/or monitoring of the effect of **Users'** electrical apparatus on the **DNO's Distribution System**.

DOC5.1.2 The testing and/or monitoring procedures will be specifically related to the technical criteria detailed in the **Distribution Planning and Connection Code**. They will also relate to the parameters submitted by **Users** in the **Distribution Data Registration Code**.

DOC5.1.3 The testing carried out under this **Distribution Operating Code (DOC5)** should not be confused with the more extensive **System Test** outlined in DOC12.

DOC5.2 Objective

DOC5.2.1 The objective of this **Distribution Operating Code** is to specify the **DNO's** requirement to test and/or monitor its **DNO's Distribution System** to ensure that **Users** are not operating outside the technical parameters required by the **Distribution Planning and Connection Code** and/or the **Distribution Operating Codes**.

DOC5.3 Scope

DOC5.3.1 This Distribution Operating Code applies to the following Users of the **DNO's Distribution System**:-

- (a) **Customers** (it is not intended that the **Distribution Code** will necessarily apply to small **Customers** individually - their obligations will generally be dealt with on their behalf by their **Supplier**).
- (b) **Embedded Generators**.
- (c) **Other Authorised Distributor** connected to the **DNO's Distribution System**.
- (d) **Suppliers**.
- (e) **Meter Operators**.

DOC5.4 Procedure Related to Quality of Supply

DOC5.4.1 The **DNO** will from time to time determine the need to test and/or monitor the quality of supply at various points on its **DNO's Distribution System**.

DOC5.4.2 The requirement for specific testing and/or monitoring may be initiated by the receipt of complaints as to the quality of supply on the **DNO's Distribution System**.

DOC5.4.3 In certain situations the **DNO** may require the testing and/or monitoring to take place at the point of connection of a **User** with the **DNO's Distribution System**.

DISTRIBUTION OPERATING CODE (DOC)

- DOC5.4.4 Where testing and/or monitoring is required at the **Connection Point**, the **DNO** will advise the **User** involved and will make available the results of such tests to the **User**.
- DOC5.4.5 Where the results of such tests show that the **User** is operating outside the technical parameters specified in the **Distribution Planning and Connection Code**, the **User** will be informed accordingly.
- DOC5.4.6 Where the **User** requests, a retest will be carried out and the test witnessed by a **User** representative.
- DOC5.4.7 A **User** shown to be operating outside the limits specified in **Distribution Planning and Connection Code** will rectify the situation or disconnect the **Apparatus** causing the problem from its electrical **System** connected to the **DNO's Distribution System** immediately or within such time as is agreed with the **DNO**.
- DOC5.4.8 Continued failure to rectify the situation will result in the **User** being disconnected or de-energised in accordance with the **Connection Agreement** from the **DNO's Distribution System** either as a breach of the **Distribution Code** or through the authority of the **Electricity Supply Regulations**, where appropriate.
- DOC5.5 **Procedure Related to Connection Point Parameters**
- DOC5.5.1 The **DNO** from time to time will monitor the effect of the **User** on the **DNO's Distribution System**.
- DOC5.5.2 The monitoring will normally be related to amount of **Active Power** and **Reactive Power** transferred across the **Connection Point**.
- DOC5.5.3 Where the **User** is exporting to or importing from the **DNO's Distribution System Active Power** and **Reactive Power** in excess of the parameters in the **Connection Agreement** the **DNO** will inform the **User** and where appropriate demonstrate the results of such monitoring.
- DOC5.5.4 The **User** may request technical information on the method of monitoring and, if necessary, request another method reasonably acceptable to the **DNO**.
- DOC5.5.5 Where the **User** is operating outside the specified parameters, the **User** will immediately restrict the **Active Power** and **Reactive Power** transfers to within the specified parameters.
- DOC5.5.6 Where the **User** requires increased **Active Power** and **Reactive Power** in excess of the physical capacity of the **Connection Point** the **User** will restrict power transfers to those specified in the **Connection Agreement** until a modified **Connection Agreement** has been applied for from the **DNO** and physically established.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 6

DOC6 DEMAND CONTROL

DOC6.1 Introduction

DOC6.1.1 This **Distribution Operating Code** DOC6 is concerned with the provisions to be made by the **DNO** and **Users** with **Systems** connected to the **DNO's Distribution System** in certain circumstances, to permit reductions in **Demand** in the event of insufficient **Generating Plant**, and transfers from **External Interconnections** being available to meet **Demand** or to avoid disconnection of **Customers** or in the event of breakdown and/or operating problems (such as in respect of **System** frequency, **System** voltage levels or **System** thermal overloads)_on any part of the **Transmission System** and/or the **DNO's Distribution System**.

DOC6.1.2 This **Distribution Operating Code** deals with the following methods of **Demand Control**:-

- (a) **Customer Demand** reduction, including **Voltage Reduction**, initiated by the **DNO**.
- (b) **Customer Demand** reduction instructed by the **Transmission Licensee**.
- (c) Automatic low frequency **Demand** disconnection.
- (d) Emergency manual **Demand** disconnection.

The term "Demand Control" is used to describe any or all of these methods of achieving a Demand reduction.

Data relating to Demand Control should be expressed in MW.

DOC6.1.3 The situation where it is necessary to reduce **Demand** due to Civil Emergencies is dealt with in **Distribution Operating Code**, DOC9.

The Electricity Supply Emergency Code issued by the Department of Energy in November 1999 (as amended from time to time) provides that in certain circumstances consumers are given a certain degree of "protection" when rota disconnections are implemented pursuant to a direction under the Energy Act 1976. No such protection can be given under the relevant **Grid Code** or this section of the **Distribution Code**.

DOC6.1.4 Connections between **Power Stations** comprising **Generation Set(s)** subject to **Central Despatch** in Scotland or **Power Stations** which comprise or contain **BM Units** which are active (ie. submitting bid-offer data) in the **Balancing Mechanism** and a **DNO's Distribution System** will not, as far as is possible, be disconnected by a **DNO** pursuant to the provisions of DOC6 insofar as that would interrupt supplies.

- (a) For the purpose of operation of the **Power Station** (including start-up and shutting down).
- (b) For the purposes of keeping the **Power Station** in a state that it could be started-up when it is off-load for ordinary operational reasons.
- (c) For the purpose of compliance with the requirements of a Nuclear Site Licence.

DISTRIBUTION OPERATING CODE (DOC)

Demand Control pursuant to this **DOC6** therefore applies subject to this exception.

DOC6.1.5 The control of **Demand Control** between the **DNO's Distribution System** and the **Transmission System** will be carried out in accordance with Operating Code of the relevant **Grid Code** and is outwith the scope of this **Distribution Operating Code**.

DOC6.2 **Objective**

To establish procedures to enable the **DNO**, following an instruction of **Transmission Licensee** or otherwise, to achieve reduction in **Demand** that will either avoid or relieve operating problems on the **Transmission System** and/or the **DNO's Distribution System**, in whole or in part in a manner that does not discriminate against or unduly prefer any one or any group of **Suppliers** or their **Customers** or **Other Authorised Distributor** in accordance with the **Distribution Licence**.

DOC6.3 **Scope**

This **Distribution Operating Code** will apply to the **DNO** and to **Users** which in this **Distribution Operating Code** means:

- (a) **Customers** (it is not intended that the **Distribution Code** shall apply to small **Customers** individually).
- (b) **Embedded Generators**.
- (c) **Other Authorised Distributor** connected to the **DNO's Distribution System**.

DOC6.3.2 Implementation of **Demand Control** by the **DNO** may affect all **Suppliers' Customers** and where applicable, contractual arrangements between **Suppliers** and their **Customers** may need to reflect this.

DOC6.4 **Operational System Load Reduction Arrangements**

DOC6.4.1 The **DNO** will arrange within its **DNO's Distribution System** a scheme to reduce load in a controlled manner by reducing voltage and/or by disconnecting **Customers** and/or **Users**.

DOC6.4.2 A **System** of warnings will be contained within the load reduction arrangements to give notice, wherever practical, of impending implementation.

DOC6.4.3 The **DNO** will arrange to have available within the **DNO's Distribution System**, four stages of **Demand Control** in integral multiples of between four and six per cent. These stages may include the use of **Voltage Reduction Voltage Reduction** and/or other forms of **Demand Control** determined by the **DNO**.

DOC6.4.4 The groups will be arranged so that disconnection can take place uniformly across the **DNO's Distribution System**, and as far as practicable uniformly between **Grid Supply Points**.

DOC6.4.5 The **DNO** will arrange to have available a scheme to implement a further four 5% stages of **Demand Control** upon receipt of a suitable warning from the **Transmission Licensee** which will be issued by 1600 hrs on the previous day.

DISTRIBUTION OPERATING CODE (DOC)

The **DNO** will arrange to have available a scheme to implement further twelve 5% stages of **Demand Control**.

- DOC6.4.6 **Embedded Generators, Suppliers, Customers and Other Authorised Distributors** connected to the **DNO's Distribution System** will need to be considered in the preparation of **DNO's Demand Control** schemes.
- DOC6.4.7 The **DNO** shall issue instructions to such **Users** of the **DNO's Distribution System** who are required to disconnect or reconnect and the **User** shall carry out the instructions without delay.
- DOC6.4.8 Once a disconnection has been applied at the instruction of the **DNO**, the **User** shall not reconnect until the **DNO** instructs the **User** to do so in accordance with this **Distribution Operating Code**.
- DOC6.4.9 The **Users** shall abide by the instructions of the **DNO** with regard to reconnection under this **Distribution Operating Code** without delay.
- DOC6.4.10 Where disconnection is envisaged by the **DNO** to be prolonged, the **DNO** may utilise disconnection rotas where 5 per cent groups are interchanged to ensure (so far as practicable) equitable treatment of **Customers**, provided that the proportion of total **Demand** disconnected at all times does not change.
- DOC6.5 **Automatic Low Frequency Demand Disconnection**
- DOC6.5.1 The **DNO** shall provide automatic low frequency disconnection in stages by tripping relays to disconnect at least 40% of the **DNO's Distribution System Peak Demand** in Scotland and 60% of the **DNO's Distribution System Peak Demand** in England and Wales (based on the winter peak value), in order to seek to limit the consequences of the loss of a major source of generation or an **Event** on the **Transmission System** which leaves part of the **Total System** with a generation deficit.
- DOC6.5.2 The **Demand** subject to automatic low frequency disconnection shall be split into discrete blocks. The number, location and size of the blocks and the associated low frequency settings will be as specified by the **DNO**. The intention is that the distribution of the blocks will be such as to give a reasonably uniform application throughout the **DNO's Distribution System**, but may take into account any operational requirements and the essential nature of certain **Demand**.
- DOC6.5.3 Where conditions are such that, following automatic low frequency disconnection, it is not possible to restore all or a great proportion of those **Customers** so disconnected within a reasonable period of time, the **DNO** may instruct, at any time, further manual load disconnection and instruct a portion of the **Customers** which were disconnected by automatic low frequency disconnection to be restored in order that any further fall in frequency will be contained by operation of automatic low frequency disconnection.
- DOC6.5.4 Once an automatic low frequency disconnection has taken place, it shall not be reconnected until the **DNO** instructs to do so in accordance with this **Distribution Operating Code**.

DISTRIBUTION OPERATING CODE (DOC)

- DOC6.5.5 Each **Supplier** and **Other Authorised Distributor** shall abide by the instructions of the **DNO** with regard to reconnection under this **Distribution Operating Code** without delay.
- DOC6.5.6 In addition, **Embedded Generators** may wish to disconnect, automatically or manually, their plant from the **System** to which it is connected at certain frequency levels. Any such disconnection will be agreed with the **DNO** on connection to the **DNO's Distribution System** in accordance with the **Distribution Planning and Connection Code**.
- DOC6.6 **Emergency Manual Disconnection of Demand**
- DOC6.6.1 The **DNO** shall make such arrangements as are necessary to enable it to disconnect **Customers** under emergency conditions irrespective of frequency.
- DOC6.6.2 The **DNO** shall annually, by the end of September, prepare schedules with details, on a **Grid Supply Point** basis and including arrangements with **Users**, of the percentage block of **Demand** at that **Grid Supply Point** available for manual disconnection, the method of disconnection to be used and the timescale of the implementation of disconnection of each block.
- DOC6.6.3 The scheme will be designed to be called into operation irrespective of **System** frequency, and to be implemented in predetermined timescales to disconnect **Demand** progressively.
- DOC6.6.4 **Customers** and **Other Authorised Distributors** may be required to provide manual disconnection facilities. Where required by the **DNO** to disconnect load, each **Customer** or **Other Authorised Distributor** shall abide by the instructions of the **DNO** with regard to disconnection under this **Distribution Operating Code** without delay and the instructed disconnection must be completed without undue delay.
- DOC6.6.5 Once a disconnection has been applied at the instruction of the **DNO** reconnection shall not be applied until the **DNO** instructs it to be done in accordance with this **Distribution Operating Code**.
- DOC6.6.6 Each **Customer** and **Other Authorised Distributor** shall abide by the instructions of the **DNO** with regard to reconnection under this **Distribution Operating Code** without delay.
- DOC6.7 **Co-ordination of Actions**
- DOC6.7.1 Where **Demand Control** is exercised by the **DNO** in order to safeguard the **DNO's Distribution System** the **DNO** will liaise with and inform **Users** accordingly so far as is practical.
- DOC6.7.2 Where **Demand Control** is exercised by the **DNO** on instruction or request from the **Transmission Licensee** in order to safeguard the **Total System** then the **DNO** is required to respond to these requests promptly but will liaise with and inform other **Users** so far as is practical.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 7

DOC7 OPERATIONAL LIAISON

DOC7.1 Introduction

DOC7.1.1 This **Distribution Operating Code** DOC7 sets out the requirements for the exchange of information in relation to **Operations** and/or **Events** on the **DNO's Distribution System** and on the immediately adjacent parts of adjoining **Systems** which have had (or may have had), or will have (or may have) an **Operational Effect**.

- (a) on the **DNO's Distribution System** or on the **System** of any other **User** in the case of an **Operation** and/or **Event** occurring on the **System** of a **User**, and
- (b) on the **System** of a **User** in the case of an **Operation** and/or **Event** occurring on the **DNO's Distribution System** or the **Transmission System**,

where no requirement for liaison is specified in any other section of the **Distribution Code**.

DOC7.1.2 The requirement to notify in DOC7 relates generally to communicating what has happened or what is to happen and not the reasons why. However, DOC7 provides, when an **Event** has occurred on the **DNO's Distribution System** which itself has been caused by (or exacerbated by) an **Operation** or **Event** on a **User's System**, the **DNO** in reporting the **Event** on the **DNO's Distribution System** to a **User** can pass on what it has been told by the **User** in relation to the **Operation** on that **User's System**.

DOC7.2 Objective

To provide for the exchange of information so that the implications of the **Operation** and/or **Event** can be considered and the possible risks arising from it can be assessed and appropriate action taken by the relevant party in order to maintain the integrity of the **Total System** and the **User's System**. This **Distribution Operating Code** does not seek to deal with any actions arising from the exchange of information, but merely with that exchange.

DOC7.3 Scope

This Distribution Operating Code applies to the **DNO** and to Users, which in this Distribution Operating Code means:-

- (a) **High Voltage Customers**.
- (b) **Embedded Generators** connected to the **DNO's Distribution System** at **HV**.
- (c) **Other Authorised Distributors** connected to the **DNO's Distribution System** at **HV**.
- (d) **Suppliers** on behalf of their **Customers** where appropriate.

DISTRIBUTION OPERATING CODE (DOC)

DOC7.4 **Communications**

DOC7.4.1 The **DNO** and each **User** connected to the **DNO's Distribution System** will establish communication channels to make effective the exchange of information required by DOC7.

DOC7.4.2 Communication should, as far as possible, be direct between the **User** and the operator of the network to which that **User** is connected.

DOC7.4.3 Information between a **DNO** and **Users** will be exchanged on the reasonable request of either party. The request may follow a specific **Operation** or **Event**, or be in accordance with a prior agreement to exchange information on particular types of **Operation** or **Event**.

This does not preclude the voluntary exchange of information which may be perceived as being relevant to the operation of the **DNO** or **User System**, in accordance with good operating practice.

DOC7.5 **Requirement to notify Operations**

DOC7.5.1 **Notification Requirements**

DOC7.5.1.1 In the case of an **Operation** on the **DNO's Distribution System** or on receipt of notification of an **Operation** on the **Transmission System**, which will have or may, in the opinion of the **DNO**, have an **Operational Effect** on the **System** of a **User** connected to the **DNO's Distribution System**, the **DNO** will notify the **User** in accordance with DOC7.

DOC7.5.1.2 In the case of an **Operation** on the **System** of a **User** connected to the **DNO's Distribution System**, which, in the opinion of the **User**, will have or may have an **Operational Effect** on the **DNO's Distribution System**, the **User** will notify the **DNO** in accordance with DOC7.

DOC7.5.1.3 An **Operation** may be caused by another **Operation** or an **Event** on another's **System** and in such situations the information to be notified is different from that where the **Operation** arose independently of any other **Operation** or **Event**.

DOC7.5.1.4 Whilst in no way limiting the general requirement to notify in advance as set out in this part of this **Distribution Operating Code**, DOC7.5, the following are examples of circumstances where notification may be required in accordance with this **Distribution Operating Code**:-

- (a) The implementation of a scheduled outage of **Plant** and/or **Apparatus** which has been arranged pursuant to **Distribution Operating Code** DOC2.
- (b) The **Operation** (other than, in the case of a **User**, at the instruction of the **DNO**) of a circuit breaker or isolator or any sequence or combination of the two, including any temporary over-stressing, **System** parallels, or **Generation Set** synchronising.
- (c) Voltage control.

DISTRIBUTION OPERATING CODE (DOC)

DOC7.5.2 Form of Notification

DOC7.5.2.1 A notification under DOC7.5.1 will be of sufficient detail to describe the **Operation**, although it need not state the cause, and to enable the recipient of the notification reasonably to consider and assess the implications and risks arising and will include the name of the individual reporting the **Operation** on behalf of the **DNO** or the **User**, as the case may be. The recipient may seek clarification of the notification.

DOC7.5.2.2 The notification may be written or oral. Written notification must be of an immediate form such as electronic mail. Where the notification is oral, it shall be written down by the sender and be dictated to the recipient who shall write it down and repeat each phrase as received and on completion shall repeat the notification in full to the sender and check that it has been accurately recorded.

DOC7.5.3 Timing

A notification under DOC7.5.12 shall be given in sufficient time as will reasonably allow the recipient to consider and assess the implications and risks arising, and to undertake mitigating actions.

DOC7.6 Requirement to Notify Events

DOC7.6.1 Notification Requirements

DOC7.6.1.1 In the case of an **Event** on the **DNO's Distribution System** or on receipt of notification of an **Event** on the **Transmission System**, which, in the opinion of the **DNO**, might have had or will have an **Operational Effect** on the **System** of a **User** connected to the **DNO's Distribution System**, the **DNO** will notify the **User** in accordance with this DOC7. This does not preclude any **User** asking the **DNO**, to whose **System** he is connected, for information regarding the **Event** which has affected the **User's System**.

DOC7.6.1.2 In the case of an **Event** on the **System** of a **User** connected to the **DNO's Distribution System**, which has had or may have had an **Operational Effect** on the **DNO's Distribution System** or on the **Transmission System**, the **User** will notify the **DNO** in accordance with this DOC7.

DOC7.6.1.3 An **Event** may be caused by (or exacerbated by) another **Event** or by an **Operation** on another's **System** and in that situation the information to be notified is different from that where the **Event** arose independently or any other **Event** or **Operation**.

DOC7.6.1.4 Whilst in no way limiting the general requirement to notify set out in this part of this **Distribution Operating Code**, DOC7.6, the following are examples of circumstances where notification may be required in accordance with this **Distribution Operating Code**:-

- (a) Where **Plant** and/or **Apparatus** is being operated in excess of its capability or may present a hazard to personnel.
- (b) The actuation of an alarm or indication of an abnormal operating condition.
- (c) Adverse weather conditions being experienced or forecast.

DISTRIBUTION OPERATING CODE (DOC)

(d) Breakdown of, or faults on, or temporary changes in the capabilities of, **Plant** and/or **Apparatus** including **Protection** control, communications and metering equipment.

(e) Increased risk of inadvertent **Protection** operation.

DOC7.6.2 **Form of Notification**

DOC7.6.2.1 A notification under DOC7.6.1 of an **Event**, although it need not state the cause, shall be of sufficient detail to enable the recipient of the notification to reasonably consider and assess the implications and risks arising. Details of the **Event** should include the timescale and the probability of repeat occurrences within a period. The recipient may seek clarification of the notification.

DOC7.6.2.2 The notification may be written or oral. Written notification must be of an immediate form such as electronic mail. Except in an emergency situation any oral notification shall, be written down by the sender and dictated to the recipient who shall write it down and repeat each phrase as received and on completion shall repeat the notification in full to the sender and check that it has been accurately recorded.

DOC7.6.3 **Timing**

A notification under DOC7.6.1 shall be given as soon as practicable after the occurrence of the **Event**, or time that the **Event** is known of or anticipated by the giver of the notification under this **Distribution Operating Code** DOC7.

DOC7.7 **System Control**

DOC7.7.1 Where a part of a **DNO's Distribution System** is, by agreement, under the **System Control** of the **Grid Control Centre** then the requirements and provisions of the relevant **Grid Code** shall apply to that situation as if that **DNO's Distribution System** was the **Transmission System**.

DOC7.7.2 Where a part of a **User's System** is, by agreement, under the **System Control** of a **Distribution Control Centre** the **DNO**, then the requirements and provisions of this **Distribution Operating Code** shall apply to that situation as if that **System** was part of the **DNO's Distribution System**.

DOC7.8. **Significant Incidents**

DOC7.8.1 Where an **Event** on the **DNO's Distribution System** or the **Transmission System** or the **System** of a **User**, in the opinion of the **DNO**, has had or may have had a significant effect on the **System** of any of the others, the **Event** shall be reported in writing to the owner of the **System** affected in accordance with the provisions of **Distribution Operating Code** DOC10. Such an **Event** will be termed a "**Significant Incident**".

DOC7.8.2 Where the **DNO** notifies a **User** of an **Event** under DOC7, which the **User** considers has had or may have a significant effect on that **User's System**, that **User** will require the **DNO** to report that **Event** in writing and will notify the **DNO** accordingly. Such an **Event** will also be termed a "**Significant Incident**".

DISTRIBUTION OPERATING CODE (DOC)

DOC7.8.3 Without limiting the general description set out in DOC7.8.1 or DOC7.4.10.2 a **Significant Incident** will include **Events** which result in, or may result in, the following:

- (a) Voltage outside statutory limits.
- (b) **System** frequency outside statutory limits.
- (c) **System** instability.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 8

DOC8 SAFETY CO-ORDINATION

DOC8.1 Introduction

DOC8.1.1 This **Distribution Operating Code** DOC8 specifies the **Safety Management System** criteria to be applied by the **DNO** and **Users** for the co-ordination, establishment and maintenance of necessary **Safety Precautions** when work or testing is to be carried out on **Plant** and/or **Apparatus** of the **DNO** or a **User** and where for this to be done safely, isolation on and/or earthing of the other's **System** is needed. This **Distribution Operating Code** does not apply to the situation where **Safety Precautions** need to be agreed solely between **Users**.

DOC8.1.2 This **Distribution Operating Code** does not seek to impose a particular set of **Safety Rules** on the **DNO** and **Users**. The **Safety Rules** to be adopted and used by the **DNO** and each **User** shall be those chosen by each.

DOC8.2 Objectives

To lay down requirements with a view to ensuring safety of persons working at or across Operational and Ownership Boundaries between the **DNO's Distribution System** and **Users' Systems**..

DOC8.3 Scope

This **Distribution Operating Code** **DOC8** specifies the **Safety Management System** criteria to be applied by the **DNO** and all **Users** of the **DNO's DNO's Distribution System** at or across an **Operational Boundary**, **Users** for the purposes of this **Distribution Operating Code** being:-

- (a) **High Voltage Customers.**
- (b) **Embedded Generators.**
- (c) **Other Authorised Distributors** connected to the **DNO's Distribution System.**
- (d) **Meter Operators.**
- (e) Any other party reasonably specified by the **DNO** including **Users** with **Unmetered Supply** and those connected at **Low Voltage** for appropriate sections of **DOC8** where necessary.

DOC8.4 Operational Safety

DOC8.4.1 Approved Safety Management Systems

DOC8.4.1.1 At each site or location where an **Operational Boundary** exists, a **Safety Management System** specifying the principles and procedures to be applied so as to ensure the health and safety of all who are liable to be working or testing on the **DNO's Distribution System**, or on **Plant** and **Apparatus** connected to it, will be established by the **DNO** and **Users**. For interfaces involving **HV Systems** this shall include the provision for **Control Person(s)**, a system of documentation and the establishment of **Safety Precautions**.

DISTRIBUTION OPERATING CODE (DOC)

DOC8.4.2 **Authorised Persons**

DOC8.4.2.1 The **DNO** and every **User** shall at all times have nominated a person or persons to be responsible for the co-ordination of safety pursuant to this **Distribution Operating Code**, those persons being referred to in this **Distribution Operating Code** as **Control Persons**. (Under the conditions of the **DNO's Safety Rules** a **Control Person** may either be at the **DNO's Distribution Control Centre** or be a person authorised in accordance with DOC8.4.2.2, who is at the site or location of the **Operational Boundary**).

DOC8.4.2.2 **Control Persons** and persons concerned with the carrying out of **Safety Precautions** and work on or testing of **Plant** and **Apparatus** forming part of, or connected to, the **DNO's Distribution System** shall have a written authorisation designating their role in implementing the **Safety Management System**.

DOC8.4.2.3 The written authorisation shall indicate the class of **Operation** and/or the class of work permitted and the parts of the **System**, the **DNO** and/or **Users**, to which the written authorisation shall apply.

DOC8.4.3 **System of Documentation**

DOC8.4.3.1 A system of documentation shall be maintained by the **DNO** and the appropriate **Users** which will record the inter-system **Safety Precautions** taken when:-

- (a) Work and/or testing is to be carried out on **HV Plant** and/or **Apparatus** across the **Operational Boundary**.
- (b) Isolation and/or earthing of the other's **System** is required.

DOC8.4.3.2 Where relevant, copies of the **Safety Management Systems** and related documentation shall be exchanged between the **DNO** and **Users** for each **Operational Boundary**.

DOC8.4.3.3 The **DNO** and **Users** shall maintain a suitable system of documentation which records all relevant operational events that have taken place on the **DNO's Distribution System** or any other **System** connected to it and the co-ordination of relevant **Safety Precautions** for work.

DOC8.4.3.4 All documentation relevant to the **Operation** of the **Distribution System**, and **Safety Precautions** taken for work or tests, shall be held by the **DNO** and the appropriate **User** for a period of not less than six months.

DOC8.4.4 **Safety Precautions**

The establishment of **Safety Precautions** involves:-

- (a) the isolation from the remainder of the **System** of **Plant** and/or **Apparatus**, including from **Low Voltage** infeeds, either by an **Isolating Device** in the isolating position and immobilised and locked or by other means of rendering the **Plant** or **Apparatus Isolated**, and/or
- (b) the earthing by way of providing a connection between a conductor and earth by using an **Earthing Device** which is applied and where reasonably practicable, immobilised and locked, the extent of the **Safety Precautions** required being determined pursuant to this **Distribution Operating Code**.

DISTRIBUTION OPERATING CODE (DOC)

DOC8.5 Environmental Safety

DOC8.5.1 Site Safety and Security

DOC8.5.1.1 Arrangements shall be made by the **DNO** and **Users** to ensure site safety and security as required by statutory requirements.

DOC8.5.1.2 Suitable arrangements shall be agreed between the **DNO** and the relevant **Users** to provide free and unrestricted access to the **DNO's Plant** and **Apparatus** at substations or similar by the **DNO's** personnel or their designated representatives at all times.

DOC8.5.2 Site Specific Hazards

Suitable arrangements shall be made by the **DNO** and/or the relevant **Users** to ensure that personnel are warned by an appropriate means of hazards specific to any site, before entering any area of the site. This shall include hazards that may be temporary or permanent. Where these risks include contamination or similar, suitable decontamination facilities and procedures shall be provided.

DOC8.6 Information Flow and Co-ordination

DOC8.6.1 Schedules of Responsibility

DOC8.6.1.1 The **DNO** and **Users** shall jointly agree and set down in writing schedules specifying the responsibilities for **System Control** of **Equipment**. These shall ensure that only one party is responsible for any item of **Plant** or **Apparatus** at any one time.

DOC8.6.1.2 Pursuant to the **Distribution Planning and Connection Code**, **Site Responsibility Schedules** specifying the responsibilities for ownership, operation and maintenance shall be jointly agreed by the **DNO** and the appropriate **User(s)** for each site or location where an **Operational Boundary** or joint responsibility exists. This will include **Operation Diagrams** illustrating sufficient information for **Control Persons** to carry out their duties which shall be exchanged by the **DNO** and the appropriate **User**.

DOC8.6.1.3 A copy of the **Site Responsibility Schedules** and **Operation Diagrams** shall be retained by the **DNO** and the appropriate **User(s)**. **Site Responsibility Schedules** and **Operation Diagrams** shall be maintained by the **DNO** and the appropriate **User(s)** and exchanged as necessary to ensure that they reflect the current agreements.

DOC8.6.2 Outage Co-ordination

DOC8.6.2.1 For those **Users** connected at **HV** and having firm supply connections (provided by more than one circuit) and where the **User** so requests the **DNO**, these schedules shall identify those specified **DNO** circuits on which **Planned Outages** by the **DNO** shall be notified to the **User**. These specified circuits will be those where the **DNO** and the **User** have agreed that during outages of the specified circuits the **User** can introduce measures to manage critical processes or safety aspects. These specified circuits will usually operate at the voltage level at which the supply is provided and will have a significant effect on the security level of the **User's** supply.

DISTRIBUTION OPERATING CODE (DOC)

- DOC8.6.2.2 Those **Users** connected at **HV** and not having firm supply connections (provided by more than one circuit) may seek to obtain outage planning information through arrangements with the **DNO**.
- DOC8.6.3 **Nomination of Control Persons**
- The **DNO** and each **User** shall at all times have nominated a **Control Person** or **Control Persons** responsible for co-ordination of **Safety From The System** pursuant to this **Distribution Operating Code**.
- DOC8.6.4 **Communications**
- DOC8.6.4.1 Where the **DNO** reasonably specifies the need, suitable communication systems shall be established between the **DNO** and other **Users** to ensure the control function is carried out in a safe and secure manner.
- DOC8.6.4.2 Where the **DNO** reasonably decides a back up or alternative routing of communication is necessary to provide for the safe and secure **Operation** of the **DNO's Distribution System** the means shall be agreed with the appropriate **Users**.
- DOC8.6.4.3 Schedules of telephone numbers/call signs shall be exchanged by the **DNO** and appropriate **User** to enable control activities to be efficiently co-ordinated.
- DOC8.6.4.4 The **DNO** and appropriate **Users** will establish 24-hour availability of personnel with suitable authorisation where the joint operational requirements demand it.
- DOC8.7 **Procedures**
- DOC8.7.1 Pursuant to this **Distribution Operating Code** the **Control Person** and/or Authorised Persons for each of the **DNO** and a **User** relating to the place where **Safety Precautions** are required will contact each other to coordinate the **Safety Precautions**, and the **Control Person** requesting **Safety Precautions** shall be referred to as the "**Requesting Control Person**" and the **Control Person** being requested and implementing the **Safety Precautions** shall be referred to as the "**Implementing Control Person**".
- DOC8.7.2 Procedures shall be maintained by the **DNO** and the appropriate **Users** which clearly specify the responsibility for **System Control** of **Plant** and **Apparatus** and these shall ensure that only one **Control Person** is responsible for any item of **Plant** and **Apparatus** at any one time.
- DOC8.7.3 The operational procedures shall be in accordance with the **Safety Management System** agreed between the **DNO** and the **User(s)**.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 9

DOC9 CONTINGENCY PLANNING

DOC9.1 Introduction

This **Distribution Operating Code** DOC9 sets out requirements and procedures relating to the following planning procedures for abnormal situations:

DOC9.1.1 Black Start

This **Distribution Operating Code** DOC9 covers the requirements for the implementation of **Black Start** recovery procedures following a **Total Shutdown** or **Partial Shutdown** of the **Total System** as recognised by the relevant **Transmission Licensee**. The **Black Start** procedure provides for the recovery of the **Total System** in the shortest possible time taking into account **Power Station** capabilities and the operational constraints of the **Total System**, in accordance with the relevant **Grid Code** and the requirements of **Transmission Licensee**.

DOC9.1.2 Re-synchronising Islands

The requirements for re-synchronising parts of the **Total System** where there is no **Total Shutdown** or **Partial Shutdown** but parts of the **Total System** are out of synchronism with each other.

DOC9.1.3 Joint System Incident Procedure

The requirements for the establishment of a communication route and arrangements between responsible representatives of the **DNO** and **Users** involved in, or who may be involved in, an actual or potential serious or widespread **Total System** disruption which requires or may require urgent managerial response, day or night.

DOC9.1.4 Civil Emergencies

The requirements for dealing with a Civil Emergency which under the **Act** is any natural disaster or other emergency which, in the opinion of the **Secretary of State**, is or may be likely to disrupt electricity supplies. The procedures may be similar to, or separate from, the **Demand** reduction schemes in **Distribution Operating Code** DOC6.

DOC9.2 Objectives

This **Distribution Operating Code** sets out Contingency Planning procedures to enable co-ordination between all **Users** with a common approach to give uniformity of priorities to restart or to operate the **Total System** in abnormal situations. It also specifies requirements to be met during periods of declared civil emergencies.

DOC9.3 Scope

This Distribution Operating Code applies to the **DNO** and to **Users** which in this Distribution Operating Code means, the **Users** specified below with a High Voltage connection to the **DNO's Distribution System**:

DISTRIBUTION OPERATING CODE (DOC)

- (a) **Customers** (it is not intended that the **Distribution Code** shall apply to small **Customers** individually).
- (b) **Embedded Generators**.
- (c) **Other Authorised Distributor** connected to the **DNO's Distribution System**.

Any actions required of **Users** connected at **HV** will be identified by the **DNO** and discussed with **Users**.

DOC9.4 **Black Start**

DOC9.4.1 **Shutdown**

DOC9.4.1.1 During a **Total Shutdown** or **Partial Shutdown** and during the subsequent recovery the Security Standards set out in, or deriving authority pursuant to, the **Transmission Licence** and the **Distribution Licence** may not apply and the **Total System** may be operated outside normal voltage and frequency standards.

DOC9.4.1.2 (a) (Applicable in respect of Scotland only)

In a **Total Shutdown** or **Partial Shutdown** in Scotland the normal **Scheduling** and **Central Despatch** procedures may not be implemented in all or part of the **Total System** until the **Transmission Licensee** so decides.

DOC9.4.1.2 (b) (Applicable in respect of England and Wales only)

In a **Total Shutdown** or **Partial Shutdown** in England and Wales, it may be necessary for the **Transmission Licensee** to issue Emergency Instructions and it may be necessary to depart from the normal **Balancing Mechanism** operation in issuing Bid-Offer Acceptances.

DOC9.4.1.3 Certain **Embedded Power Stations** are registered by the **Transmission Licensee**, as having the ability of at least one of its **Generation Sets** to start up from shutdown without connections to external power supplies. Such **Power Station** are to be referred to as **Black Start Stations** in England and Wales and **Black Start Generators** in Scotland.

DOC9.4.1.4 For each **Black Start Station** and **Black Start Generator**, plans will be put in place, in accordance with the relevant **Grid Code**, which in the event of a **Partial Shutdown** or **Total Shutdown**, will provide for the establishment of a **Power Island**. In England and Wales these plans are known as Local Joint Restoration Plans produced jointly by the Transmission Licensee the **DNO** and **Generators** and may include **Embedded Generators**. **DNOs** will be party to these Plans irrespective of whether the **Black Start Station** is **Embedded**. Similar arrangements apply in Scotland.

DOC9.4.2 **Black Start Situation**

In the event of a **Total Shutdown** or **Partial Shutdown**, the **DNO** will, as soon as reasonably practicable, inform **Users** which, in the **DNO's** opinion, need to be informed that a **Total Shutdown** or, as the case may be, a **Partial Shutdown**, exists and that the **Transmission Licensee** intends to implement the **Black Start** procedure.

DOC9.4.3 **Black Start Recovery Procedure**

DISTRIBUTION OPERATING CODE (DOC)

- DOC9.4.3.1 The procedure necessary for a recovery from a **Total Shutdown** or **Partial Shutdown** is known as **Black Start**, the main objective of which is the restoration of the **Total System** as an integrated whole as soon as possible bearing in mind the restoration of **Customers**. The procedure for a **Partial Shutdown** is the same as that for a **Total Shutdown** except that it applies only to a part of the **Total System**. It should be remembered that a **Partial Shutdown** may affect parts of the **Total System** which are not themselves shut down.
- DOC9.4.3.2 The complexities and uncertainties of recovery from a **Total Shutdown** or **Partial Shutdown** require that **Black Start** is sufficiently flexible in order to accommodate the full range of **Generation Set** and **Total System** characteristics and operational possibilities and this precludes the setting out of concise chronological sequences. The overall strategy will in general include the overlapping phases of establishment of isolated groups of **Power Stations** together with complementary local **Demand** termed "**Power Islands**", step by step integration of these groups into larger sub-systems and eventually re-establishment of a complete **Total System**.
- DOC9.4.3.3 Where there are no **Power Stations** with a contracted **Black Start** capability within the **DNO's Distribution System**, then restoration of supply may be substantially delayed while the **Transmission Licensee** re-establishes the **Transmission System** from a restored **Power Island** or part of the **Transmission System**. The **DNO** shall re-appraise the priorities in these situations and restore supplies in accordance with such priorities.
- DOC9.4.3.4 The procedure for a **Black Start** shall, therefore, be that specified by the **Transmission Licensee** at the time. **Users** shall abide by the **DNO's** instructions during a **Black Start** situation, even if they conflict with the general overall strategy outlined in DOC9.4.3.2.
- DOC9.4.3.5 The **DNO** may, in accordance with the **Transmission Licensee's** requirements, be required to issue instructions (although this list should not be regarded as exhaustive) to a **Black Start Station** or **Black Start Generator** relating to the commencement of generation, to a **User** connected to the **DNO's Distribution System** or **Customers** in the **DNO's** authorised operating area, as appropriate, relating to the restoration of **Demand** and to an **Embedded Power Station** relating to their preparation for commencement of generation when an external power supply is made available to them, and in each case may include switching instructions.
- DOC9.4.3.6 Where the **DNO**, as part of the **Black Start** procedure, has given an instruction to a **Black Start Station** or **Black Start Generator** to initiate startup the **Black Start Station** or **Black Start Generator** shall confirm to the **DNO** when the startup of a **Generation Set** has been completed. Following confirmation of startup, the **DNO** will endeavour to stabilise that **Generation Set** by the establishment of appropriate **Demand** following which the **DNO** may instruct the **Black Start Station** or **Black Start Generator** to start up the remaining available **Generation Sets** and auxiliary gas turbines if any at that **Black Start Station** or **Black Start Generator** and synchronise them to create a **Power Island**.

DISTRIBUTION OPERATING CODE (DOC)

DOC9.4.3.7 **Interconnection of Power Islands**

In accordance with the requirements of the **Transmission Licensee**, the **DNO** may be required to issue instructions to **Users** so as to establish, maintain and expand **Power Islands** and to interconnect **Power Islands** to achieve larger sub-systems and subsequently to form an integrated **System** and re-establishment of the **Total System**. **Users** shall at all times abide by the **DNO's** instructions in relation to interconnection of **Power Islands**.

DOC9.4.3.8 The conclusion of the **Black Start** situation and the time of the normal operation of the **Total System** will be determined by the **Transmission Licensee** who shall inform the **DNO**. The **DNO** will inform **Users** of the **DNO's Distribution System** which in the **DNO's** opinion need to be informed that the **Black Start** situation no longer exists and that normal operation of the **Total System** has begun.

DOC9.5 **Re-synchronisation of De-synchronised Islands**

DOC9.5.1 Where parts of the **Total System** are out of synchronism with each other but there is no **Total Shutdown** or **Partial Shutdown** the **Transmission Licensee** will instruct **Users** to regulate generation or **Demand**, as the case may be, to enable the de-synchronised islands to be re-synchronised.

DOC9.5.2 **DNOs** may be involved in re-synchronising by issuing instructions to **Users** in accordance with the requirements of the **Transmission Licensee**. **Users** shall at all times abide by the **DNO's** instructions in relation to re-synchronising de-synchronised islands.

DOC9.5.3 In England and Wales the re-synchronising of de-synchronised islands should be covered by De-synchronised Island Plans agreed between the **Transmission Licensee**, **DNO** and **Generators** for every **Embedded Large Power Station**. Similar arrangements apply in Scotland.

DOC9.6 **Joint System Incident Procedure**

DOC9.6.1 A **Joint System Incident** is an **Event** (as referred to in **Distribution Operating Code** DOC7) wherever occurring which in the opinion of the **DNO** has or may have a serious and/or widespread effect on, in the case of an incident on a **User's System**, the **DNO's Distribution System** or the **Transmission System** or, in the case of an incident on the **DNO's Distribution System** or the **Transmission System**, on a **User's**, or **Users', System(s)**. Where an incident on a **User's System** has or may have no effect on the **DNO's Distribution System** or the **Transmission System**, then such an incident does not fall within this **Distribution Operating Code** and accordingly DOC9 shall not apply to it.

DOC9.6.2 Each **User** requested by the **DNO** in accordance with the **Distribution Planning and Connection Code**, shall provide in writing to the **DNO** and the **DNO** shall provide in writing to each such **User** a telephone number or numbers at which or through which responsible management representatives, who are fully authorised to take binding decisions on behalf of their appointers, can be contacted day or night when there is a **Joint System Incident**. The lists of telephone numbers shall be provided at the time that a **User** connects to the **DNO's Distribution System** and must be updated (in writing) as often as the information contained in them changes.

DISTRIBUTION OPERATING CODE (DOC)

- DOC9.6.3 On the occurrence of an **Event**, then pursuant to **Distribution Operating Code DOC7**:
- (a) If it is on the **System** of a **User**, the **User** shall notify the **DNO** accordingly together with any other **User** who is or may be affected and will inform the **DNO** of which **Users** it has informed.
 - (b) If it is on the **DNO's Distribution System**, the **DNO** shall notify all **Users** who are or may be affected.
- DOC9.6.4 Following notification by a **User** of an **Event**, the **DNO** will if it considers necessary, telephone the **User** on the telephone number referred to in DOC9.6.2 to obtain such additional information as it requires.
- DOC9.6.5 Following notification of an **Event** in accordance with DOC9.6.3(a) or (b), and/or the receipt of any additional information requested pursuant to DOC9.6.4, the **DNO** will determine whether or not the **Event** is a **Joint System Incident**, and, if so, the **DNO** may set up a **System Incident Centre** in order to avoid overloading existing operational arrangements of the **DNO**.
- DOC9.6.6 The **DNO** shall as soon as possible notify all relevant **Users** that a **System Incident Centre** has been established and the telephone number(s) of the **DNO's System Incident Centre** if different from those already supplied pursuant to DOC9.6.2.
- DOC9.6.7 All communications between the responsible management representatives of the relevant parties with regard to the **DNO's** role in the **Joint System Incident** shall be made via the **System Incident Centre**, if it has been established.
- DOC9.7 **Civil Emergencies**
- DOC9.7.1 Directions under Section 96 of the **Act** place an obligation on the **DNO** to prepare and maintain plans for mitigating the effects of any civil emergency which may occur in accordance with the Electricity Supply Emergency Code. That Code describes the steps which Government might take to deal with an electricity supply emergency envisaged under Section 96(7) of the **Act** or Section 3(i)(b) of the Energy Act 1976 and sets down the actions which Companies in the Electricity Supply Industry should plan to take and which may be needed or required in order to deal with such an emergency.
- DOC9.7.2 In an electricity emergency it may become necessary to restrict **Users' Demand** for and consumption of electricity and may be achieved by one or more of the following methods:
- (a) Appeals by the Government to the public for voluntary restraint.
 - (b) The issue of Orders under the Energy Act 1976 requiring restrictions on consumption by industry and commerce.
 - (c) The issue of directions under the Energy Act 1976 requiring rota disconnections and associated restrictions.

DISTRIBUTION OPERATING CODE (DOC)

- DOC9.7.3 In the event that the **Secretary of State** issues directions to the **DNO** to implement rota disconnections, the **DNO** will establish an Emergency Co-ordinating Centre and as soon as possible establish communications with such relevant **Users** as is necessary to ensure operational liaison. The plans to be implemented will be similar or separate from the schemes outlined in **Distribution Operating Code, DOC6**.
- DOC9.7.4 The plans make provision for the need to maintain supply, so far as practicable, to consumers in protected categories. For the purpose of the **Distribution Code** Nuclear **Generating Plant** shall be deemed to be a protected category in accordance with the provisions of DOC6.1.4.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 10

DOC10 OPERATIONAL EVENT REPORTING AND INFORMATION SUPPLY

DOC10.1 Introduction

DOC10.1.1 This **Distribution Operating Code** DOC10 sets out the requirements for reporting in writing and, where appropriate, more fully those **Events** termed **Significant Incidents** which were initially reported under **Distribution Operating Code** DOC7 and those statutory specified events to be reported under the **Electricity Supply Regulations**.

Information between a **DNO** and **Users** will be exchanged on the reasonable request of either party.

DOC10.1.2 DOC10 also provides for the joint investigation of **Significant Incidents** by the **Users** involved.

DOC10.2 Objectives

The objective of this **Distribution Operating Code** is to facilitate the provision of more detailed information in writing and, where agreed between the **DNO** and the **Users** involved, joint investigation of those **Significant Incidents** initially reported under DOC7.

DOC10.3 Scope

This Distribution Operating Code DOC10 applies to the **DNO** and to **Users**, which in this Distribution Operating Code means:-

- (a) **High Voltage Customers**.
- (b) **Embedded Generators** connected to the **DNO's Distribution System** at **HV**.
- (c) **Other Authorised Distributors** connected to the **DNO's Distribution System** at **HV**.
- (d) Suppliers on behalf of their **Customers** where appropriate.

DOC10.4 Communications

DOC10.4.1. The **DNO** and **Users** connected to the **DNO's Distribution System** shall establish communication channels to ensure the effectiveness of this **Distribution Operating Code**. Communication should, as far as possible, be direct between the **User** and the operator of the network to which that **User** is connected. However, this does not preclude communication with the **User's** nominated representative.

DISTRIBUTION OPERATING CODE (DOC)

DOC10.4.2 Operational Event Reporting

DOC10.4.2.1 Written Reports of Events by Users to the DNO

In the case of an **Event** which has been reported initially to the **DNO** under DOC7.6 and subsequently has been determined by the **DNO** to be a **Significant Incident**, a written report will be given to the **DNO** by the **User** in accordance with DOC10. The **DNO** will not pass this report on to other affected **Users** but may use the information contained therein in preparing a report under DOC10 to a **User** in relation to a **Significant Incident** on the **DNO's Distribution System** which has been caused by (or exacerbated by) the **Significant Incident** on the **User's System**.

DOC10.4.2.2 Written Reports of Events by the DNO to Users

In the case of an **Event** which has been reported initially to the **User** under DOC7.6 and subsequently has been determined by the **User** to be a **Significant Incident**, a written report will be given to the **User** by the **DNO** in accordance with DOC10. The **User** will not pass this report on to other affected **Users** but may use the information contained therein in preparing a report for another **Authorised Electricity Operator or AEO** connected to its **System** in relation to a **Significant Incident** which has been caused by (or exacerbated) the **Significant Incident** on the **DNO's Distribution System**.

DOC10.4.3 Form of Report in Writing

DOC10.4.3.1 A report under DOC10.4.2 will be in writing and shall be sent to the **DNO** or **User**, as the case may be, containing written confirmation of the initial notification given under DOC7 together with more details relating to the **Significant Incident**, although it need not state the cause of the **Event** save to the extent required under DOC7.6.2 and such further information which has become known relating to the **Significant Incident** since the initial notification under DOC7. The report should, as a minimum, contain those matters specified in the Appendix 1 of this DOC10 which is not intended to be exhaustive to this DOC10. The recipient may raise questions to clarify the notification, and the giver of the notification will, in so far as it is able, answer any questions raised.

DOC10.4.4 Timing of the Report in Writing

DOC10.4.4.1 A written report under DOC10.4.2 shall be given as soon as reasonably practicable after the initial notification under DOC7 and in any event a preliminary report shall normally be given within 24 hours of such time.

DOC10.4.5 Statutory Reports of Specified Events

DOC10.4.5.1 Nothing in this **Distribution Operating Code** shall be construed as relieving **DNOs** or **Users** from their duty to report events specified in the **Electricity Supply Regulations** in accordance with those **Regulations** in so far as they apply to **Users**.

DOC10.4.6 Joint Investigation into Significant Incidents

DOC10.4.6.1 Where a **Significant Incident** has been declared and a report submitted under DOC10 either party or parties may request in writing that a joint investigation be carried out.

DISTRIBUTION OPERATING CODE (DOC)

- DOC10.4.6.2 The composition of such an investigation panel will be appropriate to the incident to be investigated, and agreed by all parties involved.
- DOC10.4.6.3 Where there has been a series of **Significant Incidents** (that is to say, where a **Significant Incident** has caused or exacerbated another **Significant Incident**) the parties involved may agree that the joint investigation should include some or all of those **Significant Incidents**.
- DOC10.4.6.4 A joint investigation will only take place where all affected parties agree to it. The form and rules of, the procedure for, and all matters (including, if thought appropriate, provisions for costs and for a party to withdraw from the joint investigations once it has begun) relating to the joint investigation will be agreed at the time of a joint investigation and in the absence of agreement the joint investigation will not take place.
- DOC10.4.6.5 Any joint investigation under **DOC10** is separate from any inquiry which may be carried out under the **Electricity Supply Industry (ESI** disputes resolution procedure.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 10

DOC 10 - APPENDIX 1

MATTERS, IF APPLICABLE TO THE Significant Incident, TO BE INCLUDED IN A WRITTEN REPORT GIVEN IN ACCORDANCE WITH DOC10.4.2.

1. Time and date of **Significant Incident**.
2. Location.
3. Plant and/or **Apparatus** involved.
4. Brief description of **Significant Incident**.
5. Estimated time and date of return to service.
6. Supplies/generation interrupted and duration of interruption.
7. Set/Station frequency response achieved
8. Set/Station MVA_r performance achieved
9. Ownership of the faulted **Plant** and/or **Apparatus**
10. Estimated **Demand Control** relief undertaken
11. Estimated **Demand** shed Automatic/Manual
12. Time and date of **Demand** restoration

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 11

DOC11 NUMBERING AND NOMENCLATURE OF ELECTRICAL APPARATUS AT OWNERSHIP BOUNDARIES

DOC11.1 Introduction

DOC11.1.1 This **Distribution Operating Code** DOC11 sets out the responsibilities and procedures for notifying the relevant owners of the numbering and nomenclature of **Apparatus** at **Ownership Boundaries**.

DOC11.1.2 The numbering and nomenclature of **Apparatus** shall be included in the **Operation Diagram** prepared for each site having an **Ownership Boundary**.

DOC11.2 Objectives

The prime objective embodied in this **Distribution Operating Code** is to ensure that at any site where there is an **Ownership Boundary** every item of **Apparatus** has numbering and/or nomenclature that has been mutually agreed and notified between the owners concerned to ensure, so far as is reasonably practicable the safe and effective **Operation** of the **Systems** involved and to reduce the risk of error.

DOC11.3 Scope

This **Distribution Operating Code** DOC11 applies to the **DNO** and to **Users**, which in this **Distribution Operating Code** excludes **Users** connected at **Low Voltage** without **Generation** and protected by a fuse(s) or other device(s) rated at 100 amps or less, (except it may apply to such **Users** who are the sole **User** connected to an **HV/LV** transformer.), and otherwise includes:

- (a) **Customers.**
- (b) **Embedded Generators.**
- (c) **Other Authorised Distributors** connected to the **DNO's DNO's Distribution System.**
- (d) **Meter Operators.**

DOC11.4 Procedure

DOC11.4.1 New Apparatus

DOC11.4.1.1 When the **DNO** or a **User** intends to install **Apparatus** having an interface at an **Ownership Boundary** the proposed numbering and/or nomenclature to be adopted for the **Apparatus** must be notified to the other owner(s).

DOC11.4.1.2 The notification shall be made in writing to the relevant owner(s) and will consist of **Operation Diagrams** incorporating the proposed new **Apparatus** to be installed and its proposed numbering and/or nomenclature.

DOC11.4.1.3 The notification shall be made to the relevant owner(s) at least eight months prior to the proposed installation of the **Apparatus**.

DISTRIBUTION OPERATING CODE (DOC)

DOC11.4.1.4 The relevant owners shall respond in writing within one month of the receipt of the notification confirming both receipt and whether the proposed numbering and/or nomenclature is acceptable or, if not, what would be acceptable.

DOC11.4.1.5 In the event that agreement cannot be reached between the **DNO**, and the other owner(s), the **DNO**, acting reasonably, shall have the right to determine the numbering and nomenclature to be applied at that site.

DOC11.4.2 Existing Apparatus

DOC11.4.2.1 The **DNO** and/or every **User** shall supply the **DNO** and/or every other **User** on request with details of the numbering and nomenclature of **Apparatus** on sites having an **Ownership Boundary**.

DOC11.4.2.2 The **DNO** and every **User** shall be responsible for the provision and erection of clear and unambiguous labelling showing the numbering and nomenclature of its **Apparatus** on sites having an **Ownership Boundary**.

DOC11.4.3 Changes to Existing Apparatus

DOC11.4.3.1 Where the **DNO** or a **User** needs or wishes to change the existing numbering and/or nomenclature of any of its **Apparatus** on any site having **Ownership Boundary**, the provisions of DOC11.4.1 shall apply with any amendments necessary to reflect that only a change is being made.

DOC11.4.3.2 Where a **User** changes the numbering and/or nomenclature of its **Apparatus**, which is the subject of **DOC11**, the **User** will be responsible for the provision and erection of clear and unambiguous labelling.

DOC11.4.3.3 Where a **DNO** changes the numbering and/or nomenclature of its **Apparatus**, which is the subject of **DOC11**, the **DNO** will be responsible for the provision and erection of clear and unambiguous labelling.

DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 12

DOC12 SYSTEM TEST

DOC12.1 Introduction

DOC12.1.1 This **Distribution Operating Code** DOC12 sets out the responsibilities and procedures for arranging and carrying out **System Test** which have or may have an effect on the **Systems** of the **DNO** or **Users**. **System Test** are those tests which involve either simulating conditions or the controlled application of irregular, unusual or extreme conditions on the **Total System** or any part of the **Total System**, but do not include commissioning or recommissioning tests or any other tests of a minor nature.

DOC12.1.2 **System Test** which have a minimal effect on the **Distribution System** of the **DNO** or the **Systems** of others will not be subject to this procedure; minimal effect will be taken to mean variations in voltage, frequency and waveform distortion of a value not greater than those figures which are defined in the **Distribution Planning and Connection Code**.

DOC12.1.3 If the **System Test** proposed by the **DNO** or **User** connected to the **DNO's Distribution System** will or may have an effect on the **Transmission System** then the provisions of the relevant **Grid Code** shall apply.

DOC12.2 Objectives

DOC12.2.1 The objectives of this **Distribution Operating Code** are to:-

- (a) Ensure that the procedures for arranging and carrying out of **System Test** do not so far as practicable, threaten the safety of either personnel or the general public and cause minimum threat to the security of supplies, the integrity of **Plant** and/or **Apparatus** and cause minimum detriment to the **DNO** and **Users**.
- (b) Set out procedures to be followed for establishing and reporting **System Test**.

DOC12.3 Scope

DOC12.3.1 This **Distribution Operating Code** applies to the **DNO** and to **Users**, which in this **Distribution Operating Code** means:-

- (a) **High Voltage Customers**.
- (b) **Embedded Generators** connected to the **DNO's Distribution System** at **HV**.
- (c) **Other Authorised Distributors** connected to the **DNO's Distribution System** at **HV**.

DISTRIBUTION OPERATING CODE (DOC)

DOC12.4 Procedure

DOC12.4.1 Proposal Notice

DOC12.4.1.1 When the **DNO** or a **User** intends to undertake a **System Test** which will have or may have an effect on the **System** of others normally six months notice, or as otherwise agreed by the **DNO**, of the proposed **System Test** will be given by the person proposing the **System Test** (the "Test Proposer") to the **DNO** and to those **Users** who may be affected by such a **System Test**.

DOC12.4.1.2 The proposal shall be in writing (the "Proposal Notice") and shall contain details of the nature and purpose of the proposed **System Test** and will indicate the extent and situation of the **Plant** or **Apparatus** involved.

DOC12.4.1.3 If in the view of the recipients the information set out in the Proposal Notice is considered insufficient by the recipients they shall as soon as is reasonably practicable contact the Test Proposer with a request in writing for further information which shall be supplied as soon as reasonably practicable. The **DNO** shall not be required to do anything under this **Distribution Operating Code** until it is satisfied with the details supplied in the Proposal Notice or pursuant to a request for further information.

DOC12.4.1.4 If the **DNO** wishes to undertake a **System Test** the **DNO** shall be deemed to have received a proposal of that **System Test**.

DOC12.4.2 Preliminary Notice and Establishment of Test Panel

DOC12.4.2.1 The **DNO** shall have overall co-ordination of the **System Test**. Using the information supplied to it under DOC12.4.1 the **DNO** shall determine in its reasonable estimation, which **Users** other than the Test Proposer may be affected by the proposed **System Test**.

DOC12.4.2.2 The **DNO** shall, with the agreement of the **Users** which it has identified may be affected, appoint a **Test Coordinator** as soon as reasonably practicable after it has received a Proposal Notice and in any event prior to the distribution of the Preliminary Notice referred to below.

- (a) Where the **DNO** decides that the **DNO's Distribution System** will or may be significantly affected by the proposed **System Test**, then the **Test Coordinator** shall be a suitably qualified person nominated by the **DNO**.
- (b) Where the **DNO** decides that the **DNO's Distribution System** will not be significantly affected by the proposed **System Test**, then the **Test Coordinator** shall be a suitably qualified person nominated by the proposer of the **System Test**, in consultation with the **DNO**.
- (c) The **DNO** shall as soon as reasonably practicable after it has received a Proposal Notice contact the Test Proposer where the **Test Coordinator** is to be (pursuant to this **Distribution Operating Code**) a person nominated by the Test Proposer and invite him to nominate a person. If the Test Proposer is unable or unwilling to nominate a person within seven days of being contacted by the **DNO** then the proposed **System Test** will not take place.

DOC12.4.2.3 The **DNO** will notify all **Users** identified by it under DOC12.4.2.1 in writing of the proposed **System Test** which in this **Distribution Operating Code** shall be known as a Preliminary Notice. The Preliminary Notice will contain:

DISTRIBUTION OPERATING CODE (DOC)

- (a) The details of the nature and purpose of the proposed **System Test**, the extent and situation of the **Plant** and/or **Apparatus** involved and the **Users** involved.
- (b) An invitation to nominate within fourteen days a suitably qualified representative (or representatives if the **Test Coordinator** informs the **DNO** that it is appropriate for a particular **User**) to be a member of a **Test Panel** for the proposed **System Test**.
- (c) The name of the **DNO** representative (or representatives) on the **Test Panel** for the proposed **System Test**.
- (d) The name of the **Test Coordinator** and whether he was nominated by the proposer of the **System Test** or by the **DNO**.

DOC12.4.2.4 The Preliminary Notice shall be sent within one month of the receipt by the **DNO** of the Proposal Notice or the receipt of any further information requested under DOC12.4.13, whichever is the later. Where the **DNO** is the Test Proposer the Preliminary Notice will be sent as soon as possible after the proposed **System Test** has been formulated.

DOC12.4.2.5 If replies to the invitation in the Preliminary Notice to nominate a representative to be a member of the **Test Panel** have not been received within fourteen days, the **User** which has not replied shall not be entitled to be represented on the **Test Panel**.

DOC12.4.2.6 The **DNO** shall as soon as possible after the expiry of that fourteen day period appoint nominated persons to the **Test Panel** and notify all relevant **Users** - of the composition of the **Test Panel**.

DOC12.4.3 **Test Panel**

DOC12.4.3.1 A meeting of the **Test Panel** shall take place as soon as possible after the **DNO** has notified relevant **Users** of the composition of the **Test Panel**, and in any event within one month of the appointment of the **Test Panel**.

DOC12.4.3.2 The **Test Panel** shall consider:-

- (a) The details of the nature and purpose of the proposed **System Test** and other matters set out in the Proposal Notice (together with any further information requested under DOC12.4.2).
- (b) The economic, operational and risk implications of the proposed **System Test**.
- (c) The possibility of combining the proposed **System Test** with any other tests and with **Plant** and/or **Apparatus** outages which arise pursuant to the **Operational Planning** requirements of the **DNO**, **NGC** and **Users**
- (d) In Scotland, the implications of the proposed **System Test** on **Generating Plant** subject to **Central Despatch**.

In England and Wales, the implications of the proposed **System Test** on plant which comprise or contain **BM Units** which are active (ie. submitting bid-offer data) in the **Balancing Mechanism** insofar as it is able to do so.

DISTRIBUTION OPERATING CODE (DOC)

DOC12.4.3.3 **Users** who received a Preliminary Notice concerning the proposed **System Test** (whether or not they are represented on the **Test Panel**) shall be obliged to supply that **Test Panel** upon written request with such details as the **Test Panel** reasonably requires in order to consider the proposed **System Test**.

DOC12.4.3.4 The **Test Panel** will meet as often as the **Test Co-ordinator** deems necessary to conduct its business and he shall be the person to convene a meeting.

DOC12.4.4 **Proposal Report**

(a) DOC12.4.4.1 Within two months of the first meeting, the **Test Panel** shall submit a report, which in this **Distribution Operating Code** shall be called a Proposal Report, which shall contain:**System Test** (including the manner in which the **System Test** is to be monitored).

(b) An allocation of costs (including unanticipated costs) between the affected parties, (the general principle being that the Test Proposer will bear the costs).

(c) Such other matters as the **Test Panel** consider appropriate.

The Proposal Report may include requirements for indemnities to be given in respect of claims and losses arising from the **System Test**. All **System Test** procedures must comply with all applicable legislation.

DOC12.4.4.2 If the **Test Panel** is unable unanimously to agree on any decision in preparing its Proposal Report the proposed **System Test** shall not take place and the **Test Panel** will be dissolved.

DOC12.4.4.3 The Proposal Report will be submitted to the **DNO** and to each **User** who received a Preliminary Notice under DOC12.4.2.

DOC12.4.4.4 Within fourteen days of receipt of the Proposal Report, each recipient shall respond to the **Test Coordinator** with its approval of the Proposal Report or its reason for non-approval.

DOC12.4.4.5 In the event of non-approval by one or more recipients, the **Test Panel** shall as soon as practicable meet in order to determine whether the proposed **System Test** can be modified to meet the objection or objections.

DOC12.4.4.6 If the proposed **System Test** cannot be so modified, then the **System Test** will not take place.

DOC12.4.4.7 If the proposed **System Test** can be so modified, the **Test Panel** shall as soon as practicable, and in any event within one month of meeting to discuss the responses to the Proposal Report, submit a revised Proposal Report and the provisions of DOC12.4.4.3 and DOC12.4.4.4 will apply to that submission.

DOC12.4.4.8 In the event of non-approval of the revised Proposal Report by one or more recipients, the **System Test** will not take place and the **Test Panel** will be dissolved.

DISTRIBUTION OPERATING CODE (DOC)

DOC12.4.5 Final Test Programme

DOC12.4.5.1 If the Proposal Report (or, as the case may be, the revised Proposal Report) is approved by all recipients, the proposed **System Test** can proceed and at least one month prior to the date of the proposed **System Test**, the **Test Panel** shall submit to the **DNO** and all recipients of the Proposal Notice a programme which in this **Distribution Operating Code** shall be called a “Final Test Programme” stating the switching sequence and proposed timings, a list of those staff involved in the carrying out of the **System Test** (including those responsible for site safety) and such other matters as the **Test Panel** deem appropriate.

DOC12.4.5.2 The Final Test Programme shall bind all recipients to act in accordance with the provisions contained within the programme in relation to the proposed **System Test**.

DOC12.4.5.3 Any problems with the proposed **System Test** which arise or are anticipated after the issue of the Final Test Programme and prior to the day of the proposed **System Test** must be notified to the **Test Coordinator** as soon as possible in writing. If the **Test Coordinator** decides that these anticipated problems merit an amendment to or postponement of the **System Test**, he shall notify any party involved in the proposed **System Test** accordingly.

DOC12.4.5.4 If on the day of the proposed **System Test** operating conditions on the **System** are such that any party involved in the proposed **System Test** wishes to delay or cancel the start or continuance of the **System Test**, they shall immediately inform the **Test Coordinator** of this decision and the reasons for it. The **Test Coordinator** shall then postpone or cancel, as the case may be, the **System Test** and shall if possible, agree with all parties involved in the proposed **System Test** another suitable time and date or if he cannot reach such agreement, shall reconvene the **Test Panel** as soon as practicable which will endeavour to arrange another suitable time and date and the relevant provisions of the **Distribution Operating Code** shall apply.

DOC12.4.6 Final Report

DOC12.4.6.1 At the conclusion of the **System Test**, the Test Proposer shall be responsible for preparing a written report (the “Final Report”) of the **System Test** for submission to the **DNO** and other members of the **Test Panel**.

DOC12.4.6.2 The Final Report shall include a description of the **Plant** and/or **Apparatus**, tested and of the **System Test** carried out, together with the results, conclusions and recommendations for submission to other members of the **Test Panel**.

DOC12.4.6.3 The Final Report shall not be distributed to any party which is not represented on the **Test Panel** unless the **Test Panel**, having considered the confidentiality issues, shall have unanimously approved such distribution.

DOC12.4.6.4 When the Final Report has been submitted under DOC12.4.2.1 the **Test Panel** shall be dissolved.

DISTRIBUTION DATA REGISTRATION CODE (**DDRC**)

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

DDRC1 INTRODUCTION

DDRC1.1 The various sections of the **Distribution Code** require the **DNO** and **Users** to exchange and update data from time to time. The data which is specified in each section of the **Distribution Code** is summarised in the **Distribution Data Registration Code (DDRC)**.

DDRC1.2 The **Distribution Data Registration Code** (“**DDRC**”) provides a series of schedules summarising all requirements for information of a particular type. Each class of **User** is then referred to the appropriate schedule or group of schedules for a statement of the total data requirements in his case.

DDRC1.3 The **DDRC** specifies procedures and timings for the supply of data and subsequent updating, where the timings are covered by detailed timetables laid down in other sections of the **Distribution Code** they are not necessarily repeated in full in the **DDRC**.

DDRC1.4 In the case of a **Generator** seeking a connection to the **DNO’s Distribution System** then irrespective of its potential involvement in the **Balancing Mechanism** in England and Wales or **Scheduling** and **Central Despatch** in Scotland, discussions on connection will be with the **DNO** concerned with the connection arrangements, in addition to any discussions required with the **Transmission Licensee** under the relevant **Grid Code**.

DDRC2 OBJECTIVE

The objective of the **DDRC** is to collate and list in a readily identifiable form all the data to be provided by:

- (a) Each category of **User** to the **DNO** under the **Distribution Code**.
- (b) The **DNO** to each category of **User** under the **Distribution Code**.

DDRC3 SCOPE

The **DDRC** will apply to the **DNO** and to all **Users** which for the purpose of the **DDRC** are listed below:

- (a) **Customers** It is not intended that the **Distribution Code** shall generally apply to small **Customers** individually; their obligations will be dealt with on their behalf by their **Supplier**.
- (b) **Embedded Generators**.
- (c) **Other Authorised Distributors** connected to the **DNO’s Distribution System**.
- (d) **Suppliers**
- (e) Any other person who is making application for use of or connection to the **DNO’s Distribution System**.

DDRC4 DATA CATEGORIES

DDRC4.1 Categories of Data

Within the **DDRC** the data required by the **DNO** is allocated to one of the following three categories:

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

- (a) **Standard Planning Data (SPD)**
- (b) **Detailed Planning Data (DPD)**
- (c) **Operational Data (OD)**

DDRC4.2 **Standard Planning Data (SPD)**

DDRC4.2.1 **Standard Planning Data** is that data listed in the **Distribution Planning and Connection Code** which is required to be supplied by all **Users** when making application for connection to and/or use of the **DNO's Distribution System** in order that the **DNO** may assess the implications for making the connection.

DDRC4.2.2 **Standard Planning Data** will be provided to the **DNO** in accordance with Section DPC6 and DPC7 of the **Distribution Planning and Connection Code**.

DDRC4.2.3 Following an agreement for connection/use of **System**, it is a requirement of the **Distribution Planning and Connection Code** that estimated data supplied by **Users** should be replaced by actual values prior to connection which will be referred to as **Registered Data**.

DDRC4.3 **Detailed Planning Data (DPD)**

DDRC4.3.1 **Detailed Planning Data** is that data listed in the **Distribution Planning and Connection Code** which is required to be supplied by the **Users** specified for connection to and/or use of the **DNO's Distribution System**.

DDRC4.3.2 **Detailed Planning Data** will be provided to the **DNO** in accordance with Section DPC6 and DPC7 of the **Distribution Planning and Connection Code**.

DDRC4.3.3 Following an agreement for connection/use of **System**, it is a requirement of the **Distribution Planning and Connection Code** that estimated data supplied by **Users** should be replaced by measured values prior to connection.

DDRC4.4 **Operational Data (OD)**

DDRC4.4.1 **Operational Data** is data, which is required by the **Distribution Operating Codes**.

DDRC4.4.2 **Operational Data** is required to be supplied in accordance with timetables set down in the relevant **Distribution Operating Codes** and is repeated in tabular form in the schedules attached to this **DDRC**.

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

DDRC5 PROCEDURES AND RESPONSIBILITIES

DDRC5.1 Responsibility for Submission and Updating of Data

In accordance with the provisions of the various sections of the **Distribution Code** and unless otherwise agreed or specified by the **DNO**, each **User** is required to submit data as defined in DDRC6 following and the attached schedules.

DDRC5.2 Methods of Submitting Data

DDRC5.2.1 Data must be submitted to the **DNO** in writing and where possible in the format specified by the **DNO** and must indicate the name of the person who is submitting those schedules.

DDRC5.2.2 If a **User** wishes to change any data item then this must first be discussed with the **DNO** concerned in order for the implications to be considered and the change if agreed (such agreement not to be unreasonably withheld), should be confirmed by the submission of a revised data scheduler by verbal means with confirmation in writing if short timescales are involved.

DDRC5.2.3 The **DNO** will supply data as requested by **Users** and as agreed by the **DNO** where no obligation of confidentiality exists.

DDRC5.3 Changes to User's Data

Whenever a **User** becomes aware of a change to an item of data, which is registered with the **DNO** the **User**, must notify the **DNO** in accordance with the appropriate section of the **Distribution Code**. The method and timing of the notification to the **DNO** is set out in the appropriate section of the **Distribution Code**.

DDRC5.4 Data Accuracy and Data not Supplied

DDRC5.4.1 The **User** is solely responsible for the accuracy of data (or of changes to data) supplied to the **DNO**.

DDRC5.4.2 Any data which the **User** fails to supply when required by any section of the **Distribution Code** may be estimated by the **DNO** if and when, in the **DNO's** view, it is necessary to do so. Such estimates will be based upon data supplied previously for the same **Plant** or **Apparatus** or upon corresponding data for similar **Plant** or **Apparatus** or upon such other information as the **DNO** deems appropriate.

DDRC5.4.3 The **DNO** will advise a **User** in writing of any estimated data it intends to use pursuant to DDRC5.4.2 relating directly to that **User's Plant** or **Apparatus** in the event of data not being supplied. The **DNO** will not be liable as a result of using that estimated data; the responsibility for the accuracy of that data will rest with the **User** as if the data has been supplied by that **User**.

DDRC5.4.4 It is a requirement of the **Distribution Planning and Connection Code** that Registered Project Planning Data is updated by the **User** annually.

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

DDRC6 DATA TO BE REGISTERED

- DDRC6.1 Schedules 1-4 are not used within the **Distribution Code**.
- DDRC6.2 Schedules 5a, 5b and 5c - **Embedded Generator** Technical Information.
- DDRC6.3 Schedule 6 - **Demand** forecasts - as described in **DOC1**, time varying output/generation forecasts for the **Users** defined in the scope.
- DDRC6.4 Schedule 7 - **Operational Planning** - as described in **DOC2**, outage planning information.
- DDRC6.5 Schedule 8 - **System** Design Information - comprising **System** technical data.
- DDRC6.6 Schedule 9 - Load Characteristics - comprising the forecast data for load points indicating for example, the maximum load, the equipment that comprises the load, and the harmonic content of the load.
- DDRC6.7 The schedules applicable to each class of **User** are as follows:-

Schedule Number:-	Title	Applicable to:-
Schedule 5a	Power Station Data	All Power Stations
Schedules 5b	Generation Set Data	All Embedded Generation Sets
Schedule 5c	Generation Set Data	For specified types of Generation Set and ancillary Plant and Apparatus <ul style="list-style-type: none"> (i) Synchronous Generation Set (ii) Fixed speed induction Generation Set (iii) Doubly fed induction Generation Set (iv) Series Converter Connected Generation Set (v) Transformers
Schedule 5d	DNO Network Data	DNO's Distribution System operating at below 33 kV.
Schedule 6	Demand Forecasts	All Embedded Generators greater than 5MW or 1MW in the case of Scottish Renewable Generating Plant ; Any Other Authorised Distributor connected to the host DNO System ; All Suppliers ; All Customers connected at HV whose Demand is greater than 5MW

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule Number:-	Title	Applicable to:-
Schedule 7	Operational Planning	Embedded Generators whose output is greater than 5MW or 1MW in the case of Scottish Renewable Generating Plant ; Any Other Authorised Distributor connected to the host DNO System ; All Suppliers ; All Customers connected at HV whose Demand is greater than 5MW
Schedule 8-9	System Design Information and Load Characteristics	Embedded Generator ; Any Other Authorised Distributor connected to the host DNO's Distribution System ; All Suppliers ; All Customers

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 5a

DATA REGISTRATION CODE

POWER STATION DATA FOR ALL EMBEDDED GENERATORS

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
Connection Point (geographical and electrical)	Text	SPD
Location plan	Plan	SPD
Single line diagram of existing and proposed connections or Operation Diagrams when available	Diagram	SPD
Voltage of Connection Point	Volts	SPD
Number of Generation Sets	Number	SPD
Are all Generation Sets of the same design/rating	Y/N	SPD
Type of Generation Set Synchronous, CCVSSG, FSIG, DFIG, Converter Connected	Text	SPD
Type of prime mover	Text	SPD
Is the scheme CHP	Text	SPD
Operating Regime – continuous, intermittent, wind or hydro restricted.	Text	SPD
Is secure connection required	Y/N	SPD
Will Generating Plant operate in islanded mode?	Y/N	SPD
Will Generating Plant supply electricity to premises?	Y/N	SPD
Total Power Station Capacity (Net of unit supplied auxiliary loads) MW or Registered Capacity when available	MW	SPD
Total Power Station rated MVA _r output	MVA _r	SPD
Total Power Station output at Maximum Generation	MW	SPD
Total Power Station output at Minimum Generation	MW	SPD
Maximum power export	MW	SPD
Maximum reactive power export	MVA _r	SPD
Maximum power import	MW	SPD
Maximum reactive power import	MVA _r	SPD
Fault Level contribution	kA or MVA	SPD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
Proposed Interface Arrangements		
Means of synchronising between DNO and User		
Means of connection and disconnection with earth (ETR 113)	Text	SPD
Precautions should neutral become disconnected from earth (HV only)	Text	SPD
Requirements for Top - Up supply	Text	SPD
Requirement for Standby supply	Text	SPD
Total Power Station Reactive Power Capability at Registered Capacity		
Lagging	MVAr	DPD
Leading	MVAr	DPD
Total Power Station Reactive Power Capability at Minimum Generation		DPD
Lagging	MVAr	DPD
Leading	MVAr	DPD
Power Station auxiliary demand at Registered Capacity	MW	DPD
Power Station auxiliary demand at Registered Capacity	MVAr	DPD
Maximum auxiliary demand	MW	DPD
Maximum auxiliary demand	MVAr	DPD
Power Station auxiliary demand at Minimum Generation	MW	DPD
Power Station auxiliary demand at Minimum Generation	MVAr	DPD
Site protection arrangements	Text	DPD
Site communications and control arrangements	Text	DPD

ETR 113 is Engineering Technical Report 113 which supports Engineering Recommendation ER G59/1, Item 3 DGD [Annex 1](#), published and available from the Electricity Association.

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 5b

DATA REGISTRATION CODE

GENERATION SET DATA FOR ALL EMBEDDED GENERATORS

<u>DATA DESCRIPTION</u> For All Generators	<u>UNITS</u>	<u>DATA CATEGORY</u> (Generators specified in <u>Item 3 Annex 1</u>)	<u>DATA CATEGORY</u> (Generators specified in <u>Item 4 Annex 1</u>)
Number of generators to which data applies	Number	SPD	SPD
Type of Generation Set Synchronous, CCVSSG, FSIG, DFIG, Converter Connected	Text	SPD	SPD
Type of Prime Mover		SPD	SPD
Terminal Voltage	Volts	SPD	SPD
Generation Set rating or Registered Capacity when available	MW	SPD	SPD
Generation Set rating MVA	MVA	SPD	SPD
Generation Set rating MVar	MVar	SPD	SPD
Maximum Generation	MW	SPD	SPD
Minimum Generation	MW	SPD	SPD
<u>Total Generation Set Reactive Power Capability at Registered Capacity</u>			
Lagging	MVar	DPD	SPD
Leading	MVar	DPD	SPD
<u>Total Generation Set Reactive Power Capability at Minimum Generation</u>			
Lagging	MVar	DPD	SPD
Leading	MVar	DPD	SPD
Proposed Interface Arrangements			
Means of synchronising between DNO and User		SPD	SPD
Means of connection and disconnection with earth (ETR 113)	Text	SPD	SPD
Precautions should neutral become disconnected from earth (HV only)	Text	SPD	SPD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 5c (i)

DATA REGISTRATION CODE

GENERATION SET DATA FOR EMBEDDED GENERATORS

<u>DATA DESCRIPTION</u> 5c (i) Synchronous Generation Sets	<u>UNITS</u>	<u>DATA CATEGORY</u> (Generators specified in <u>Item 3 Annex 1</u>)	<u>DATA CATEGORY</u> (Generators specified in <u>Item 4 Annex 1</u>)
Type of Generation Set , round rotor or salient pole	Text	None	DPD
Generation Set MW/MVAr Capability / Performance Chart	Chart	None	DPD
State base MVA adopted per unit or % on machine rating or 100 MVA base.	Text	SPD	SPD
+Ve sequence or armature resistance	Specify		DPD
+Ve sequence or armature reactance	Specify	SPD	SPD
Short circuit ratio	Number	DPD	SPD
Stator leakage reactance	Specify	None	DPD
Inertia Constant	MWsec/ MVA	DPD	SPD
Stator Resistance	Specify	None	DPD
Direct Axis Reactance			
Sub-transient	Specify	DPD	SPD
Transient	Specify	DPD	SPD
Synchronous	Specify	DPD	SPD
Quadrature Axis Reactance			
Sub-transient	Specify	None	DPD
Transient	Specify	None	DPD
Synchronous	Specify	None	DPD
Time Constants			
Direct axis sub-transient	secs	DPD	SPD
Direct axis transient	secs	DPD	SPD
Quadrature axis sub-transient	secs	None	DPD
Quadrature axis transient	secs	None	DPD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

<u>DATA DESCRIPTION</u> 5c (i) Synchronous Generation Sets	<u>UNITS</u>	<u>DATA CATEGORY</u> (Generators specified in <u>Item 3 Annex 1</u>)	<u>DATA CATEGORY</u> (Generators specified in <u>Item 4 Annex 1</u>)
Potier Reactance (if saturation factor available)	Specify	None	DPD
Saturation factor (PU of field current to produce 1.2PU voltage)	Per Unit	None	DPD
Zero sequence resistance	Specify	DPD	DPD
Zero sequence reactance	Specify	DPD	DPD
Negative sequence resistance	Specify	DPD	DPD
Negative sequence reactance	Specify	DPD	DPD
Governor model (parameters provided separately)	Text	None	DPD
The AVR model (parameters provided separately)	Text	None	DPD
Excitation model (Parameters provided separately)	Text	None	DPD
Rated stator current	Amps	None	DPD
Rated field current	Amps	None	DPD
Field Current Saturation Curve 50% to 120%	Graphs	None	DPD

Notes:

1. The q-axis parameters will be requested where required to increase the accuracy of the model.
2. The Potier reactance is only required if the saturation factor is available. The saturation factor is defined as the PU value of field current required to generate 1.2PU voltage.
3. The Short Circuit Ratio (SCR) of a **Generation Set** is one measure of the performance of a machine under short circuit conditions and is important in determining the unit's Stability performance. The reciprocal of the synchronous reactance (X_d) approximates to the SCR, the only difference is that the SCR considers saturation whereas X_d is derived from the air-gap line.

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 5c (ii)

DATA REGISTRATION CODE

GENERATION SET DATA FOR EMBEDDED GENERATORS

DATA DESCRIPTION 5c (ii) Fixed Speed Directly Connected Induction Generation Sets	UNITS	<u>DATA CATEGORY</u> (For <u>Generators specified in Item 3 Annex 1</u>)	<u>DATA CATEGORY</u> (For <u>Generators specified in Item 4 Annex 1</u>)
Stator Current unity power factor	Amps	DPD	DPD
Stator Current max lagging power factor	Amps	DPD	DPD
Stator Current min lagging power factor	Amps	DPD	DPD
Magnetising reactance	Specify	DPD	DPD
Stator resistance	Specify	DPD	DPD
Stator reactance	Specify	DPD	DPD
Inner cage or running rotor resistance	Specify	DPD	DPD
Inner cage or running rotor reactance	Specify	DPD	DPD
Outer cage or standstill rotor resistance	Specify	DPD	DPD
Outer cage or standstill rotor reactance	Specify	DPD	DPD
For above state whether derived from inner outer cage or running-standstill measurements	Text	DPD	DPD
Slip at rated output	Per unit	DPD	DPD
Load torque-speed coefficient B	Number	DPD	DPD
Load torque-speed coefficient C	Number	DPD	DPD
Inertia constant for generator prime mover drive chain	MWsec/ MVA	DPD	DPD

NOTE

The torque-speed (T-N) relationship is defined as:

$$T = T_0(A + BN + CN^2) \text{ where } A= 1.0 -B -C$$

Therefore only B & C are needed.

Alternatively a per unit torque-speed curve can be provided

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 5c (ii)

DATA REGISTRATION CODE

GENERATION SET DATA FOR EMBEDDED GENERATORS

DATA DESCRIPTION	UNITS	<u>DATA CATEGORY</u> (For <u>Generators</u> specified in <u>Item 3</u> <u>Annex 1)</u>	<u>DATA CATEGORY</u> (For <u>Generators</u> specified in <u>Item 4</u> <u>Annex 1)</u>
5c (ii) Fixed Speed Directly Connected Induction Generation Sets (Continued)			
Describe method of adding star capacitance over operating range		None	DPD
Capacitance connected in parallel at % of rated output Starting 20% 40% 60% 80% 100%		DPD	DPD
Maximum starting current	Amps	SPD	SPD
Starting Regime Symmetrical RMS current at time = t from energisation t = 0 t = 50 ms t = 200 ms t = 1 s t = 5 s		None	DPD
Supply operating chart to show range of reactive import and export with compensation as a function of active power		None	DPD
Details of turbine and governor model, described in block diagram form showing transfer functions of individual elements		None	DPD

The **User** will need to provide the above characteristic for each asynchronous **Generation Set** based on the number of pole sets (i.e. Two data sets for dual speed 4/6 pole machines). For large sites, with multiple machines, the **User** may alternatively provide an equivalent network modelled as an asynchronous **Generation Set** with matching Generating

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Unit Transformer at the **Connection Point**. This equivalent should also model the site electrical network, power factor correction, etc.

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 5c (iii)

DATA REGISTRATION CODE

GENERATION SET DATA FOR EMBEDDED GENERATORS

5c (iii) Doubly Fed Induction Generation Sets

The **User** should, if possible, provide the following **Detailed Planning Data** for both the static and dynamic models of their machines. For large sites, with multiple machines, the **DNO** may agree that the **User** may provide an equivalent network model. Should models not be available, the **User** may agree with the **DNO** a series of operational parameters, which describe the operation of the **Power Station** under a series of static and dynamic network conditions. These may cover, amongst other requirements:

The delivery of real power:

- The maximum rate of rise and fall of power per minute.
- Voltage and frequency ranges of operation.
- The ability (or not) to operate at a set reduced power and the rate at which this can be achieved.
- The instantaneous maximum output, system normal.

The delivery of reactive power:

- The range of reactive power available without compromising real power output.
- The maximum range of reactive power output available.
- The step change and/or rate of change of reactive power available.
- The ability (or not) to control reactive power and hence offer power factor or voltage control facilities.

The reaction to voltage depressions on the system:

- The ability (or not) to remain connected to the system for a series (1 to n) of independent voltage depressions of depth = $V_{(1-n)}$ % and length (in time) = $T_{(1-n)}$ ms.
- The ability (or not) to provide reactive (capacitive) power and the magnitude of that reactive power, during each voltage depression.
- The fault current contribution, in accordance with IEC 60909(1) during each voltage depression.

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 5c (iv)

DATA REGISTRATION CODE

GENERATION SET DATA FOR EMBEDDED GENERATORS

5c (iv) Series Converter Connected Generation Sets

The User should, if possible, provide the following Detailed Planning Data for both the static and dynamic models of their machines. For large sites, with multiple machines, the DNO may agree that the User will provide an equivalent network model. Should models not be available, the User may agree with the DNO a series of operational parameters, which describe the operation of the Power Station under a series of static and dynamic network conditions. These may cover, amongst other requirements:

The delivery of real power:

- The maximum rate of rise and fall of power per minute.
- Voltage and frequency ranges of operation.
- The ability (or not) to operate at a set reduced power and the rate at which this can be achieved.
- The instantaneous maximum output, system normal.

The delivery of reactive power:

- The range of reactive power available without compromising real power output.
- The maximum range of reactive power output available.
- The step change and/or rate of change of reactive power available.
- The ability (or not) to control reactive power and hence offer power factor or voltage control facilities.

The reaction to voltage depressions on the system:

- The ability (or not) to remain connected to the system for a series (1 to n) of independent voltage depressions of depth = $V_{(1-n)}$ % and length (in time) = $T_{(1-n)}$ ms
- The ability (or not) to provide reactive (capacitive) power and the magnitude of that reactive power, during each voltage depression.
- The fault current contribution, in accordance with IEC 60909(1) during each voltage depression.

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 5c (v)

DATA REGISTRATION CODE

GENERATION SET DATA FOR EMBEDDED GENERATORS

DATA DESCRIPTION	UNITS	<u>DATA</u> <u>CATEGORY</u> <u>(For</u> <u>Generators</u> <u>specified in</u> <u>Item 3</u> <u>Annex 1)</u>	<u>DATA</u> <u>CATEGORY</u> <u>(For</u> <u>Generators</u> <u>specified in</u> <u>Item 4</u> <u>Annex 1)</u>
5c (v) Transformers			
Transformer type Unit/Station/Auxiliary	Text	SPD	SPD
Number of identical units	Text	SPD	SPD
Description	Text	SPD	SPD
Transformer Rating	MVA	SPD	SPD
Primary Voltage	Volts	SPD	SPD
Secondary Voltage	Volts	SPD	SPD
Transformer Voltage Ratio	Number	SPD	SPD
+ive sequence reactance at nominal tap	Specify	DPD	SPD
+ive sequence reactance at minimum tap	Specify	None	DPD
+ive sequence reactance at maximum tap	Specify	None	DPD
+ive sequence resistance at nominal tap	Specify	DPD	SPD
+ive sequence resistance at minimum tap	Specify	None	DPD
+ive sequence resistance at maximum tap	Specify	None	DPD
Zero sequence reactance	Specify	DPD	DPD
Zero sequence resistance	Specify	DPD	DPD
Winding configuration eg DY11	Text	DPD	SPD
Type of tapchanger (on load / off load)	Text	DPD	SPD
Tap change range	%	DPD	SPD
Tap step size	%	DPD	SPD
Number of taps	Number	DPD	SPD
Maximum ratio tap	Number	DPD	DPD
Minimum ratio tap	Number	DPD	DPD
Nominal tap position	Number	DPD	DPD
Method of voltage control	Text	DPD	SPD
Method of primary winding earthing	Text	SPD	SPD
Method of secondary winding earthing	Text	SPD	SPD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 5d

DATA REGISTRATION CODE

DNOs' Network Data

(Data indicative of that which may be requested by Users for parts of the Distribution System operating at below 33kV.)

DATA DESCRIPTION	UNITS
<u>Fault Level Data at Primary Substation lower voltage busbars and other points on the system that may be affected by a Generator.</u>	
Calculated break fault level – state time from inception and fault level	ms and MVA
Calculated maximum peak fault current – time at first peak is 10ms - state current	kA
Maximum symmetrical fault level X/R ratio	
<u>Transformer Data</u> (For Each Transformer)	
Primary voltage	kV
Secondary Voltage	kV
Transformer Rating	MVA
Substation Rating Export	MVA
Substation Rating Import	MVA
Substation Maximum Export to higher voltage system	MVA
Substation Maximum Import from higher voltage system	MVA
Target secondary voltage	kV
Upper secondary voltage limit	kV
<u>Circuit data</u>	
Circuit Schematic Diagram and Geographic Diagram showing normal open points.	Diagram
Circuit impedances	Specify
Circuit ratings and any seasonal variations	Specify
Is the network operated radial or non-radial	Text
Circuit transformer voltage ratios eg HV/433/250	kV/V/V
Are circuit transformers zoned by applying the progressively higher tap settings for each group of transformers in zones along the circuit to optimise voltage regulation.	Y/N

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

DATA DESCRIPTION	UNITS
Applied tap setting for each circuit transformer (eg in range+5% to -5% - but only if available. DNOs will not collect this data if it is only available from site visits.)	Mark diagram
Circuit Maximum Demand Export	MVA
Circuit Miminum Demand Export or Maximum Import	MVA
Size and location of existing generation	Text
<u>Circuit parameters - for each section of circuit between the primary substation and point of common coupling with proposed generator.</u>	
Cable type (underground cable or overhead line)	Text or diagram
Length	km
Summer rating – state continuous or cyclic	MVA
Reactance (state base)	Ohm/km
Resistance (state base)	Ohm/km

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 6

DATA REGISTRATION CODE

DEMAND FORECASTS

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
1. Half hour Active Power and Power Factor at Annual ACS Conditions for specified time of the annual peak half hour at the associated Grid Supply Points and at the specified time of the annual peak half-hour of the NGC Demand	MW/ MVAr	8 weeks - 3 years	Week 35	OD
2. Half hour Active Power and Power Factor at Average Conditions at the specified half hour of the annual minimum NGC Demand .	MW/ MVAr	8 weeks - 3 years	Week 35	OD
3. Half hour Power output of Embedded Generating Plant at the specified half hour of the annual peak half hour of the NGC Demand .	MW	8 weeks - 3 years	Week 35	OD
4. Schedules for the operation of Embedded Generation Sets whose output is greater than 5MW on a half-hourly basis	MW Date Time	2 weeks to 8 weeks ahead	1600 hrs Friday	OD
5. Suppliers will provide details of their proposed use of Demand Control measures aggregated to 5MW or more (averaged over any half hour) on a half hourly basis for each DNO Connection Point .	MW Date Time	2 weeks to 8 weeks ahead	1600 hrs Friday	OD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
6. Customers, Suppliers, Other Network Operators and other DNOs connected to the DNO's Distribution System shall notify the DNO where their or their Customers operations are likely to result in an aggregated change in Demand at the DNO Connection Point of supply of greater than 5MW of the Demand at that time on a half hourly basis.	MW Date Time	2 weeks to 8 weeks ahead	1600 hrs Friday	OD
7. Items 5, 6 and 7 above updated.		2 days to 12 days ahead	0900 hrs each Wednesday	OD
8. Details of differences greater than 5MW from the schedules of operation of any Embedded Generating Plant on a half-hourly basis submitted under item 5 above.	MW Date Time	0 - 24 hrs ahead	As specified	OD
9. Details from Suppliers of any differences of the amount and donation of their proposed use of Customer Demand Control (aggregated over any half hourly basis submitted under item 6 above).	MW Date Time	0 - 24 hrs ahead	As specified	OD
10. Details from each User connected to the DNO's Distribution System of any change in aggregate Demand at the point of surplus of greater than 5MW of the Demand .	MW Date Time	0 - 24 hrs ahead	As specified	OD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
11. Details of half hour Active Power and Reactive Power output sent out to the DNO's Distribution System by Embedded Generating Plant during the previous day on a half hourly basis.	MW MVA _r	Previous day	0300	OD
12. Suppliers , Other Network Operators and other DNOs connected to the DNO's Distribution System will provide details of the amount and duration of Demand Control at the DNO Connection Point aggregated to 5MW or more (arranged over any half hour) which was implemented during the previous Operational Day .	MW Time	Previous day	0300	OD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 7a

OPERATIONAL PLANNING - LONG TERM

YEARS 3 AHEAD-

EMBEDDED GENERATING PLANT CONNECTED TO THE DNO'S DISTRIBUTION SYSTEMS AS SPECIFIED BY THE DNO

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
1. For individual Generation Sets the Set number and Generation Set capacity. Preferred outage dates earliest start date latest finish date.	MW Date	Years 3 ahead	Week 2	OD
2. DNO advise Generators of:-				
(a) details of Generating Plant they may withdraw from service.	Date	Years 3 ahead	Week 12	OD
(b) Output Usable requirements.	MW Date	Years 3 ahead	Week 12	OD
3. Generators provide DNO with				
(a) update of provisional Generating Plant outage programme.	Date	Years 3 ahead	Week 12	OD
(b) Registered Capacity .	MW			
(c) Neutral weekly Output Usable forecasts.	Date			
4. DNO following discussion with Generator will notify, with reason, revision to the provisional Generating Plant outage programme.	Date	Years 3 ahead	Week 28	OD
5. DNO following discussion with Generator will notify, with reason, revisions to the provisional Generating Plant outage programme. (This taking into account User outages received in Week 28).	Date	Years 3 ahead	Week 42	OD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
6. DNO following discussion with Users agree Users outages.	Date	Years 3 ahead	Week 43	OD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 7b

OPERATIONAL PLANNING - MEDIUM TERM

YEARS 1-2

EMBEDDED GENERATING PLANT CONNECTED TO THE DNO'S DISTRIBUTION SYSTEM AS SPECIFIED BY THE DNO

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
1. For individual Generation Sets the Set numbers and Generating Plant capacity. Preferred outage dates earliest start date latest start date.	MW Date	Years 1 - 2	Week 2	OD
2. Generators provide the DNO with estimates of:-				
(a) Output Usable	MW Date	Years 1 - 2	Week 10	OD
(b) outage programme	Date	Year 1		
3. DNO following discussion with Generator provide:-	Date	Years 1 - 2	Week 12	OD
(a) Details of Generating Plant they may withdraw from service for an outage				
(b) Update of Generator outage programme.				
4. DNO notify each Generator of Output Usable requirements.	MW Date	Years 1 - 2	Week 12	OD
5. Generator provides estimates of Output Usable of each Generating Plant .	MW Date	Years 1 - 2	Week 41	OD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 7c

OPERATIONAL PLANNING - SHORT TERM

EMBEDDED GENERATING PLANT CONNECTED TO THE DNO'S DISTRIBUTION SYSTEM AS SPECIFIED BY THE DNO

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
1. For individual Generation Sets the Set number and Generating Plant capacity. Duration of outage earliest start date latest finishing date.	MW Date	Weeks 9 - 52		
Output Usable estimates.	MW Date	Weeks 9 - 52	Week 2	OD
2. DNO informs Generators of Output Usable requirements.	MW Date	Weeks 9 - 52	Week 4	OD
3. Generators provide DNO with Generating Plant Output Usable estimates.	MW Date	Weeks 18 - 52	Week 10	OD
4. DNO informs Generators of change to Output Usable requirements.	MW Date	Weeks 18 - 52	Week 12	OD
5. Generators provide DNO with Generating Plant Output Usable estimates.	MW Date	Weeks 28 - 52	Week 25	OD
6. DNO informs Generators of changes to Output Usable requirements.	MW Date	Weeks 31 - 52	Week 27	OD
7. Generators will provide estimates of Generating Plant Output Usable .	MW Date	Weeks 44 - 52	Week 41	OD
8. DNO inform contracted Generators of changes to Output Usable requirements.	MW Date	Weeks 44 - 52	Week 43	OD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 7d

DATA REGISTRATION CODE

OPERATIONAL PLANNING USER PLANT AND APPARATUS

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>TIME PERIOD COVERED</u>	<u>UPDATE TIME</u>	<u>DATA CATEGORY</u>
Users provide the DNO with details of proposed outages which may affect the performance of the DNO's Distribution System . Details of trip testing, risks of trip and other information where known which may affect the security and stability of the DNO's Distribution System shall also be included.	Dates	Years 1 - 2 and Years 3 ahead	Week 28	OD
Update of previously submitted data for year 3 ahead.				
Following consultation with Users and DNO will include agreed outage proposals in the programme.	Date	Years 3 ahead Years 1 - 2	Week 43 Week 48	OD OD
As changes occur.	Update of Users proposals agreed in the Medium Term Plan.			

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 8

DATA REGISTRATION CODE

SYSTEM DESIGN INFORMATION

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
<u>General Information:</u>		DPD
<u>Type of load and control arrangements</u>		
<u>Maximum load on each phase at time of Peak Demand</u>		
<u>Fluctuating Loads:</u>		
Rate of change of Demand – Active Power and Reactive Power increasing and decreasing	MW/s MVA _r /s	DPD
Shortest repetitive time intervals between fluctuations in Demand Active Power and Reactive Power	s	DPD
Largest step change Active Power and Reactive Power increasing and decreasing	MW/s MVA _r /s	DPD
Maximum energy Demand per half hour	MWh	DPD
Steady state residual Demand (MW) between Demand fluctuations	MW	DPD
<u>Reactive Compensation</u>		
Rating of individual shunt reactors (not associated with cables)	MVA _r	DPD
Rating of individual capacitor banks	MVA _r	DPD
Details of any automatic control logic such that operating characteristics can be determined.	Text/ Diagrams	DPD
Point of connection to the System	Diagram	DPD
<u>Lumped Network Susceptance</u>		
Details of the equivalent lumped network susceptance of the User System referred back to the connection with the DNO's Distribution System .	MVA _r	DPD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
<p>Including shunt reactors which are an integrated part of a cable system and which are not normally in or out of service independent of the cable.</p> <p>Excluding independently switched reactive compensation connected to the User System and any susceptance of the User System inherent in the active and reactive Demand.</p>		DPD
<u>Fault Infeeds</u>		
Maximum and minimum short circuit infeeds into the DNO's Distribution System	MVA	DPD
X/R ratio under maximum and minimum short circuit conditions		DPD
[Contribution from rotating plant]		DPD
Equivalent network information at the request of the DNO		DPD
Interconnection Impedance		DPD
<p>For User interconnections that operate in parallel with the DNO's Distribution System details of the interconnection impedance shall be exchanged between the DNO and User, including</p> <p style="text-align: right;">Positive Sequence Resistance</p> <p style="text-align: right;">Zero Sequence Resistance</p> <p style="text-align: right;">Positive Sequence Reactance</p> <p style="text-align: right;">Zero Sequence Reactance</p> <p style="text-align: right;">Susceptance</p>	<p>% on 100</p>	<p>DPD</p> <p>DPD</p> <p>DPD</p> <p>DPD</p> <p>DPD</p>
If the impedance in the view of the DNO is low then more detailed information will be requested.		
Demand Transfer Capability		DPD
Information shall be exchanged on Demand transfer capability where the same Demand may be supplied from alternative DNO or User points of supply including the proportion of Demand normally fed from each point of supply	MW	DPD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
The arrangements for manual/automatic transfer under planned/outage conditions should be provided		DPD
Non - DNO System Data		
The DNO will request information on circuit parameters, switchgear and Protection arrangements	Text/ Diagrams	DPD
Transient Overvoltages		DPD
Demand Profile For Day Of Exit Point Peak Demand		DPD
Demand Profile For Day Of Exit Point Minimum Demand		DPD

DISTRIBUTION DATA REGISTRATION CODE (DDRC)

Schedule 9

DATA REGISTRATION CODE

LOAD CHARACTERISTICS

<u>DATA DESCRIPTION</u>	<u>UNITS</u>	<u>DATA CATEGORY</u>
Geographical and electrical point of connection and date connection required Diagrams existing and proposed connections	Text	SPD
Types of Demand :-		
Maximum Active Power Demand Registered Capacity	MW	SPD
Maximum and minimum Reactive Power requirement	MVAr	SPD
Type of load and control arrangements. Eg variable speed motor type of starter employed	Text	SPD
Maximum phase unbalance	Amp/ Phase at the time	SPD
Maximum harmonic content	% THVD	SPD
Fluctuating Loads:- Graphical indication of typical cycle variation of Demand (Active / Reactive)	Graphical	SPD
Load Management Data	Text	
Maximum short circuit infeed based on Generation Set subtransient reactance	MVA	SPD
Maximum zero phase sequence impedance of the User's System at the connection point	% on 100 MVA	SPD
2 hour Demand profiles for Peak Demand	MW and MVAr	SPD
Monthly Peak Demand variation	MW and MVAr	SPD

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITIAN

**Issue 2 of The Distribution Code of
Licensed Distribution Operators of Great Britain**

March 2003

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

NOTE - This Guide is provided to prospective Users of the **DNO's Distribution System** for their information only and does not constitute part of the Distribution Code. Terms defined in the Distribution Code have initial capitals.

The Guide describes the provisions of the Distribution Code, which are mainly of a technical nature, in the context of the overall commercial and administrative arrangements for connection to the Distribution System covered in the Distribution Licence.

1. ELECTRICITY SUPPLY INDUSTRY

The principal functions within the Electricity Supply Industry are Generation, Transmission, Distribution, Supply and Metering.

1.1 Generation

Electricity is generated from a number of fuels, principally from nuclear energy, natural gas, coal, and water. A number of renewable sources are under continual development and output from wind, waste and biomass sources is expected to increase.

1.2 Transmission

The major Power Stations are connected to the Transmission System (The Grid) which operates as a fully interconnected system within Scotland, England and Wales. The Grid operates at 275kV and 400kV. The 132kV network in Scotland is also classed as part of the Transmission System but this is not the case in England and Wales. The Transmission System provides a secure supply of electricity to Grid Supply Points, ie the Grid Exit Points, which are also the Entry Points to the Distribution System, and also to the Exit Points for Customers with large or special Demands.

1.3 Distribution

The Distribution System operates at nominal voltages of 66kV, 33kV and 22kV (EHV), 11kV and 6.6kV (HV) and 400 volts and 230 volts (LV). The 132kV network in England and Wales is also classed as part of the Distribution System but this is not the case in Scotland. The Distribution System provides a supply to the Exit Points to all remaining Customers for industrial, commercial and domestic purposes. The voltage of the connection depends on Demand, the purpose for which the supply is used and the local technical requirements of the Distribution System. An increasing output from small Generators is connected directly to the Distribution System and these are termed Dispersed, Distributed or Embedded, Generators. The terms are synonymous and Embedded will be used throughout the Distribution Code.

1.4 Supply

The Supply Function deals with the marketing of electricity, billing and commercial aspects of the use of electricity.

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

1.5 Metering

Metering is used to measure real time power flows within the various Systems to allow them to be operated within ratings and to match supply with Demand. Metering is also used to record the amount of electrical energy produced by Generators, transferred over the grid and onto the Distribution System. Metering also records the amount of energy consumed by Customers and Suppliers for billing purposes.

2 PRINCIPAL ORGANISATIONS

The following outlines the principal organisations involved in fulfilling the functions described above.

- (a) The DNOs, as holders of Distribution Licences under the Electricity Act 1989 as amended, who own and operate the Distribution System, and who are under a statutory duty to provide a connection to the Distribution System and to distribute electricity on request.
- (b) Generators who are licensed under the Electricity Act 1989 as amended or licence exempt and who are independent of the DNOs.
- (c) Suppliers who supply electricity under licence or exemption under the Electricity Act 1989 as amended. There is only one class of licensed Supplier and the term “Public Electricity Suppliers (PES)” is now defunct. However certain Suppliers including the supply businesses of the former PESs continue to have a statutory obligation to supply electricity on request.
- (d) Customers with Own Generation who have Generating Plant for supplying their own needs, although they may sell a certain amount of electricity without a licence.
- (e) The Distributors’ Metering Businesses which own metering assets and provide metering services and Licensed Meter Operators.

3 PRINCIPLES OF AN INTERCONNECTED SYSTEM

3.1 General

The benefits of the interconnection of individual generating stations and the supply of electricity from such interconnected systems to discrete load centres have long been recognised worldwide. High Voltage interconnected systems confer on electricity supply the advantages of increased security of supply and greater economy arising from the immediate accessibility of the required mix of generation at any time.

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

3.2 Demand Forecasting

Since electricity cannot be stored in bulk until it is needed it has to be generated in the correct quantities at virtually the instant it is required, otherwise the supply voltage and frequency will deviate outside fairly narrow statutory limits with both undesirable and possibly harmful effects. Because of this property it is necessary to forecast total Demand from all Suppliers on a daily basis so that the minute-by-minute operation of Power Stations can be scheduled. A mismatch will immediately affect the quality of supply to Suppliers' Customers and can arise from unexpected occurrences like sudden changes in weather leading to large swings in the Demand for electricity or breakdowns on the interconnected system or on Generating Plant. It normally takes several hours for Generation Sets to become available. Therefore to offset the effect of any occurrences a reserve or security margin of Generating Plant is required to be available to provide electricity at very short notice. It is also necessary to forecast Demand in the longer term to programme the reinforcement of the interconnected network.

3.3 System Security

Standard procedures are necessary to ensure that the interconnected system is developed, operated, maintained and used to transmit and distribute supply to the load centres and Suppliers' Customers in a secure and efficient manner during normal and abnormal conditions. It is necessary to specify the technical requirements for the development of the interconnected system and the technical requirements for connection to it. Any failure to meet with these minimum requirements can lead to reduced security and efficiency or to disturbances or events causing undesirable effects on the System. It is also necessary to plan outages of Generation Sets and of the interconnected system to preserve Demand Control and match generation to Demand.

3.4 Industry Structure

In Scotland, electricity transmission and distribution is operated by each of Scottish Hydro Electric Power Distribution Ltd and SP Distribution Ltd, which both also have interests in generation and electricity supply. In England and Wales transmission is operated by the National Grid Company which has no interests in generation and supply in Great Britain. DNOs own and operate the Distribution System and some DNOs are also involved in generation and supply of electricity. Generation and supply are fully competitive activities and the Distribution Licences applicable to all companies require that Distribution Businesses are operated as separate businesses, promote competition, do not discriminate between different Users of the System and maintain confidentiality of information. In addition, there is an opportunity for competition in the construction of connections to the Transmission and Distribution Systems.

The electricity market also operates differently in Scotland and England and Wales. The differences in structure and market operation lead to some differences in terminology and information exchange requirements. However the technical requirements of Distribution Systems are identical and a common Distribution Code has been adopted for Great Britain as a whole, with a small number of alternative provisions for Scotland and England and Wales.

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

4 GRID AND DISTRIBUTION CODES

It is a requirement of the Licences that Codes be prepared and at all times be in force covering all technical aspects relating to connection to and the planning, operation and use of the interconnected system, and the operation of electrical lines and electrical Plant and Apparatus connected to that System. There are two such Codes which will apply to the appropriate parts of the System and to those who are connected to it.

- (a) The Grid Code which is a condition of the Transmission Licence and relates to the Transmission System and connections to it.
- (b) The Distribution Code which is a condition of the Distribution Licence and relates to the Distribution System and connections to it.

The Grid Code and the Distribution Code are approved by the Authority. The Office of Gas and Electricity Markets (Ofgem fulfils the function of the Authority) and are essential to ensure that the total electricity supply System operates efficiently, so as to provide, as far as is reasonably practicable, a secure high quality supply to Customers.

The relationship between the Grid Code and the Distribution Code is shown diagrammatically in the relevant Figure 1 to this Guide.

5 DISTRIBUTION CODE

5.1 General

The Distribution Code covers all material technical aspects relating to connections to and the operation and use of the Distribution Systems of the DNOs. However, it is not exhaustive as to the requirements to be complied with by those connected to the Distribution System who must also comply with the requirements of the Electricity Act 1989, the Electricity Supply Regulations and all other relevant legislation which from time to time comes into force.

The principles contained in the Distribution Code shall apply to all Users, ie all persons and companies connected to the Distribution System:

- (a) Customers, classified by Demand and connection voltage. (It is not intended that the Distribution Code should generally apply to small Customers individually; their obligations will be dealt with on their behalf by their Suppliers.
- (b) Suppliers
- (c) Embedded Generators classified by output and connection voltage
- (d) Other Authorised Distributors connected to the System
- (e) Meter Operators, via Suppliers

The Distribution Code does not deal with charges and other commercial terms relating to

- (a) A connection to the System
- (b) Supplies of electricity

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

- (c) The use of the Distribution System for the transport of electricity.

Statements setting out the principles of connection to and use of the Distribution System are covered in the Distribution Licence and summarised in this Guide. Further details and the calculation of such charges, together with current prices, are available from the DNO.

5.2 Distribution Code Review Panel

The DNOs are required to maintain a Distribution Code Review Panel comprising representatives of the DNOs, Ofgem and Users. The Panel maintains an ongoing review of the Distribution Code and its workings.

Users can pass to the Panel suggestions for changes to the Distribution Code at any time. Users can also ask the Panel to issue guidance in relation to the implementation, performance and interpretation of the Code.

5.3 Distribution Code Sections

The Code is prepared by the DNOs and is specifically designed to:

- (a) Permit the development, maintenance and operation of an efficient co-ordinated and economic system for the distribution of electricity.
- (b) Facilitate competition in the generation and supply of electricity.

The Code covers the Distribution Systems of the DNOs which are defined so as to include Equipment at 33kV and below in Scotland and 132kV and below in England and Wales.

The Code comprises several sections which identify the responsibilities of both the host DNO and Users with regard to connection to and use of the Distribution System:

- (i) **Glossary and Definitions**, defines terms used in the Distribution Code.
- (ii) **Introduction** to the Distribution Code.
- (iii) **General Conditions**, apply to all aspects of the Distribution Code and are intended to ensure that the Code works to the benefit of all Users.
- (iv) **Planning and Connection Code**, specifies technical, design and operational criteria and procedures applied by DNOs in planning and developing the Distribution System and with which Users must comply when seeking a connection.
- (v) **Operating Code**, sets out operating procedures at the interface with Users and requires Users of the Distribution System to provide load and/or generation output information to the DNOs.
- (vi) **Data Registration Code**, provides guidelines for the collection and assembly of information exchanged between Users and DNOs under the various sections of the Distribution Code.

Subsequent sections of this Guide consider in turn the main Distribution Code sections.

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

5.4 Distribution Planning and Connection Code

The Distribution Planning and Connection Code specifies technical and design criteria and the procedures to be applied by DNOs and Users in the planning and development of the Distribution System, including information exchange.

In the event that reinforcement or extension of the Distribution System is required, the Distribution Licence imposes an appropriate timescale for the exchange of information between the DNO and Users subject to all parties observing, where appropriate, the confidentiality of such information.

5.4.1 Design Principles and Standards (DPC4)

The characteristics of the Distribution System which must be provided by the **DNO** are specified in DPC 4.2, including security of supply and voltage and frequency limits.

The technical requirements for small Customers taking low voltage supplies of 100 amps and less are specified in DPC 4.3. Installations complying with BS7671 Requirements of Electrical Installations (wiring regulations) are deemed to comply with the Distribution Code.

The general technical requirements for larger installations are specified in DPC 4.4 which makes reference to Electricity Supply Industry Standards covering earthing arrangements. More complex requirements for High Voltage Customers, are specified in DPC 6 and DPC 8.

5.4.2 Network Statements (DPC4.5)

The DNO is required by the Authority (Ofgem) to prepare a Long Term Development Statement, for the whole of the DNO's Distribution System, which gives information to assist prospective and existing Users when developing their distribution arrangements with the DNO.

In addition to this, prospective or existing Users can request a more detailed statement from the DNO showing its best estimate and forecast of the present and future circuit capacity, power flow and loading on the part or parts of the relevant Distribution System specified in the request.

This requested statement must be prepared as soon as practicable and in any event within 28 days of the requester agreeing to meet the cost of providing the information (see below), unless due to the complexity of the request, a longer timescale is sought by the DNO within 10 days of the request and agreed by Ofgem.

The Code makes it clear that the requested statement shall include:

- (a) Such further information as the DNO considers necessary to the requester in the assessment of opportunities available for connection to or use of the Distribution System specified in the request.
- (b) If so requested, a commentary setting out the DNO's view as to the suitability of that part of the System for the purpose specified in the request.

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

The DNO will only omit supporting information from the statement on the grounds of confidentiality as required by the Distribution Licence. The omission of information will not invalidate the conclusions of the statement.

5.4.3 Charges for Information

A provision in the Distribution Licence allows the DNO to charge for providing such Planning Statements. These charges relate to reasonable costs in providing the statement. The exact procedure is as follows:

- (a) The DNO may within 10 days of receipt of a request provide an estimate of its reasonable costs in preparing any statement.
- (b) Provision of the requested information is conditional on the requester agreeing to pay the amount estimated or such other amount as Ofgem may direct, on application of the DNO or the person requesting such statement. on payment of the DNO's estimated costs or, such other amount as Ofgem may direct.
- (c) The DNO must provide the information within 28 days of the date of the request, or if the DNO has provided an estimated cost for providing data, within 28 days of the date on which agreement to pay the charge is received.

5.4.4 Exchange of Information (DPC5)

DPC 5 (General Requirements for Connection) specifies the connection arrangements, and information requirements, in separate sections for small and large Users. The information required includes Active Power and Reactive Power requirements and information about disturbing loads to ensure that they comply with the standards referred to in DPC4 (5.4.1 above).

5.4.5 Embedded Generators (DPC7)

Embedded generation, that is generation directly connected to the Distribution System or Customers With Own Generation, can have a significant effect on Distribution Systems and the DNO will need to assess the impact of specific projects. Generators are classified by voltage and output power and the detailed technical standards to be applied and information required from Embedded Generators is set out in a composite section of the Planning and Connection Code (DPC7).

5.4.6 Application for Connection Procedures

Any person seeking to establish new or modified arrangements for connection to and/or use of the Distribution System must make their application to do so on standard forms provided by the DNO. However, in the case of large or technically complex connections full details appropriate to the scheme should be provided. The DNO will provide guidance in cases where the standard forms are not appropriate and full details are required.

Under the Competition in Connections policy applicants for new or modified connections may wish to take responsibility for some aspects of the associated work. The DNO will provide details of the scope and implications of contestable work on request.

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

5.4.7 Typical Areas for Discussion

During the Application Process the following is typical of the issues to be discussed.

- (a) Will the System take X amount of additional power without upgrading? If not, how much will it take before a major upgrade is required?
- (b) If there are network constraints, what are they? Are they acceptable? A constraint may reflect a system capacity limit which requires the System to be switched off for maintenance work. This may be for as little as one day per annum, or substantially longer and more frequent.
- (c) Are there any major upgrading works scheduled in the area over the next 5 years which will reduce any connection costs?
- (d) Can the amount of power required be provided by the local System without major upgrading, and at reasonable cost?
- (e) By how much can the required supply capacity be increased without necessitating major upgrading? If a System upgrade is required what are the mechanisms for allocating the costs and benefits associated with the upgrade?
- (f) What will be the supply voltage? Are there other options and what are the implications of the other options?
- (g) How reliable is the supply (in statistical terms)? How will the supply be provided? Will it be mainly by overhead line, or by underground cable?

5.4.8 Requirement to Offer Terms

DNOs are required by the Distribution Licence to offer terms under which they are prepared to enter into an agreement with the applicant for establishment of the proposed new or modified connection to and/or use of the DNO's Distribution System.

The offer will be made as soon as is practicable after receipt of an application containing all such information as the DNO may reasonably require for the purposes of formulating an offer and (save where the Authority (Ofgem) consents to a longer period) in any event not more than 28 days in the case of an application for use of System only or not more than 3 months in the case of an application for connection or use of System with connection. The offer shall specify, and the terms shall take account of, any works required for the extension or reinforcement of the DNO's Distribution System or the Transmission System necessitated by the applicant's proposed activities and for the obtaining of any consents necessary for such purposes.

The extension or reinforcement required to the DNO's Distribution System or the Transmission System to accommodate an application may be of such magnitude or complexity that the DNO considers that analysis of the proposal cannot reasonably be concluded within the specified timescale. In such circumstances, the Authority may agree to an extension, in which case the DNO shall, within the original timescale, provide a preliminary offer, indicating those areas which require more detailed analysis. On receipt of the preliminary offer, the User shall indicate whether it wishes the DNO to undertake the work necessary to proceed to a firm offer within a timescale to be specified by the Authority.

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

Where an offer made has lapsed or has been rejected by the applicant, the DNO shall refer to the Authority for his consideration, any further application received from that applicant within twelve months of the original application if, in the view of the DNO, the further application does not represent a significant change from the original application. The DNO shall not proceed with consideration of the further application unless and until the Authority confirms he considers the applicant to be acting reasonably under the terms of the Distribution Code.

5.4.9 Right to Reject an Application

The DNO shall reject an application for connection to or use of the DNO's Distribution System only if it considers that any offer of terms for establishment of the proposed arrangements would place the DNO in breach of statutory obligations or other regulatory or licence conditions or if the applicant does not agree to comply with the Distribution Code.

5.4.10 Information Provided by the DNO

Once committed by signature the Connection/Use of System Agreement constitutes a contract between the DNO and the User. A signed contract may (but not always) reduce the scope for referring areas of dispute to Ofgem for determination. Users may wish to discuss these issues with Ofgem to satisfy themselves in this respect before signing a contract.

The contract includes a condition requiring both parties to comply with the Code. In particular for connection at High Voltage, both parties are required to sign a site responsibility schedule detailing the division of responsibility in relation to ownership, control, operation and maintenance of Plant and Apparatus. The Connection/Use of System Agreement requires the DNO to provide:

- (a) Details of any capital related payments arising from necessary reinforcement or extension to the company's Distribution System or Transmission System, and if required.
- (b) Detailed costing arrangements for the supply of Standby and Top-up facilities.

5.4.11 Information Required From Users

Prospective and existing Users are required to provide sufficient Planning Data as requested by the DNO to allow compliance with its Distribution Licence. The required Planning Data is allocated to one of two categories, Standard Planning Data and Detailed Planning Data. The DNOs can provide proforma schedules for the submission of both Standard and Detailed Planning Data, although every effort will be made to minimize the complexity and detail of the data requested.

These schedules are included in the Distribution Data Registration Code section of the Distribution Code.

Standard Planning Data include items such as:

- (a) The location of the connection and the date when connection is required.
- (b) A requirement for diagrams (single line) of Plant and Apparatus and the type and electrical loading of equipment.

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

- (c) Maximum and minimum parameters for Active Power Demand, Reactive Power etc. and details of any load management scheme adopted by the Active Power.

Detailed Planning Data, when required, includes data relating to Demand and load fluctuation. In some cases detailed information may need to be provided to allow a full assessment of the effect of the Users load on the Distribution Systems.

5.4.12 Status of Planning Data

For Distribution Planning and Connection Code purposes, planning data supplied by Users may be allocated to one of three status levels which provided a progression related to degrees of commitment and validation, as follows:

- (a) **Preliminary Project Planning Data** - Data supplied by a User in conjunction with an application for connection or use of System shall be considered as Preliminary Project Planning Data until such time as a binding Connection/Use of System Agreement is established between the DNO and the applicant. This data shall be treated as confidential by the DNO.

Preliminary Project Planning Data will normally contain only Standard Planning Data, unless Detailed Planning Data is required to permit more detailed System studies by the DNO.

- (b) **Committed Project Planning Data** - When a Connection/Use of System Agreement is established, the data relating to the User's development, and subsequent data required by the DNO under the Distribution Planning and Connection Code, shall have the status of Committed Project Planning Data. This data shall form the background against which any further applications from other Users shall be considered and against which planning of the DNO's Distribution System shall be undertaken. Committed Project Planning Data may contain both Standard Planning Data and Detailed Planning Data.

- (c) **Registered Project Planning Data** (For Users other than at Low Voltage) - The Distribution Planning and Connection Code requires that, before an agreed connection may be physically established, any estimated values contained within the Committed Project Planning Data shall be replaced, where practicable, by validated actual values and as appropriate by updated forecasts for future data items such as Demand. Data provided at this stage is termed Registered Project Planning Data. Registered Project Planning Data may contain both Standard Planning and Detailed Planning Data.

5.5 Distribution Operating Code

The objective of the Operating Code is to set out operating procedures at the interface with Users and to facilitate the exchange of information necessary to allow the DNO to operate the System so as to ensure maximum security and stability.

The Operating Code covers a number of specific aspects for which information and detailed procedures are required. Categories of information are identified by schedules in the Distribution Data Registration Code that are designed for the provision of the specific information:

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

- (a) **Demand Forecasts** (DOC1) Generators and Customers whose Demand is greater than 5MW are required to provide information of their Demand as specified in DOC1.
- (b) **Operational Planning** (DOC2) This section covers information intended mainly for Embedded Generators although operational procedures will need to be agreed with High Voltage Customers regarding planned plant maintenance which may affect the Customer's operations.
- (c) **Testing and Monitoring** (DOC 5) To ensure that the Customer is not operating outwith the parameters of the Connection Agreement, the DNO has the right to test and monitor the Customer's supply at the Connection Point. The DNO must advise the Customer that tests are to be carried out and will make results available. The Customer may witness any of the tests carried out. Should the DNO establish that the Customer is operating outwith the agreed parameters the Customer faces the ultimate possibility of being disconnected from the Distribution System.
- (d) **Demand Control** (DOC 6) In cases of extreme emergency, due to plant breakdown for example, where available Generating Plant is insufficient to meet the total Demand of Customers, it will be necessary to reduce the load on parts or all of the Distribution System. This section sets out the alternative methods which may be applied. Until the emergency has passed, Customers may be subject to rota disconnections.
- (e) **Operational Liaison** (DOC 7) The Customer must nominate a person to be contacted and advised by the DNO's nominated person of the possible risk of System disturbance or System security caused by Operations or Events on the Distribution System.
- (f) **Safety Co-ordination** (DOC 8) This section sets out the responsibilities and requirements when working at or across the Operational and Ownership Boundaries.
- (f) **Contingency Planning** (DOC 9) This section describes procedures to be undertaken following a complete or partial failure of the Distribution and Transmission Systems or civil emergency.
- (h) **Event Reporting** (DOC 10) Any major incident, such as a fault on Customers System, must be reported by the Customer to the DNO. Any oral report must be confirmed by a full written report as soon as possible after the incident.
- (i) **Numbering and Nomenclature** (DOC 11) The DNO will be responsible for providing the Customer with circuit/apparatus, numbering/nomenclature at own ownership boundaries in accordance with agreed standards. Such information for new installations will be provided on an Operation Diagram as soon as possible.
- (j) **System Test** (DOC 12) When the DNO or User intends to carry out a System Test which may affect supply to other Customers the DNO must inform all affected Customers in writing, giving details of the nature and purpose of the proposed System Tests. There are laid down time periods within the Code for giving Customers prior warning of any tests.

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

5.6 Distribution Data Registration Code

The Distribution Data Registration Code collates in a readily identified form the information exchanged between the DNO and Users under the various sections of the Code.

Data required by the DNO is allocated to one of three categories:

- (a) **Standard Planning Data** is that data listed in the Planning and Connection Code which is required to be supplied by all Users when making application for connection to and/or use of the DNOs' Distribution System.
- (b) **Detailed Planning Data** is that data listed in the Planning and Connection Code which is required to be supplied by the User. This is more specific data relating to Demand, fluctuating loads etc. which could adversely affect the Distribution System. There may be some relaxation of the requirement to provide detailed planning data in the case of small Embedded Generators.
- (c) **Operational Data** is data which is required by the Distribution Operating Code and should be supplied in accordance with the timetables set down in the relevant operating codes.

5.6.1 Procedures and Responsibilities

Data must be submitted to the DNO in writing and, where required, in the format of the schedules included in the Distribution Data Registration Code. These schedules are structured to serve as standard formats for data submission.

The registration code identifies procedures in the event that Users may wish to change data submitted or already registered with the DNO.

There is provision for the DNO to estimate data which Users have failed to supply. However, DNOs must notify Users in writing of any estimated data it intends to use.

A specific requirement of the Planning Code is that Registered Data is updated by Users on an annual basis.

6 CONNECTION TO THE DISTRIBUTION SYSTEM

6.1 Electricity Suppliers

Supplies of electrical energy to Customers within the DNO's authorised supply area will be made by the licensed Suppliers or exempted Suppliers. Each will be entitled, under a specific Agreement(s), to use both the Transmission and Distribution Systems for the transport of electrical energy from the Generating Plant to Customers.

By virtue of the conditions of its Distribution Licence, the DNO is obliged to offer use of its Distribution System to all Supply Businesses. The Licence provides that in doing so the DNO must not discriminate in favour of any Supply Business.

6.2 Connection Types

There are two types of connection to the DNO's Distribution System, namely:

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

- (a) Entry Point: That is the connection between the DNO's Distribution System and the point where electricity enters the System, usually the Transmission System or an Embedded Generator.
- (b) Exit Point: That is the connection between the DNO's Distribution System and either the premises where the electricity is consumed or, in some cases, another Distribution System (owned, for example, by another Distributor and termed Other Authorised Distributor).

Note:- A connection may be an Entry and an Exit Point (Customer With Own Generation)

The DNO's Distribution System may also be used

- (a) To transport electricity between Entry and Exit Points.
- (b) For the provision of Standby and/or Top-up supplies of electricity.

6.3

Connection Agreements and Use of System Agreements

Use of the Distribution System may require a Customer to sign a specific agreement(s) with the DNO. The following is given as a guide and is not intended to be exhaustive.

- (a) Large power Customers shall be required to sign a Connection Agreement. In most cases low voltage Customers will only be required to sign a Supply Agreement with their Supplier.
- (b) Embedded Generators shall be required to sign an Embedded Generator Connection Agreement, including specific technical and operating requirements, and may also require a Use of System Agreement.
- (c) Suppliers shall be required to sign a Use of System Agreement.
- (d) Top up and Standby agreements may be required by:
 - (i) A Supplier.
 - (ii) A Customer With Own Generation.
 - (iii) A Customer with an alternative supply not provided via the DNO's Distribution System.

A prospective User, once committed by signature of a Connection/Use of System Agreement, is termed a "Committed User".

A Connection/Use of System Agreement will constitute a contract between the DNO and the User, including as appropriate within its terms and conditions:

- (a) A condition requiring both parties to comply with the Distribution Code.
- (b) Details of the rates forming the basis of Use of System Charges.
- (c) Details of capital related payments arising from necessary reinforcement or extension of the Distribution or Transmission System.
- (d) Details of any ongoing charges for special services such as regular ongoing System studies or abnormal System management requirements.

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

- (e) A condition requiring both parties to sign a Site Responsibility Schedule, detailing the divisions of responsibility at interface sites in relation to ownership, control, operation, maintenance of Plant and Apparatus and to safety of persons.

Detailed costing arrangements for the supply of standby and top-up facilities, if required, to cover any shortfall in contract quantities of electricity delivered by a Generator to a Supplier under a Connection/Use of System Agreement shall be the subject of a top-up and standby supply agreement.

6.4 Consents and Statutory Obligations

Depending on the size and type of a Users installation which is to be connected to the DNO's Distribution System, a User may have obligations in connection with obtaining consents and satisfying statutory obligations associated with the connection referred to in DPC1.5.

6.4.1 An offer by the DNO to a User for connection or use of the DNO's Distribution System may be conditional upon the outcome of any or all of the following procedures relating to an extension or reinforcement of the DNO's Distribution System or the Transmission System to permit a development by the User:

- (a) An application for planning consent.
- (b) Negotiations with landowners or occupiers for consent to place Plant and Apparatus on or across their land.
- (c) The submission of an environmental assessment statement.
- (d) A Public Inquiry.

6.4.2 A User whose development requires the DNO to engage in any of the procedures referred to in 6.4.1 or any other statutory procedure which would not otherwise be necessary shall:

- (a) Provide any necessary supporting information or evidence.
- (b) Ensure attendance at a Public Inquiry by such witness as the DNO may reasonably request.
- (c) Bear the cost incurred in compliance with 6.4.2 (a) and (b).

6.4.3 If planning consent is granted, but is conditional upon a change in the design arrangements originally offered by the DNO (eg undergrounding), then the DNO shall make a revised offer to the User, including revised terms and timing. This revised offer shall form the basis of any Connection Agreement/Distribution Use of System Agreement.

6.4.4 If any necessary consent is not granted, the DNO shall not be obliged to fulfil any Connection Agreement/Distribution Use of System Agreement

6.5 Approval to Connect

Depending on the size and type of a User's installation which is to be connected to the DNO's Distribution System a DNO may specify procedures to approve the technical compliance of the User's installation and commissioning procedures to energise the connection, as provided for in DPC5.3.3. These procedures may have some or all of the typical features specified below:

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

6.5.1 Readiness to Connect

6.5.1.1 A User, whose development is under construction in accordance with a Connection Agreement and who wishes to establish connection with the DNO's Distribution System, shall apply to the DNO by submitting a standard connection card or otherwise in writing, stating readiness to connect and giving the following:

- (a) Confirmation that the User's installation complies with the principles outlined in Regulation 27(2) of the Electricity Supply Regulations.
- (b) Where appropriate update the Distribution Planning and Connection Code data based on actual values.
- (c) Where appropriate update forecasts for future operational data as listed in the Distribution Data Registration Code.
- (d) A proposed connection date.

6.5.1.2 The DNO may request a User to provide, in addition to his written application to the DNO for connection in accordance with 6.5.1.1, a report certifying to the DNO that all matters required by DPC4 have been considered and that DPC5 to DPC8 inclusive have been complied with by the User and incorporating:

- (a) Type test reports and test certificates produced by Nationally Accredited Laboratories showing that the Plant and/or Apparatus specified in the Distribution Planning and Connection Code meet the criteria specified.
- (b) Copies of the manufacturers' test certificates relating to Plant and/or Apparatus referred to in the Distribution Planning and Connection Code, including measurements of positive and zero sequence impedance of Apparatus which will contribute to the fault current at the point of connection.
- (c) Details of Protection arrangements and settings under DPC6.3.
- (d) A certificate declaring the maximum short circuit current in Ampere which the User's System would contribute to a three- phase short circuit at the point of connection, and the minimum zero sequence impedance of the User's System at the Connection Point and taking into account the contributions of any Generation Set or Power Station motors.
- (e) Confirmation that design conforms with the standards referred to in DPC4.
- (f) A list of persons appointed by the User to undertake, and to be responsible for, the application and removal of **Safety Precautions** on those parts of the User's System which are directly connected to the DNO's Distribution System.
- (g) A list of names and telephone numbers of responsible management representatives in accordance with Distribution Operating Code DOC.9.
- (h) Site Common Drawings as specified in the Connection Agreement.
- (i) A single line diagram of the User's Apparatus showing all items to which the Distribution Planning and Connection Code applies.
- (j) Information to enable the DNO to prepare a Site Responsibility Schedule as DPC5.4.3.

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

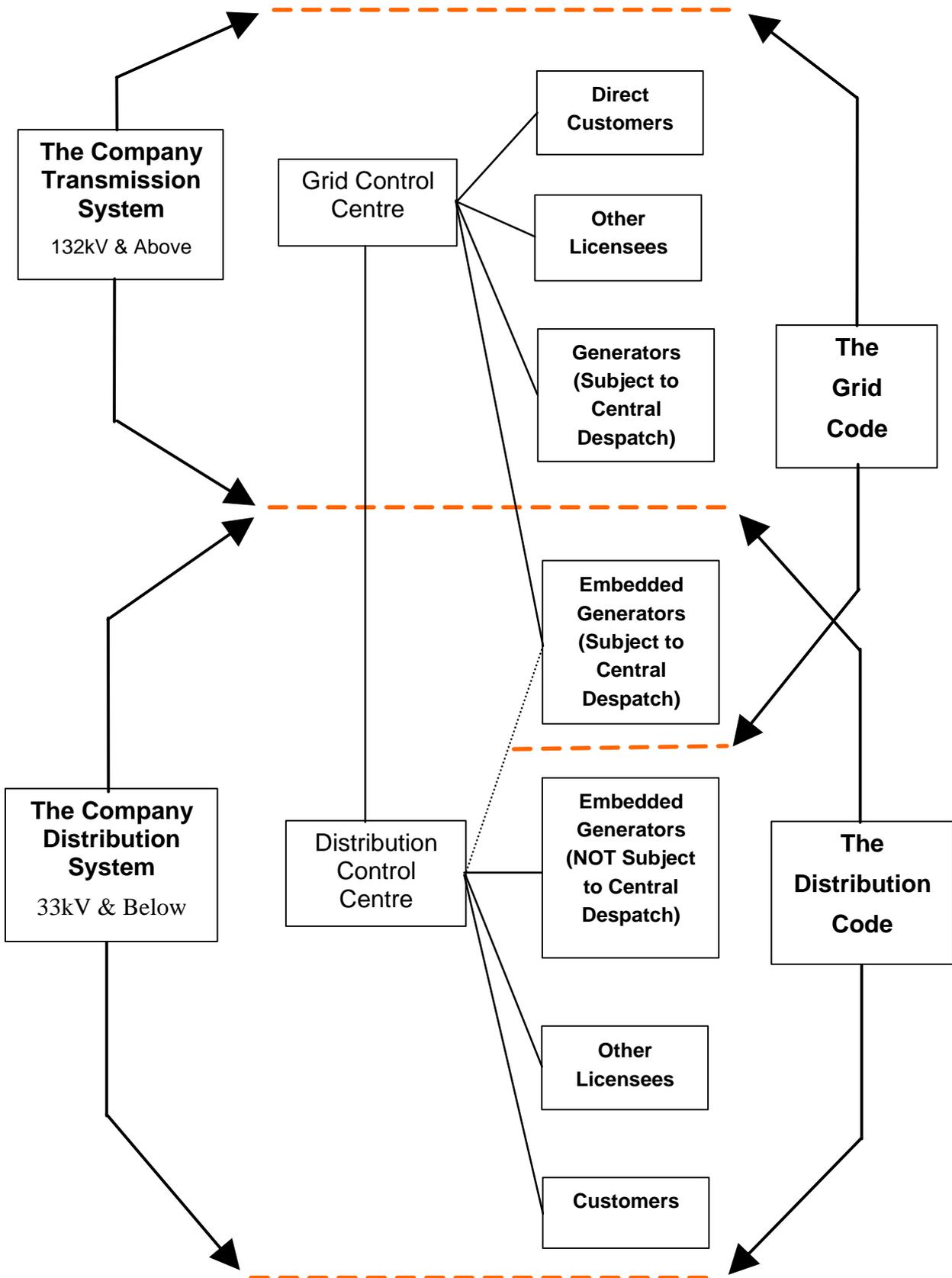
- 6.5.1.3 For connections at High Voltage, the User shall provide a proposed commissioning programme, giving at least six weeks notice of the proposed connection date, and detailing all proposed site testing of main and ancillary Equipment, together with the names of the organisations who are to carry out such testing.
- 6.5.1.4 The DNO shall be entitled to witness site testing of Equipment whose performance can reasonably be regarded as affecting the integrity of the DNO's Distribution System. The User shall provide the DNO with certified results of all such tests and the DNO may withhold agreement to energise the User's Equipment where test results indicate that the Distribution Planning and Connection Code have not been satisfactorily complied with.
- 6.5.1.5 Where in advance of the proposed connection date, a Generator requires connection to the DNO Distribution System for the purpose of testing, the Generator will require satisfying the DNO of the following:
- (a) Compliance with the requirements of the Connection Agreement.
 - (b) Provision of a commissioning programme supplied by the Generator and agreed with the DNO to allow commissioning tests to be co-ordinated in a manner detailed in Distribution Operating Code DOC-12 – "System Tests".

6.5.2 Confirmation of Approval to Connect

- 6.5.2.1 The DNO shall inform the User whether or not the DNO considers the requirements of 6.4.1 and requirements of the Distribution Planning and Connection Code are satisfied and the making of the connection is approved subject to satisfactory results of those tests which cannot be performed prior to energisation of the User's Plant and Apparatus. Where approval is withheld, detailed reasons shall be stated.
- 6.5.2.2 When indicating agreement to the energisation of a connection, the DNO shall specify the contents and sequence of the energisation programme and associated testing and shall be entitled to postpone or suspend the programme where, due to circumstances which could not reasonably have been foreseen by the DNO, continuation of the programme would impose an unacceptable level of risk to the integrity of the DNO's Distribution System.
- 6.5.2.3 Detailed costing arrangements for the supply of standby and top-up facilities, if required, to cover any shortfall in contract quantities of electricity delivered by a Generator to a Supplier under a Connection Agreement /Distribution Use of System Agreement shall be the subject of a top-up and standby supply agreement.

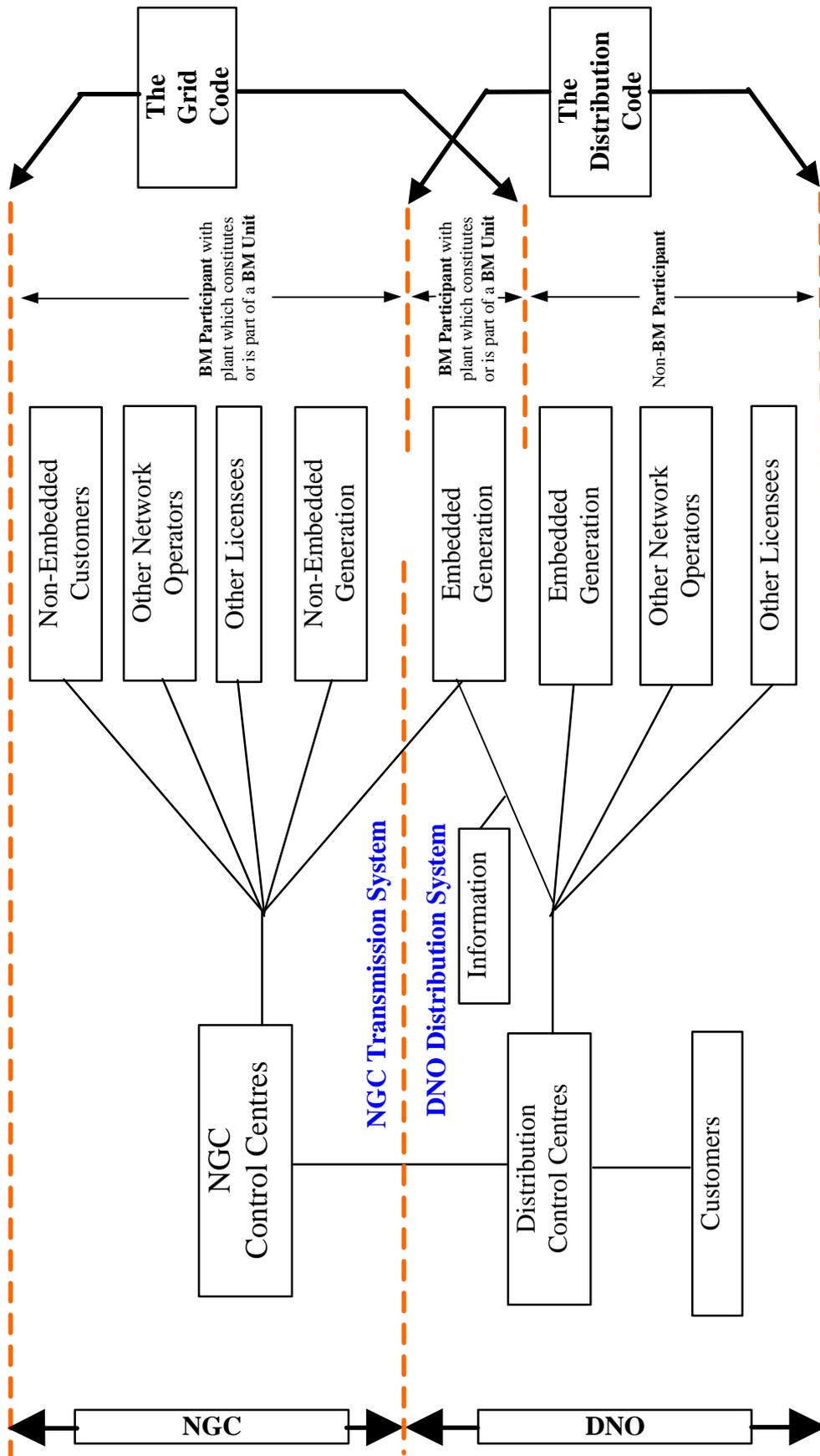
GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

Figure 1a - Grid Code & Distribution Code Boundaries (Scotland)



GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

Figure 1b - Grid Code & Distribution Code Boundaries (England and Wales)



GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

APPENDIX 1 - CATEGORIES OF Users OF THE DISTRIBUTION System

Category A Users are those having a connection at 1 kV or above (HV)

- A1. Embedded Generators including CWOOGs having an output capacity of 5 MW and above, or 1 MW in the case of Scottish Renewable Generating Plant.
- A2. Embedded Generators including CWOOGs having an output capacity of less than 5 MW, or 1 MW in the case of Scottish Renewable Generating Plant.
- A3. Customers without generation having a Demand of 5 MW and above.
- A4. Customers without generation having a Demand of less than 5 MW.

The classification threshold of 5 MW is related to the obligations that a **DNO** has for providing aggregated **Demand** information to NGC. Generators are further classified by voltage of connection and capacity for the purposes of technical standards.

Category B Users are those having a connection at below 1 kV (Low Voltage)

- B1. Embedded Generators (including CWOOGs) irrespective of capacity of fuse(s) or other Protection device(s).
- B2. Customers who are the sole Customer with a connection to the Low Voltage side of a High Voltage to Low Voltage transformer, irrespective of the capacity of fuse(s) or other protection device(s).
- B3. Customers without generation and having a single or three phase supply protected by fuse(s) or other device(s) rated at more than 100 amps.
- B4. Customers without generation having a single phase or three phase supply protected by a fuse(s) or other device(s) rated at 100 amps or less.
- B5. Customers with Unmetered Supplies.
- C. Suppliers including licence exempt Suppliers, unless otherwise stated.
- D. Other Authorised Distributors connected to the DNO's Distribution System, being licensed or licence exempt Distributors.
- E. Meter Operators (This Distribution Code does not place any direct obligation on Meter Operators other than through the appointment by either a Supplier or a Customer.)

GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

SECTIONS OF THE DISTRIBUTION CODE APPLYING TO PARTICULAR CATEGORIES OF USERS OF THE DNO'S DISTRIBUTION SYSTEM

CATEGORY OF USERS

D Code Ref	A1	A2	A3	A4	B1	B2	B3	B4	B5	C	D	E
DGC	D	D	D	D	D	D	D	D	D	D	D	D
DPC1	R	R	R	R	R	R	R	R	R	R	R	R
DPC2	R	R	R	R	R	R	R	R	R	R	R	R
DPC3	R	R	R	R	R	R	R	R	R	R	R	R
DPC4	D	D	D	D	D	D	D	D	D	R	D	D
DPC5	D	D	D	D	D	D	D	D	D	R	D	D
DPC6	D	D	D	D	D	D	D	X	X	R	D	D
DPC7	D	D	X	X	D	X	X	X	X	R	D	X
DPC8	D	D	D	D	X	X	X	X	X	R	D	X
DOC1	D	X	D	X	X	X	X	X	X	D	D	X
DOC2	D	X	D	X	X	X	X	X	X	D	D	X
DOC5	D	D	D	D	D	D	D	D	D	D	D	D
DOC6	D	D	D	D	R	R	R	R	R	D	D	X
DOC7	D	D	D	D	X	X	X	X	X	D	D	X
DOC8	D	D	D	D	D	D	D	D	D	R	D	D
DOC9	D	D	D	D	R	R	R	R	R	R	D	R
DOC10	D	D	D	D	X	X	X	X	X	D	D	X
DOC11	D	D	D	D	D	D	D	X	D	X	D	D
DOC12	D	D	D	D	D	D	X	X	X	R	D	X
DDRC	D	D	D	D	D	X	X	X	X	D	D	X

X Not applicable.

D Applicable with specific obligations.

R Relevant for information but no specific obligations.

ISSUE SUMMARY

Issue		Details of Changes
No.	Date	
1	01/10/02	<p>This is the first issue of the Distribution Code for Great Britain. The D Code has been formed from an amalgamation of the pre-existing Scottish (Issue 4), and England & Wales (Modification 13) D Codes.</p> <p>There are no deliberate policy changes introduced in this first issue of the GB code: the drafting reflects the requirements existing in both forerunner codes. However there are changes to the wording from both codes necessary in adopting a common text. These changes have been kept to a minimum consistent with developing a common Distribution Code for Great Britain. The detail of these changes from the forerunner codes was publicly consulted on as part of the process of introducing the Distribution Code for Great Britain.</p> <p>Where there are technical, regulatory or institutional differences between Scotland and England & Wales the drafting has preserved these differences in the combined code where necessary.</p>
2	01/03/03	Annex 1 amended to recognize that ER G75 has been re-issued as ER G75/1.
3	01/09/03	<p>Modifications in respect of data requirements for Embedded Generators – particularly:</p> <ul style="list-style-type: none"> • the addition of new DPC1.6 and DPC1.7; • additions to DPC4.5.1; • new DPC5.1.2; • modified DPC7.3 and new DPC7.3.4 <p>Modifications to the Distribution Data Registration Code</p>

END