

**AL AIN DISTRIBUTION COMPANY**

**ABU DHABI DISTRIBUTION COMPANY**

**ABU DHABI COMPANY FOR SERVICING REMOTE AREAS**

# **THE ELECTRICITY DISTRIBUTION CODE**

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**Approved by:**

**The Regulation and Supervision Bureau  
for the Water and Electricity Sector  
in the Emirate of Abu Dhabi**

# THE ELECTRICITY DISTRIBUTION CODE

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## THE DISTRIBUTION CODE

### PREFACE

1. The re-organised Electricity Supply Sector comprises the following principal organisations:

- i. **The Abu Dhabi Transmission and Despatch Co. (TRANSCO)**, which holds a licence granted under Article 82 of **the Law** which operates the **Abu Dhabi Transmission System**.
- ii. **Electricity and Water Distributors (DISCOs)** which hold licences granted under Article 82 of The Law
- iii. **Generators (GENCOS)**, which hold licences granted under Article 82 of **Law**;
- iv. **Customers** who have **Generating Plant** for supplying part or all of their own needs.
- v. **The Abu Dhabi Water and Electricity Company (ADWEC)** which holds a licence granted under Article 82 of **the Law**; which is the single buyer of water and electricity capacity and output and is responsible for the matching of capacity and demand.

2. The **TRANSCO Transmission System** transports the electricity, mainly generated by the larger **Generating Plants**, to the **DISCOs Distribution Systems**, through which most Customers will be supplied. Some of the **Generating Plant** of the **GENCOs** may be connected to a **DISCOs Distribution System** and not the **TRANSCO Transmission System** and, as such, is referred to as **Embedded** generation-

3. **TRANSCO** has produced a **Transmission Code**, approved by the **Bureau**, which defines the technical aspects of the working relationship between **TRANSCO** and all those connected to the **TRANSCO Transmission System**. **Embedded** generation may also be subject to some of the provisions of the **Transmission Code**.

4. **TRANSCO** has produced a **Metering and Data Exchange Code (MDEC)**, approved by the Bureau which defines the technical aspects of the working relationship for metering at defined metering points (Reference to the most recent version of the MDEC).

5. **This Distribution Code**, which has also been approved by the **Bureau**, is designed to perform a similar function to that of the **Transmission Code** in relation to the **DISCOs Distribution System** and to those connected to it. It also enables the **DISCO** to comply with its obligations under its licence and the **Transmission Code**. The provisions of the **Distribution Code** are common to all **DISCOs** except in those areas where an individual **DISCO** has received approval from the **Bureau** for variation.

6. The **Distribution Code** does not deal with charges and other terms for connection but deals with technical aspects concerning supply of electricity and the use of the **DISCO Distribution System** for the transport of electricity. Statements setting out the calculation of such charges, together with current prices, are available from the **DISCO**.

7. The **Transmission Code** specifies all technical aspects of the interface requirements between **TRANSCO** and the **DISCO** and, consequently, the **Distribution Code** does not contain specific references to the rights and obligations of **TRANSCO**.

8. The **Transmission Code** and the **Distribution Code** are essential to ensure that the total electricity supply **System** operates efficiently, so as to provide, as far as is reasonably practicable, security and quality of supplies to **Customers**.

9. The **Distribution Code** is given legal authority by the provisions of licences issued under the **Law** and is incorporated as a term in every agreement for the connection or supply of electricity or for the use of the **DISCOs Distribution System**.

10. The **Distribution Code** is not exhaustive as to the requirements to be complied with by those connected to the **DISCOs Distribution System** who must also comply with the requirements of the **Law**, the **Electricity Supply Regulations**, and all other relevant legislation which from time to time comes into force.

11. The **Distribution Code** applies to all **Users** as detailed under schedule 1, including **Low Demand Customers** connected at LV. However, the **DISCO** will be responsible for ensuring that such **Customers** cause no consequential effects on the quality of electricity supply and that they do not interfere with the efficient operations of the **DISCO Distribution System**. The **DISCO** shall provide such additional support and guidance to such customers including such technical information and clarification as required to enable the customer to comply with the requirements of this **Code**.

12. The **Distribution Code** consists of the following parts:

Glossary and Definitions:

General Conditions (**DGC**);

Planning and Connection Code (**DPCC**);

Operating Code (**DOC**);

Data Registration Code (**DDRC**).

13. Those sections of the **Distribution Code** which principally apply to the various categories of User connected to the **DISCOs Distribution System** under the terms of a specific connection or **Use of System Agreement**. However, all **Users** and potential **Users** must have a working knowledge of all provisions of the **Distribution Code** as these apply to all **Users**.

14. Potential **Users** will find in the **DPCC**, details of the standard of supply offered by the **DISCO Distribution System** and of the design principles to which it is constructed, together with details of the technical and other requirements to be met by those requiring a general connection to the **System**. Persons desiring to connect **Generating Plant** to the **DISCO Distribution System** need to read the

**DPCC**, which contains special requirements relating to such connections. The **DPCC** enables any person to obtain from the **DISCO** a statement of capacities, power flows, loadings and certain other information on the **DISCO Distribution System**.

15. The **DOC** deals with the various operational matters affecting **Users**, including the provision of forecasts of **Demand**, the planning of **DISCO Distribution System** outages and **Generating Plant** outages, the reporting of operational changes and events, safety matters and procedures for dealing with contingencies.

16. The requirements for the provision of information to the **DISCO** are summarised in tabular form in the **Distribution Data Registration Code (DDRC)** which provides for the establishment by the **DISCO** of a data bank consisting of information furnished by **Users**. The data included in such a data bank is termed "**Registered Data**" and will be used by the **DISCO** for planning, and operational purposes. A **User** will be able to apply to the **DISCO** for details of the **Registered Data** furnished by him. Information will be supplied to the **DISCO** on a confidential basis, and it will be disclosed by the **DISCO** in the circumstances set out in the **Distribution General Conditions** of the **Distribution Code**, which deals with subsidiary matters, mainly of a legal nature.

17. The **DISCO**, like each other **DISCO**, may have several different businesses, including a Distribution business which will own and operate its **Distribution System**, a Supply Business which will comprise the supply of electricity in its authorised area.

18. Supplies of electrical energy to **Customers** within the **DISCOs** area will be made by the Supply Business of the **DISCO**, or **Exempt Suppliers**. Each will be entitled to use both the **TRANSCO Transmission System** and the **DISCO Distribution System** for the transport of electrical energy from the **Generating Plant to Customers**.

19. Use of a **DISCO Distribution System** may involve several different transactions:

- i. two types of connection to that **DISCO Distribution System**, namely:
  - a. **Entry:** i.e. the connection between the **DISCO Distribution System** and the point where electricity enters the **System**, usually the **TRANSCO Transmission System** or an **Embedded Generating Plant** (i.e. a **Generating Plant** connected to the **DISCO Distribution System**), or with another **DISCO** connected to the **DISCO Distribution System**; and
  - b. **Exit:** i.e. the connection between the **DISCO Distribution System** and either the premises where the electricity is consumed or, in some cases, another **Distribution System**;
- ii. use of the **DISCO Distribution System** to transport electricity between entry and exit points; and
- iii. the provision by the **DISCO of Standby** and/or **Top-up** supplies of electricity. "**Standby** supplies" means the provision of electricity on a periodic or intermittent basis, to replace a primary source of

supply which is temporarily unavailable. "**Top-up** supplies" means the provision of electricity on a continuing or regular basis, to augment a primary source of supply other than from the **DISCO** which generally is insufficient to meet the supply requirement.

These are, of course, in addition to the supply of electricity between the **DISCO** and the **Customer**.

20. These transactions will give rise to a number of agreements:
- i. **Embedded** generation **Connection Agreements** will provide for:
    - a. connection to the **DISCO Distribution System**, and
    - b. compliance by the parties with the **Distribution Code**.

Contracts in respect of **Embedded** generation connected in future will deal also with the construction of the **Connection Point**.

- ii. Other **Connection Agreements** fall into a number of different categories.
  - a. Existing **Low Demand Customers** of the **DISCO**: the existing arrangements will continue until they are revised.
  - b. New **Low Demand Customers** of the **DISCO**: Such a **Customer** will require an application form. The application form will contain the terms of connection and supply and will be available from the **DISCO**.
  - c. Existing **High Demand Customers** of the **DISCO**: the existing arrangements will continue until they are revised.
  - d. New **High Demand Customers**: such Customers will enter into a **Connection Agreement** and a **Supply Agreement** with the **DISCO** which will provide, inter alia, for compliance with the **Distribution Code**.
  - e. Connection to a **User With Own Generation (UWOG)**: a UWOG will require a specific Connection Agreement. The **Connection Agreement** will, where appropriate, make provision for compliance with the **Distribution Code** by the parties to such agreement.
- iii. **Top-up** and **Standby** agreements may be required by a **User With Own Generation**.

In each case an agreement with the **DISCO** will be required.

21. This preface is provided to prospective **Users** of the **DISCO Distribution System** for their information only and does not constitute part of the **Distribution Code**.



**Schedule 1 -  
SECTIONS OF THE DISTRIBUTION CODE APPLYING TO PARTICULAR CATEGORIES  
OF USERS OF THE DISCO DISTRIBUTION SYSTEM**

	Users of the Electricity Distribution Code					
	host DISCO and other DISCOs	Embedded Generator	UWOG: parallel operation	UWOG: non-parallel operation	High Demand Customer (≥1MW)	Low Demand Customer (<1MW)
<b>General Conditions (DGC)</b>						
All parts	✓	✓	✓	✓	✓	✓
<b>Planning Code (DPCC)</b>						
1. Introduction	✓	✓	✓	✓	✓	✓
2. Scope	✓	✓	✓	✓	✓	✓
3. Objectives	✓	✓	✓	✓	✓	✓
4. Design Principles & Standards	✓	✓	✓	✓	✓	✓
5. General Requirements for Connections	✓	✓	✓	✓	✓	✓
6. Technical Requirements for Connections	✓	✓	✓	✓	✓	✓
7. Requirements for Embedded Generators	✓	✓	✓	N	N	N
8. Transfer of Planning Data	✓	✓	> 5MW	> 5MW	> 5MW	N
<b>Operating Code (DOC)</b>						
1. Demand Forecasts	✓	> 5MW	> 5MW	> 5MW	> 5MW	N
2. Operational (Outage) Planning	✓	✓	> 5MW	N	N	N
3. Testing and Monitoring	✓	✓	✓	✓	✓	✓
4. Demand Control	✓	✓	✓	✓	✓	✓
5. Operational Liaison	✓	✓	✓	> 5MW	> 5MW	N
6. Safety Co-ordination	✓	✓	✓	✓	✓	✓
7. Contingency Planning	✓	✓	✓	N	N	N
8. Incident Reporting	✓	✓	✓	> 5MW	> 5MW	N
9. Numbering & Nomenclature	✓	✓	✓	> 5MW	> 5MW	N
10. Special System Tests	✓	✓	✓	> 5MW	> 5MW	N

Schedule 1 contd...

<b>Data Registration Code (DRC)</b>	<b>Users of the Electricity Distribution Code</b>					
	host DISCO and other DISCOs	Embedded Generator	UWOG: parallel operation	UWOG: non-parallel operation	High Demand Customer (≥1MW)	Low Demand Customer (<1MW)
Schedule 1a - Embedded Generator data	✓	✓	N	N	N	N
Schedule 1b - Embedded Generator data > 5MW	✓	> 5MW	> 5MW	N	N	N
Schedule 2 - Demand & Generation Forecasts	✓	✓	> 5MW	> 5MW	> 5MW	N
Schedule 3a - Generation Outages - long term	✓	✓	> 5MW	N	N	N
Schedule 3a - Generation Outages - medium term	✓	✓	> 5MW	N	N	N
Schedule 3a - Generation Outages - short term	✓	✓	> 5MW	N	N	N
Schedule 3d - User Outages	> 5MW	N	> 5MW	> 5MW	> 5MW	N
Schedule 4 - System Design Data	✓	N	✓	✓	✓	N
Schedule 5 - Load Characteristics	✓	N	✓	✓	✓	✓

## CHAPTER 1 GLOSSARY AND DEFINITIONS

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

<b>AC</b>	Alternating Current.
<b>Active Power</b>	The product of voltage and the in-phase component of alternating current normally measured in kilowatts ( <b>kW</b> ) or megawatts ( <b>MW</b> ).
<b>Annual MD Conditions or Annual Maximum Demand Conditions</b>	A particular combination of weather which gives rise to a level of peak Demand within a <b>DISCO Financial Year</b> which has a 50% chance of being exceeded as a result of weather variation alone.
<b>Apparatus</b>	All <b>Equipment</b> in which electrical conductors are used, supported or of which they may form a part.
<b>Apparent Power</b>	The Product of voltage and of alternating current measured in units of volt-amperes and standard multiples thereof, $1000 \text{ VA} = 1 \text{ Kva}$ $1000 \text{ kVA} = 1 \text{ MVA}$
<b>Authorisation</b>	The formal sanction given in writing to undertake specified tasks that has a specific meaning in <b>Safety Management Systems</b> .
<b>Authorised Electricity Operator or AEO</b>	Any person (other than the <b>DISCO</b> ) in its capacity as Operator of the <b>Distribution System</b> who is licensed under the <b>Law</b> to generate, transmit or supply electricity.
<b>Average Conditions</b>	That combination of weather elements within a period of time chosen by the <b>DISCO</b> to represent the average of the observed values of those weather elements during equivalent periods over a number of years (sometimes referred to as normal weather).
<b>Back-up Protection</b>	Protection equipment or system(s) which are intended to operate when a system fault is not cleared in due time because of the failure or inability of the <b>Main Protection</b> to operate or in case of the failure of operation of a circuit breaker other than the <b>Main Protection</b> circuit breaker
<b>Black Start</b>	The procedure necessary for a recovery from a <b>Total</b> or <b>Partial System Shutdown</b> .

<b>Black Start Capability</b>	The ability of a <b>Power Station</b> to commence <b>generating</b> without the need for a power supply external to that <b>Power Station</b> .
<b>Breakdown</b>	An occurrence relating to <b>Equipment</b> which prevents that <b>Equipment</b> performing its correct function within the <b>Distribution System</b> .
<b>Bureau</b>	The Regulation and Supervision Bureau for the Water and Electricity Sector in the Emirate of Abu Dhabi established under the Law.
<b>Central Despatch</b>	<b>The Despatch of Generating Units</b> by TRANSCO.
<b>Circuit Breaker</b>	A mechanical switching device, capable of making, carrying and breaking currents under normal circuit conditions and also of making, carrying for a specified time and breaking currents under specified abnormal circuit conditions, such as those of short circuit.
<b>Civil Emergency Direction</b>	Directions given by the <b>Crown Prince</b> to <b>AEOs</b> for the purpose of mitigating the effects of any natural disaster or other emergency which, in the opinion of the <b>Crown Prince</b> , is or may be likely to disrupt electricity supplies.
<b>Commissioning</b>	The final process of testing part of a <b>System</b> prior to that part of the <b>System</b> being considered suitable for normal use.
<b>Connected Load</b>	As declared in the application for supply or the <b>Connection Agreement</b> between the user and the <b>DISCO</b> . The method of calculating the <b>Connected Load</b> is given in the <b>Wiring Regulations</b>
<b>Connection Agreement</b>	An agreement setting out terms relating to a connection with the <b>DISCO Distribution System</b> (excluding any such agreement with <b>TRANSCO</b> ).
<b>Connection Point</b>	A point of supply to or from a <b>User</b> .
<b>Control Centre</b>	A location for the control and operation of <b>Distribution System</b> , the <b>TRANSCO Transmission System</b> or the <b>System</b> of a <b>User</b> .
<b>Control Person</b>	A person who has been nominated by the <b>DISCO</b> , <b>TRANSCO</b> or a <b>User</b> to be responsible for controlling and co-ordinating <b>System</b> operations.
<b>Control Phase</b>	The period 0-24 hours inclusive ahead of real time operation.
<b>Customer</b>	Any person who has an agreement with or is entitled to be supplied with electricity by the <b>DISCO</b> but excluding any

	<b>Authorised Electricity Operator</b> in its capacity as such for the provision of electrical power.
<b>DC</b>	Direct Current.
<b>Decimal Week</b>	The week numbering system where week 1 commences in the first week of January on a date as advised by the <b>DISCO</b> .
<b>Demand</b>	Unless otherwise stated, the demand expressed in <b>MW</b> and <b>MVA</b> (or <b>Active Power</b> and <b>Apparent Power</b> ) respectively for <b>High demand customers</b> ; or <b>MW</b> or <b>MVA</b> for <b>Low Demand Customers</b> .
<b>Demand Control</b>	Any or all of the methods of achieving reductions in <b>Demand</b> listed in the <b>DOC</b> .
<b>Design Rating</b>	The maximum current or voltage, or combination of both, which an item of <b>Equipment</b> is intended to have applied to it, taking into account cyclic variations of that voltage or current, together with other parameters as appropriate to specific items of <b>Equipment</b> .
<b>Despatch</b>	The issue of instructions for <b>Generating Units</b> to achieve specific <b>Active Power</b> and <b>Reactive Power</b> outputs within <b>Registered Data</b> parameters and by stated times.
<b>DISCO Distribution System</b>	The <b>Distribution System</b> operated by the <b>DISCO</b> .
<b>DISCO Financial Year</b>	Bears the meaning given to it in the <b>DISCO</b> Licence.
<b>Distribution Code</b>	The document prepared and maintained by each <b>DISCO</b> pursuant to its licence and approved by the <b>Bureau</b> as from time to time revised with the approval of the <b>Bureau</b> .
<b>Distribution Code Review Panel or Panel</b>	The <b>Panel</b> with the functions set out in the <b>DGC</b> .
<b>Distribution Data Registration Code or DDRC</b>	That portion of the <b>Distribution Code</b> which is identified as the <b>Distribution Data Registration Code</b> .
<b>Distribution General Conditions or DGC</b>	That portion of the <b>Distribution Code</b> which is identified as the <b>Distribution General Conditions</b> .
<b>Distribution Operating Code or DOC</b>	That portion of the <b>Distribution Code</b> which is identified as the <b>Distribution Operating Code</b> .
<b>Distribution Planning</b>	That portion of the <b>Distribution Code</b> which is identified as the

<b>and Connection Code or DPCC</b>	<b>Distribution Planning and Connection Code.</b>
<b>Distribution System</b>	A 33kV and lower voltage electrical network operated by a <b>DISCO</b> or any <b>AEO</b> (other than <b>TRANSCO</b> ).
<b>DISCO</b>	The holder of an Electricity Distribution and Supply Licence.
<b>Electricity Supply Regulations Embedded</b>	Regulations issued pursuant to Article 62 of the <b>Law</b> by the <b>Bureau</b> . Having a direct electrical connection to a <b>Distribution System</b> .
<b>Embedded Generator</b>	An entity who holds a Licence issued by the <b>Bureau</b> to generate electricity and whose <b>Generating Units</b> are directly connected to a <b>DISCO Distribution System</b> .
<b>Emergency Return to Service Time</b>	The time specified in respect of <b>Equipment Isolated</b> from the System for the purposes of maintenance or construction work by which it is possible to return it to normal service.
<b>Engineering Recommendations</b>	The documents referred to as and issued by the <b>Disco</b> .
<b>Equipment</b>	<b>Plant</b> and/or <b>Apparatus</b> .
<b>Exempted Supplier</b>	A person who supplies electricity, authorised by exemption under the <b>Law</b> .
<b>External Interconnection</b>	A connection to a <b>System</b> outside the <b>Total System</b> .
<b>Fault Level</b>	Prospective current that would flow into a short circuit at a stated point on the <b>System</b> and which may be expressed in kA or, if referred to a particular voltage, in MVA.
<b>Generating Plant</b>	A <b>Power Station</b> including any <b>Generating Unit</b> therein.
<b>Generating Plant Output</b>	That portion of the output of <b>Generating Plant</b> which is contributing to meeting <b>Demand</b> .
<b>Generating Unit</b>	Any <b>Apparatus</b> which produces electricity.
<b>Generator (GENCO)</b>	An entity which generates electricity under licence or exemption under the <b>Law</b> .
<b>Good Industry Practice</b>	In relation to any undertaking and any circumstances, the exercise of that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and

experienced operator engaged in the same type of undertaking under the same or similar circumstances

<b>High Demand Customer</b>	A Customer who has a total <b>Connected Load</b> at or greater than 1MW in aggregate for the site.
<b>High Voltage or HV</b>	A voltage exceeding <b>Low Voltage</b> .
<b>IEC</b>	International Electrotechnical Commission.
<b>Incident</b>	An unscheduled or unplanned occurrence on or relating to a <b>System</b> (including <b>Embedded Generating Plant</b> ) including faults, incidents and breakdowns and adverse weather conditions being experienced.
<b>Independent Generating Plant</b>	A <b>Power Station</b> or any <b>Generating Unit</b> not necessarily subject to Generating <b>Central Despatch</b> .
<b>Islands of Supply</b>	Discrete parts of the <b>Distribution System</b> capable of generating and maintaining a stable supply of electricity to the <b>Customers</b> within those discrete parts without any connections external to that discrete part.
<b>Isolated</b>	Disconnected from associated <b>Equipment</b> by an <b>Isolator</b> or by adequate physical separation.
<b>Isolator</b>	A device which provides in the open position a means of disconnecting <b>Apparatus</b> from the <b>Distribution System</b> in accordance with specified requirements.
<b>Law</b>	Law No 2 of 1998 concerning the Regulation of the Water and Electricity Sector in the Emirate of Abu Dhabi.
<b>Load Reduction</b>	The method to temporarily control <b>Demand</b> by reduction of System Connected Load.
<b>Low Demand Customer</b>	A customer with a total <b>Connected Load</b> of less than 1MW in aggregate at the site.
<b>Low Voltage or LV</b>	A voltage exceeding 50 volts <b>AC</b> but not exceeding 1000 volts <b>AC</b> or 1500volts DC between conductors or 600 volts AC or 900 volts DC between any conductor and earth
<b>Main Protection</b>	<b>Protection</b> equipment or system(s) expected to have priority in initiating either a fault clearance or an action to terminate an abnormal condition in a power system.
<b>Minimum Generation</b>	The minimum output which a <b>Generating Unit</b> can reasonably generate, as registered with <b>TRANSCO</b> under <b>DDRC</b> .

<b>Minor Independent Generating Plant</b>	Any <b>independent generating plant</b> with a <b>registered capacity</b> of less than 20 MW.
<b>Negative Phase Sequence</b>	A term used within the theory of symmetrical components which is a method of analysing an <b>AC polyphase System</b> .
<b>Non-Embedded Customer</b>	A Customer receiving electricity direct from the <b>TRANSCO Transmission System</b> irrespective of by whom it is supplied.
<b>Normal Operating Frequency</b>	The number of Alternating Current cycles per second, expressed in Hertz at which the System normally operates, i.e. 50 Hertz.
<b>Operation</b>	A scheduled or planned action carried out on a <b>System</b> .
<b>Operation Diagrams</b>	Diagrams which are a schematic representation of <b>the HV Apparatus</b> and the connections to all external circuits at a <b>Connection Point</b> , incorporating its numbering, nomenclature and labelling.
<b>Operational Boundary</b>	The boundary between the <b>Equipment</b> operated by the <b>DISCO</b> or a <b>User</b> and the <b>Equipment</b> operated by another, as specified in the relevant site responsibility schedules.
<b>Operational Effect</b>	Any effect on the <b>Operation</b> of the relevant other <b>System</b> which causes the <b>Systems</b> of the <b>DISCO, TRANSCO</b> or other <b>Users</b> , 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.
<b>Operational Planning Phase</b>	The period from 8 weeks to 3 years inclusive ahead of real time operation.
<b>Output Usable or OU</b>	That portion of <b>Registered Capacity</b> which is not unavailable due to a <b>Planned Outage</b> or breakdown.
<b>Overloading</b>	The condition under which part of a <b>System</b> is subject to a <b>Demand</b> in excess of the normal <b>Design Rating</b> of that part of the <b>System</b> and not due directly to <b>System</b> fault current.
<b>Ownership Boundary</b>	The boundary between the <b>Equipment</b> owned by one <b>DISCO</b> or <b>User</b> and the <b>Equipment</b> owned by another.
<b>Parallel</b>	The operation of one source of power in direct connection with another; such as an Embedded Generator with a DISCO Distribution System, or a User With Own Generation with a DISCO Distribution System, or a DISCO Distribution System interconnected with another System. This definition includes



	‘short term’ <b>parallel</b> operation of, for example, a User With Own Generation with a DISCO for the purpose of testing generation units.
<b>Partial System Shutdown</b>	The condition which applies when all generation has ceased in part of a <b>System</b> and there is no interconnection from other parts of the <b>System</b> .
<b>Planned Outage</b>	A scheduled outage of <b>Generating Unit</b> or of part of the <b>TRANSCO Transmission System</b> or of part of a <b>Distribution System</b> .
<b>Plant</b>	Fixed and movable items used in the generation and/or supply and/or transmission of electricity other than <b>Apparatus</b> .
<b>Power Factor</b>	The ratio of <b>Active Power</b> to <b>Apparent Power</b> .
<b>Power Station</b>	An installation comprising one or more <b>Generating Units</b> even where sited separately, which are owned and/or controlled by the same <b>Generator</b> and may reasonably be considered as being managed as one <b>Power Station</b> .
<b>Programming Phase</b>	The period 24 hours to 8 weeks ahead inclusive of real time operation.
<b>Protection</b>	The provisions for detecting abnormal conditions in a <b>System</b> and initiating fault clearance or actuating signals or indications.
<b>Reactive Power</b>	The product of voltage and current and the sine of the phase angle between them which is normally measured in <b>kVAr</b> or <b>MVar</b> .
<b>Registered Capacity</b>	The normal full load capacity of a <b>Generating Unit</b> as declared by the <b>Generator</b> less the <b>MW</b> consumed when producing the same. For a <b>Customer With Own Generation</b> this will relate to the level of output he expects to export to the <b>DISCO Distribution System</b> .
<b>Registered Data</b>	Data referred to in the schedules to the <b>Data Distribution Registration Code</b> .
<b>Safety From The System</b>	That condition which safeguards persons working on or testing <b>Apparatus</b> from the dangers which are inherent in working on items of <b>Apparatus</b> which are used separately or in combination in any process associated with the generation, transmission and Distribution of electricity.
<b>Safety Management</b>	The procedure adopted by the <b>DISCO</b> or a <b>User</b> to ensure the safe <b>Operation</b> of its <b>System</b> and the safety of personnel required to work on that <b>System</b> .

<b>Safety Procedures</b>	The procedures specified within a <b>Safety Management System</b> .
<b>Scheduling</b>	The procedure for determining intended usage of <b>Generating Plant</b> .
<b>Settlement Day</b>	The period from 0000 to 2400 hours in each day.
<b>Small Independent Generating Plant</b>	Any <b>Independent Generating Plant</b> with a <b>Registered Capacity</b> of more than 5 MW, and less than 20 MW.
<b>Special System Tests</b>	Those tests which involve simulating conditions or the controlled application of irregular, unusual or extreme conditions on the <b>Total System</b> or any part of it, but not including routine testing, commissioning or recommissioning tests.
<b>Standard Review Period</b>	A defined length of time, as appropriate, expressed as one of the following intervals: Week Month Quarter Year
<b>Standby</b>	The supply of electricity by the <b>DISCO</b> to a <b>Customer</b> on a periodic or intermittent basis to make good any shortfall between the <b>Customer's</b> total supply requirements and that met by his own generation.
<b>Summer Maximum Demand</b>	The highest level of <b>Demand</b> recorded or forecast for a specified summer period which is normally also the highest for the 12 month period.
<b>Superimposed Signals</b>	Those electrical signals carried on a <b>Distribution System</b> for the purposes of information transfer.
<b>Supply Agreement</b>	An agreement for the supply of electricity made between a <b>Disco</b> or <b>Exempt Supplier</b> and a consumer of electricity.
<b>Supply Regulations</b>	Regulations made by the <b>Bureau</b> pursuant to Article 62 of the <b>Law</b>
<b>System</b>	A network running at various voltages.
<b>System Control</b>	The administrative and other arrangements established to maintain as far as possible the proper safety and security of the <b>System</b> .
<b>System Stability</b>	The state of the <b>System</b> whereby predicted changes in load and

generation can be accommodated without any detrimental effect on the **System**.

<b>Top-up</b>	The supply of electricity by the <b>DISCO</b> to the <b>Customer</b> on a continuing or regular basis to make good any shortfall between the Customer's total supply requirements and that met from other sources.
<b>Total System</b>	The <b>TRANSCO Transmission System</b> and the <b>Distribution Systems</b> of all <b>DISCOs</b> and <b>AEOs</b> in the Emirate of Abu Dhabi.
<b>Total System Shutdown</b>	The situation existing when all generation has ceased and there is no supply from <b>External Interconnections</b> .
<b>TRANSCO</b>	The Abu Dhabi Transmission and Despatch Company.
<b>TRANSCO Demand</b>	The amount of electricity to be supplied to the <b>Transmission Supply Points</b> and to be met by <b>Embedded Generating Plant</b> plus <b>TRANSCO Transmission System Losses</b> less the output of directly connected <b>Independent Generating Plant</b> .
<b>TRANSCO Transmission System</b>	The <b>System</b> of <b>High Voltage</b> lines and <b>Plant</b> owned or operated by <b>TRANSCO</b> for the transmission of electricity from one <b>Power Station</b> to a sub-station or to another <b>Power Station</b> or between sub-stations, or between <b>External Interconnections</b> and a sub-station or <b>Power Station</b> including any electrical plant and meters owned or used by <b>TRANSCO</b> in connection with the transmission of electricity.
<b>TRANSCO Transmission System Losses</b>	The losses of electricity incurred on the <b>TRANSCO Transmission System</b> .
<b>Transmission Code</b>	The code required under the terms of the <b>Transmission Licence</b> to be produced and maintained by <b>TRANSCO</b> .
<b>Transmission Licence</b>	The licence granted to <b>TRANSCO</b> under Article 82 of the <b>Law</b> .
<b>Transmission Supply Point</b>	The point of supply from the <b>TRANSCO Transmission System</b> .
<b>User</b>	A term used in various sections of the <b>Distribution Code</b> to refer to the persons using the <b>DISCO Distribution System</b> , more particularly identified in each section of the <b>Distribution Code</b> , but excluding <b>TRANSCO</b> , such persons normally comprising:

all **Embedded Generators**

any other **DISCO** connected to the **Distribution System**

all **High Demand Customers**

all **Low Demand Customers**.

**User Responsible Engineer/Operator**

An employee or duly authorised representative of a Disco or AEO or **Generator** authorised by his employer to carry out specific duties associated with the **Operation** of the **Total System**.

**User System**

Any **System** owned by a **User** comprising **Generating Units** and/or **Distribution Systems** and/or **Equipment** connecting **Generator Units** or **Distribution Systems**.

**User With Own Generation or UWOG**

A **User** with one or more **Generating Units** providing all or part of the **User** electricity requirements, and which may use the **DISCO Distribution System** for the transport of any surplus of electricity.

**Weekly Maximum Demand Condition**

Means that particular combination of weather elements that gives rise to a level of peak **Demand** within a week, taken to commence on a Saturday and end on a Friday, 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 MD Conditions** is 50%, and in the week of maximum risk the weekly peak **Demand** under **Weekly MD Conditions** is equal to the annual peak Demand under **Annual MD Conditions**.

**Wiring Regulations**

Regulations made by the **Bureau** pursuant to Article 62 of the **Law**

## Construction of References

### In the **Distribution Code**:

- i) The Table of contents, the Preface 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 a **Law** or any Section of or Schedule to, or other provision of a **Law** 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 **Law**;
- vi) references to “in writing” or “written” include typewriting, printing, lithography and other modes of reproducing words in a legible and non-transitory form;
- vii) where the Glossary or 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 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; and
- ix) nothing in the **Distribution Code** is intended to or shall derogate from the **DISCOs** statutory or licence obligations.

## CHAPTER 2 GENERAL CONDITIONS

### 1. INTRODUCTION

The provisions of the **Distribution General Conditions** are of general application to 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**.

### 2. SCOPE

The **Distribution General Conditions** apply to all **Users**.

### 3. UNFORESEEN CIRCUMSTANCES

If circumstances not envisaged by the provisions of the **Distribution Code** should arise, the **DISCO** 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 **DISCO** and those **Users** cannot be reached in the time available, the **DISCO** shall determine what is to be done. Wherever the **DISCO** 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 **DISCO** 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 **DISCO** shall promptly refer all such unforeseen circumstances and any such determination to the **Distribution Code Review Panel** for consideration.

### 4. THE DISTRIBUTION CODE REVIEW PANEL

The **DISCOs** shall establish and maintain the **Panel**, which shall be a standing body, to carry out the following functions:

The **Panel** shall:

- i. keep the **Distribution Code** and its working under review;
- ii. review all suggestions for amendments to the **Distribution Code** which the **Bureau** or any **User** may wish to submit to a **DISCO** for consideration by the **Panel** from time to time;
- iii. publish recommendations as to amendments to the **Distribution Code** that a **DISCO** or the **Panel** feels are necessary or desirable and the reasons for the recommendations;
- iv. issue guidance in relation to the **Distribution Code** and its implementation, performance and interpretation when asked to do so by any **User**; and

- v. consider what changes are necessary to the **Distribution Code** arising out of any unforeseen circumstances referred to it by a **DISCO**.

The **Panel** shall consist of:

- i. a Chairman and up to 4 members appointed by the **DISCOs**;
- ii. up to 2 persons appointed by the **Bureau**; and
- iii. the following members:
  - a) 3 persons representing Generators with **Embedded Generating Plant** subject to Central Despatch;
  - b) 1 person representing Generators with **Embedded Generating Plant** other than those in (a) above; and
  - c) 1 person representing **Users** without **Generating Plant**.

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 **Bureau**.

The **DISCO** shall consult in writing with all **Authorised Electricity Operators** 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.

## 5. COMMUNICATION BETWEEN THE DISCO AND USERS

Unless otherwise specified in the **Distribution Code**, the methods of operational communication and data transfer shall be agreed between the **DISCO** and **Users** from time to time.

## 6. DUTY OF GOOD FAITH AND STANDARD OF CONDUCT

Each party to the Code shall at all times in its dealings with the other parties to this Code:

- (a) act in good faith;
- (b) act in accordance with **Good Industry Practice**.

## 7. CODE RESPONSIBILITIES

The **Distribution Code** sets out procedures and principles governing the relationship between the **DISCO** and all **Users** of the **DISCO Distribution System** excluding **DISCO Low Demand Customers**.

## 8. EMERGENCY SITUATIONS

**Users** of the **Distribution Code** should note that the provisions of the **Distribution Code** may be suspended in whole or in part during an emergency situation for the period when a **Civil Emergency Direction** is in place.

## 9. CONFIDENTIALITY

The **Distribution Code** requires information to be provided by **Users** to other **Users**. **Users** of the **Distribution Code** shall not, except in pursuance of specific requirements of the **Distribution Code**, disclose this information to any other **User** or person without the prior written consent of the provider of the information.

## 10. DISPUTES

Any Dispute that cannot be resolved between **Users** or potential **Users** of the **Distribution Code** shall be referred to the **Bureau** for resolution.



## CHAPTER 3 PLANNING AND CONNECTION CODE

### 1. GENERAL INTRODUCTION

The **Distribution Planning and Connection Code (DPCC)** specifies the technical and design criteria and the procedures to be complied with by the **DISCO** in the planning and development of its **Distribution System**. **DPCC** also applies to **Users** of the **DISCO Distribution System** in the planning and development of their **Systems** in so far as they affect the **DISCO Distribution System**.

The **User** requirements may necessitate the reinforcement of or the extension to the **DISCO Distribution System** and in some cases may require the **DISCO** to seek the reinforcement of or extension to the relevant **TRANSCO/DISCO** interface capacity, such work being identified by the **DISCO** or **TRANSCO** as appropriate, as part of the discussions concerning the **User** requirements.

The time required for the planning and development of the **DISCO Distribution System** and any consequential requirement of the **DISCO** interface with the **TRANSCO Transmission System**, will depend on the type and extent of the necessary reinforcement and/or extension work and the degree of complexity in undertaking the new work whilst maintaining satisfactory security and quality of supply on the **DISCO Distribution System**.

### 2. SCOPE

The **Users** to whom the **Distribution Planning and Connection Code** applies are as shown in **Schedule 1**.

### 3. OBJECTIVES

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

- i. enable the **DISCO Distribution System** to be planned, designed and constructed to operate economically, securely and safely;
- ii. facilitate the use of the **DISCO Distribution System** by others and to specify a standard of supply to be provided,
- iii. establish technical conditions which facilitate the interfacing of **Systems** at points of entry to and exit from the **DISCO Distribution System**;
- iv. formalise the exchange of **System** planning data; and
- v. 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 **DISCO Distribution System**.

## 4. DESIGN PRINCIPLES AND STANDARDS

### 4.1 Introduction

It is necessary to ensure that the **DISCO Distribution System** conforms to the statutory requirements and licence conditions placed on the owner and operator of the **System**.

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

The **DPCC** sets out current principles and standards to be applied in the design of the **DISCO Distribution System** and any **User** connections to that **System**.

The **DPCC** is, therefore, based upon the performance requirements of the **DISCO Distribution System** necessary to meet the above criteria.

### 4.2 Standard of supply

#### 4.2.1 Security

The **DISCO Distribution System** and any **User** connections to that **System** shall be designed to be consistent with the security requirements of Annex 1 Item 4.

#### 4.2.2 Frequency and voltage

The **DISCO 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**.

#### 4.2.3 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 **DISCO Distribution System** or damage to connected **Apparatus**. In order to limit these effects the following shall apply to **User** loads connected to the **DISCO Distribution System**:

- i. voltage fluctuations shall comply with the limits set out in Annex 1 Item 7;
- ii. the harmonic content of a load shall comply with the limits set out in Annex 1 Item 1; and
- iii. voltage unbalance between phases shall comply with the levels laid down in Annex 1 Item 10.

Under certain circumstances the **DISCO** may agree to other limits or levels subject to prior approval by the **Bureau**.

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 **DISCO Distribution System** and this variation in voltage shall be taken into account in selecting **Equipment** from an appropriate specification for installation on or connected to the **System**.

### 4.3 Design principles

#### 4.3.1 Specification of equipment, overhead lines and underground cables

- i. 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 **DISCO Standards**. Advice will be made available upon request to the **DISCO**.
- ii. The documents specified in paragraph (i) 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 Annex I of the **Distribution Code** or such other specifications as the **DISCO** may adopt from time to time by agreement with the **Bureau**.
- iii. The specifications of **Equipment**, overhead lines and cables shall be such as to permit **Operation** of the **DISCO Distribution System** within the **Safety Management System** of the **DISCO**, details of which will be made available by the **DISCO** upon request.
- iv. **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 **DISCO 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 **DISCO**.
- v. **Equipment**, overhead lines and underground cables 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 **DISCO** upon request.

### 4.3.2 Earthing

- i. The arrangements for connecting the **System** with earth shall be designed to comply with the requirements of the **Electricity Supply Regulations**. Guidance as to the design of earthing systems is contained in Items 8 and 9 in Annex 1.
- ii. The method of earthing of the **DISCO Distribution System**, for example, whether it is connected solidly to earth or through an impedance, shall be advised by the **DISCO**. The specification of associated **Equipment** shall meet the voltages which will be imposed on the **Equipment** as a result of the method of earthing.
- iii. **Users** shall take precautions to limit the occurrence and effects of circulating currents in respect of the neutral points connected with earth where there is more than one source of electricity.

### 4.3.3 Voltage regulation and control

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

### 4.3.4 Protection

- i. The **DISCO Distribution System** and the **System** of any **User** connected to the **DISCO Distribution System** shall incorporate protective devices in accordance with the requirements of the **Electricity Supply Regulations**.
- ii. In order to ensure satisfactory operation of the **DISCO Distribution System**, Protection systems, operating times, discrimination, and sensitivity at the **Ownership Boundary** shall be agreed between the **DISCO** and the **User** during the application for connection process, and may be reviewed from time to time by the **DISCO**, with the concurrence of the **User**.
- iii. In order to cover a **Circuit Breaker**, or **Equipment** having a similar function, failing to operate correctly to interrupt fault current on a **High Voltage System**, **Back-up Protection** by operation of other **Circuit Breakers** or **Equipment** having a similar function must normally be provided. During the application for connection process, the **DISCO** will advise the **User** if the same is not required.
- iv. Unless the **DISCO** should advise otherwise, it is not acceptable for **Users** to limit the fault current infeed to the **DISCO 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 **DISCO** to operate outside its short-circuit rating.

#### **4.3.5 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 **DISCO Distribution System**, the prior agreement of the **DISCO** is required.

## 5. GENERAL REQUIREMENTS FOR CONNECTION

### 5.1 Introduction

**Distribution Planning and Connection Code Section 5 (DPCC5)** ensures that all **Users** of the **DISCO Distribution System** are subject to the same requirements for connection.

DPCC5 specifies the information required from **Users** by the **DISCO** in order to ensure that adequate technical provision is made for new supplies or increases in existing load; DPCC5 also applies to **Generators** who operate in **parallel** with the **DISCO Distribution System**, where a supply is required from the **DISCO** under normal or emergency conditions.

### 5.2 Declaration of load characteristics

For supplies at **Low Voltage** 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:

- i. maximum power requirements ( kVA);
- ii. type and electrical loading of **Equipment** to be connected, e.g. number and size of motors, electrical heating or cooling arrangements; and
- iii. the date when the connection is required.

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

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

For supplies other than at **Low Voltage** it may be necessary for the following more comprehensive information to be provided on request:

- iv. All types of **Demand**:
  - a. maximum **User** apparent **Power** requirement (MVA);
  - b. maximum and minimum **Reactive Power** requirements;
  - c. type of load and control arrangements eg controlled rectifier or large motor drives, type of starter employed, stored motor current and started current;

d. maximum load on each phase at time of maximum **Demand**; and

e. the maximum harmonic currents to be imposed on the **DISCO Distribution System**

v. Fluctuating Loads:

Details of the cyclic variation, and where applicable the duty cycle, of **Active Power** (and **Re-active Power**, if appropriate), in particular:

a. the rates of change of **Active** and **Reactive Power**, both increasing and decreasing;

b. the shortest repetitive time interval between fluctuations in **Active Power and Reactive Power**; and

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 DISCO 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 **DISCO** when necessary.

### 5.3 Connection arrangements

The design of connections between the **DISCO Distribution System** and **Users** shall be in accordance with the principles set out in the **DPCC**, subject to any modification to which the **DISCO** may reasonably consent.

During the application for connection process the **DISCO** 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 **DISCO** may on occasion specify a different connection voltage from normal in order to avoid potential disturbance caused by the **User Apparatus** to other **Users** of the **DISCO Distribution System** or for other technical reasons or may agree alternative methods for minimising the effects of disturbing loads.

Before entering into a **Connection Agreement** it will be necessary for the **DISCO** to be reasonably satisfied that the **User's System** at the boundary with the **DISCO Distribution System** will comply with all appropriate requirements of the **Distribution Code**.

The **User** installation shall comply with the principles contained in the **Electricity Supply Regulations**.

#### 5.4 Ownership Boundaries

The point or points at which supply is given or taken between the **DISCO Distribution System** and **Users** will be agreed between the **DISCO** and the **User** as required. For supplies at **Low Voltage** the general rule is that the point of supply will be at the **User** terminals of the **DISCO** owned metering equipment. For **High Voltage** supplies, including connections between **DISCOs** and **Users**, 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.

The respective **Ownership** of **Plant** or **Apparatus** will be recorded in a written agreement between the **DISCO** 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**.

For supplies at **High Voltage**, and those covered by the **Electricity Supply Regulations**, the **DISCO** will with the **User's** agreement prepare a responsibility schedule and, where determined by the **DISCO** during the application for connection process, an **Operation Diagram** showing the agreed **Ownership** Boundary. Copies of these documents will be retained by the **DISCO** and the **User**. Changes in the boundary arrangements proposed by either party must be agreed in advance and will be recorded on the **DISCO Operation Diagram**.

#### 5.5 Communications

Where, for operational reasons, a **DISCO** determines that a means of routine and emergency communication between the **DISCO** and the **User** is required then the same shall be provided and maintained by the **DISCO**.



## 6. TECHNICAL REQUIREMENTS FOR CONNECTIONS

### 6.1 Introduction

**Distribution Planning and Connection Code Section 6 (DPCC6)** specifies the technical arrangements required at the **Ownership Boundary** between the **DISCO Distribution System** and the **System of the User** and is applicable at all voltage levels.

### 6.2 Equipment at the ownership boundary

All **Equipment** at the **Ownership Boundary** shall meet the design principles contained within **DPCC4**. Connections for entry to and exit from the **DISCO Distribution System** shall incorporate a means of disconnection of the **User's** installation by the **DISCO**.

### 6.3 Protection requirements

**Protection** requirements vary widely depending on established practices and the needs of the particular **DISCO Distribution System**. The basic requirement in all cases is that **User** arrangements for **Protection** at the **Ownership Boundary**, including types of **Equipment** and **Protection** settings, must be compatible with standard practices on the **DISCO Distribution System**, as specified by the **DISCO** during the application for connection process.

In particular :

- i. maximum clearance times (from fault current inception to arc extinction) must be within the limits established by the **DISCO** in accordance with **Protection** and **Equipment** short circuit rating policy adopted for the **DISCO Distribution System**;
- b. in connecting to the **DISCO Distribution System** the **User** should be aware that auto-reclosing or sequential switching features may be in use on the **DISCO Distribution System**. The **DISCO** 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; and
- iii. the **User** should also be aware that the **Protection** arrangements on some **Distribution Systems**, e.g. rural, may cause disconnection of one phase only of a three phase supply for certain types of fault.

### 6.4 Earthing

Earthing of that part of the **User System** that is connected to the **DISCO Distribution System** shall comply with the arrangements specified in **DPCC4**.

## 6.5 Fault level considerations

The short circuit rating of **User's Equipment** at the **Connection Point** should be not less than the **Fault Level** specified in the **Electricity Supply Regulations**. The choice of **Equipment** for connection at **Low Voltage** may take into account attenuation in the service lines as specified in the **Wiring Regulations**. The **DISCO** in the design of its **System** will take into account the contribution to **Fault Level** of the **User's** connected **System** and **Apparatus**.

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 **DISCO Distribution System**.

## 6.6 Capacitive and inductive effects

The **User** shall, when applying to make a connection, provide the **DISCO** with information as detailed in **DPCC8**. Details will be required of capacitor banks and reactors connected at **High Voltage** which could affect the **DISCO Distribution System** and which it is proposed to connect if agreed by the **DISCO**. When requested by the **DISCO** details shall also be provided of distributed circuit capacitance and inductance. Sufficient detail is required for the following:

- i. to verify that controlling **Equipment** of the **DISCO Distribution System** is suitably rated;
- ii. to show that the performance of the **DISCO Distribution System** will not be impaired; and

## 6.7 Telemetry

- i. The **User** should provide such voltage, current, frequency, **Active** and **Reactive Power** pulses and outputs and status points from his **System** as are considered reasonable by the **DISCO** to ensure adequate **System** monitoring. The telemetry outstation in such a situation will be provided, installed and maintained by the **DISCO**. Under the requirements of the **Transmission Code** new scheduled **Generating Units** and **Power Stations** will need to provide signals to **TRANSCO** for monitoring purposes.
- b. If it is agreed between the parties that the **DISCO** shall control the switchgear on the **User System** the **DISCO** 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.

## 7. REQUIREMENTS FOR EMBEDDED GENERATORS AND USERS WITH OWN GENERATION

### 7.1 Introduction

**Distribution Planning and Connection Code Section 7 (DPCC7)** is applicable to **all** existing or prospective **Generators**, including **Users With Own Generation**, having **Plant** operating or capable of operating in **Parallel** with the **DISCO 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 **DISCO** will advise the **Generator** which requirements are necessary for the **Operation** of the **DISCO Distribution System**.

In addition to meeting the requirements of **DPCC7**, **Embedded Generators** will need to meet the requirements of other relevant sections of the **Distribution Code**.

### 7.2 General requirements

**Embedded Generators** connected at or below 11 kV and with an output not in excess of 5 MW shall, as a minimum requirement comply with the requirements of Item 3, Annex 1. **Embedded Generators** connected at a higher voltage or of a larger capacity shall comply with the general principles of Item 3, Annex 1, subject to the particular requirements of the **DISCO** necessitated by the adjacent **DISCO Distribution System** conditions, which will be made known by the **DISCO** during the connection application process.

### 7.3 Provision of information

**Embedded Generators** will fall within three basic classes

- i. **Generator with Embedded Generating Plant** connected at a voltage level of 11 kV or below or with a capacity less than 5 MW (Item 3, Annex 1)
- ii. **Generator with Embedded Generating Plant** connected at a voltage level greater than 11 kV or with a capacity greater than 5 MW and up to 20 MW
- iii. **Generators with Embedded Generating Plant** in excess of 20 MW.

When applying for connection to the **DISCO Distribution System Generators** shall also refer to **DPCC5**.

The **DISCO** will use the information provided to model the **DISCO 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 **DISCO** 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 under 7.3.1 below will be required for **Embedded Generators** who are to be connected at **Low Voltage** and are less than 50 kVA in capacity, or connected at other than **Low Voltage** and smaller than 300 KVA in capacity.

### 7.3.1 Information required from all Embedded Generators

It will be necessary for each **Generator** to provide to the **DISCO** information on (a) the **Generating Plant** and (b) the proposed interface arrangements between the **Generating Plant** and the **DISCO Distribution System**. The information which may be required by the **DISCO** before entering into an agreement to connect any **Generating Plant** onto the **DISCO Distribution System** is given under Schedule 1a.

### 7.4 Additional information required from embedded generators greater in size than 5 MW or connected at a voltage level above 11 kV

This section details the technical and design information requirements for **Embedded Generators** not specifically covered by Item 3 Annex 1. The following information may be requested by the **DISCO** before entering into an agreement to connect any **Generating Plant** onto the **DISCO Distribution System**:

#### Technical Data

a. **Generating Plant** information (impedances p.u. on rating):

Type of Prime Mover	
Rated MVA	
Rated MW	
Generator <b>MW/MVA</b> r Capability Chart (at lower voltage terminals; see Figure 1)	
Type of Excitation system	
Inertia constant <b>MW sec/MVA</b> (whole machine)	
Stator Resistance	
Direct Axis Reactances:	Sub-Transient Transient Synchronous
Quadrature Axis Reactances:	Sub-Transient Synchronous
Time Constants: Direct Axis:	Sub-Transient Transient
Quadrature Axis: (Stating either open or short circuit time constant)	Sub-Transient
Zero Sequence:	Resistance Reactance
Negative Sequence:	Resistance Reactance

Generator transformer:	Resistance
	Reactance
	MVA Rating
	Tap Arrangement
	Vector Group
	Earthing

b. Automatic Voltage Regulator:

A block diagram for the model of the AVR system including the data on the gains, forward and feedback gains, time constants and voltage control limits;

c. Speed Governor & Prime Mover Data

A block diagram of the **Generating Plant** turbine control system and turbine time constants together with the turbine rating and maximum power.

#### Capacity and Standby Requirements

- d. **Registered Capacity and Minimum Generation** of each **Generating Unit and Power Station** in MW.
- e. **Generating Unit and Power Station auxiliary Demand** (Active Power and Reactive Power) in **MW and MVA<sub>r</sub>**, at **Registered Capacity** conditions. For **Users with own generation** this should include **Top-up** requirements
- f. **Generating Unit and Power Station auxiliary Demand** (Active Power and Reactive Power) in **MW and MVA<sub>r</sub>**, under Minimum Generation conditions. For **Users with own generation** this should include **Top-up** and **Standby** requirements.

## 7.5 Technical requirements

### 7.5.1 Generating Plant performance requirements

For **Generating Plant** subject to **Central Despatch** the electrical parameters required will be those detailed in the **Transmission Code**. For generation not subject to **Central Despatch** the electrical parameters required to be achieved at the **Generating Unit** terminals are defined according to the connection method and will be specified by the **DISCO** with the offer for connection.

### 7.5.2 Control arrangements

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

### 7.5.3 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 **DISCO Distribution System** as follows:

- i. For **Generating Plant** directly connected to the **DISCO Distribution System** the **Generator** must meet the target clearance times for fault current interchange with the **DISCO Distribution System** in order to reduce to a minimum the impact on the **DISCO Distribution System** of faults on circuits owned by **Generators**. The **DISCO** will ensure that the **DISCO 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 **DISCO** to meet the requirements of the relevant part of the **Distribution System**.

- ii. 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 **DISCO Distribution System** shall be agreed between the **DISCO** 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 **DISCO**.

- iii. It will be necessary for the **Generating Plant Protection** to co-ordinate with any auto-reclose policy specified by the **DISCO**.
- iv. Any **Generating Unit** or **Power Station** connected to the **DISCO 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 Backup Protection** which will be within the **Plant** short time rating on the **DISCO Distribution System**. The **DISCO** will advise the **Generator** of the expected **Negative Phase Sequence** loadings during the **Connection Agreement** process.

### 7.5.4 Islanding

It is conceivable that a part of the **DISCO 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 **DISCO** to decide, dependent on local network conditions, if it is desirable for the **Embedded Generators** to continue to generate onto the islanded **DISCO Distribution System**.

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

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 **DISCO Distribution System** 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 **DISCO** on request.

#### **7.5.5 Black start capability**

It will be necessary for each **Embedded Generator** to notify the **DISCO** if its **Generating Plant** has a restart capability without connection to an external power supply, unless the **Embedded Generator** shall have previously notified **TRANSCO** accordingly under the **Transmission Code**.

#### **7.5.6 Generating Plant commissioning tests**

Where **Generating Plant** requires connection to the **DISCO 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 **DISCO** with a commissioning programme, approved by the **DISCO** if reasonable in the circumstances, to allow commissioning to be co-ordinated.

## 8. TRANSFER OF PLANNING DATA

### 8.1 Introduction

**Distribution Planning and Connection Code Section 8 (DPCC8)** details information to be exchanged between the **DISCO** and **Users**. It includes data that is necessary in order for the **DISCO Distribution System** to be developed in an efficient, co-ordinated and economic manner, and to enable the **DISCO** to comply with the conditions contained in its **DISCO Licence**. This data is explained below and listed in the relevant schedules in the **DDRC**.

### 8.2 Planning statement

In accordance with its **DISCO Licence** the **DISCO** will prepare a statement on request. This statement will detail the present and future circuit capacities, forecast power flows and loading on the part or parts of the **DISCO Distribution System**, specified in the request and shall include **Fault Levels** at each distribution node covered by the request. The statement will be prepared within 28 days after the date of receipt of the request or the date on which the **DISCO** receives agreement from the person making the request to pay the amount estimated or such amount as is determined by the **Bureau** on account of the reasonable costs of the **DISCO** in the preparation of the Statement (or where the **Bureau** so approves such longer period as the **DISCO** may reasonably require having regard to the nature and complexity of the request), providing the request contains sufficient information to enable the statement to be prepared. Under the terms of the **DISCO Licence** a charge may be levied by the **DISCO** for the provision of this statement.

### 8.3 Planning information to be provided by Users

**Users** of the **DISCO Distribution System** must provide sufficient planning data/information as requested by the **DISCO** from time to time to enable the **DISCO** to comply with the requirements under its **DISCO Licence**. For those **Users** from whom **Demand** forecasts are required under **DOC1**, there will be a requirement to prepare an annual submission to the **DISCO**. 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 5 years ahead that data or information, including changes either increasing or decreasing in maximum **Demand**, transfer requirements or generating capacity as appropriate.

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

### 8.4 Information to be Provided to Users

Where the **DISCO** has received from a **User** any information or data, or where the **DISCO** proposes to make modifications to the **DISCO Distribution System** which, in either case, in the reasonable opinion of the **DISCO**, may impact upon the **System** of any other **User**, the **DISCO** will notify that



**User** of the proposals subject to any constraints relating to the timing of release of information or confidentiality provisions.

### 8.5 Reactive compensation plant

A **User** shall provide the **DISCO** with information on any reactive compensation Plant directly or indirectly connected to a **DISCO** Distribution System, other than at **Low Voltage**, including:

- i. the **MVar** capacitive or inductive rating of the **Equipment** and operating range if variable;
- ii. details of any, automatic control logic such that the operating characteristics can be determined; and
- iii. the point of connection to the **DISCO Distribution System**.

### 8.6 Lumped network susceptance

Under certain circumstances it will be necessary for the **User** to provide, at the request of the **DISCO**, 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 **DISCO 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 (i.e. they are regarded as part of the cable).

It should not include:

- i. independently switched reactive compensation plant connected to the **User's System**; or
- ii. any susceptance of the **User's System** inherent in the **Reactive Power**.

### 8.7 Fault infeeds

Information shall be exchanged between the **DISCO** and the **User** on fault infeed levels at the point of connection with the **DISCO Distribution System** in the form of :

- i. the maximum and minimum 3-phase symmetrical and phase to earth short circuit infeed;
- ii. the X/R ratio under short circuit conditions and
- iii. in the case of interconnected **Systems**, adequate equivalent network information.

### 8.8 Interconnection impedance

For **User** interconnections that operate in **parallel** with the **DISCO Distribution System** details of the interconnection impedance shall be exchanged between the **DISCO** and the **User**. This

information shall include an equivalent single impedance (resistance, reactance and shunt susceptance) of the **parallel User or DISCO Distribution System**.

### **8.9 Demand transfer capability**

Information shall be exchanged on **Demand** transfer capability where the same **Demand** may be supplied from alternative **DISCO** 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.

### **8.10 Distribution System data**

**Users**, including adjacent **DISCOs**, shall provide the **DISCO** with detailed data relating to the interface between their **Distribution System** and that of the **DISCO**, covering circuit parameters, switchgear and **Protection** arrangements of equipment directly connected to or affecting the **Distribution System** to enable the **DISCO** to assess any implications associated with these points of connection. Reciprocal arrangements will apply between the **DISCO** and its **Users**.

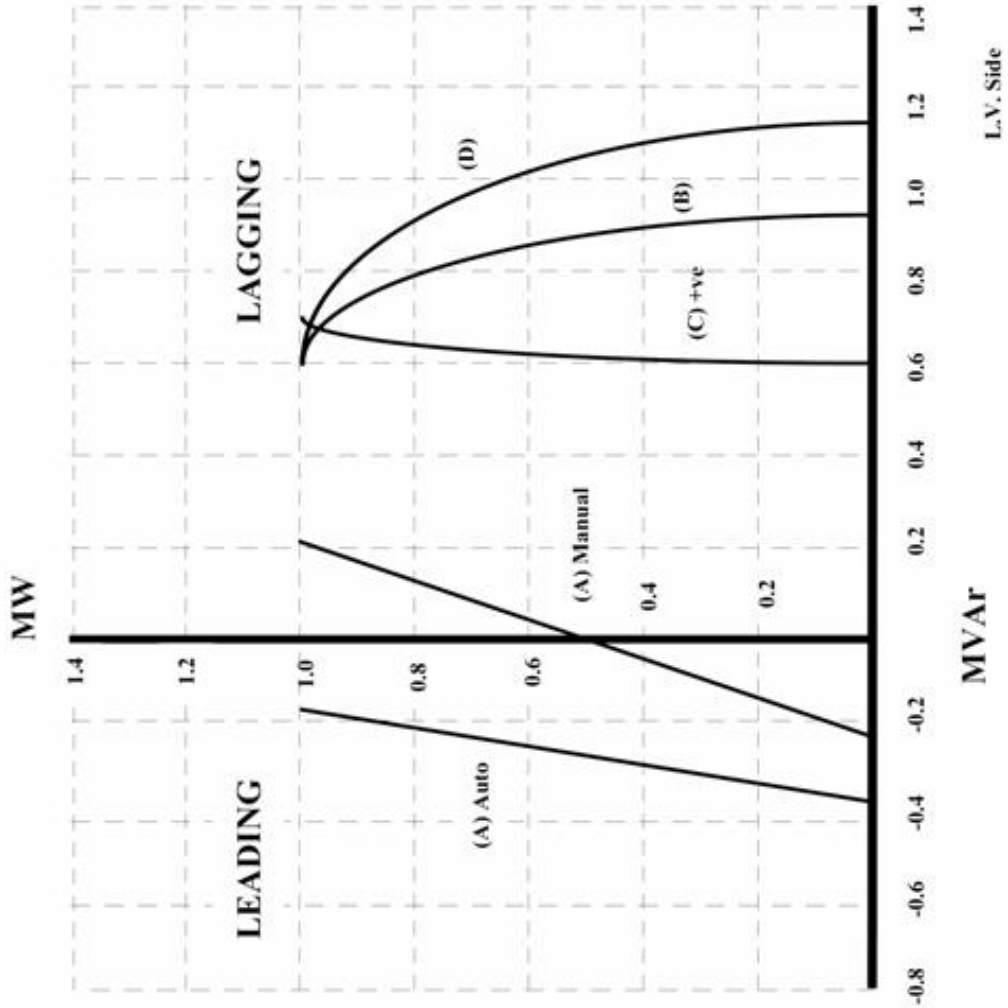
### **8.11 Transient overvoltage effects**

For **User's** busbars connected to the **DISCO Distribution System** sufficient details may need to be exchanged with respect to the **User/DISCO 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.

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

FIGURE 1

# GENERATOR PERFORMANCE CHART



- KEY:-**
- (A) Practical Stability Limit
  - (B) Rotor Heating Limit
  - (C) Transformer Tap Limit
  - (D) MVA Limit
- GENERATOR**
- MW .....
  - MVA .....
  - pf .....
  - kV ..... (term)
  - $X_d$  .....
- TRANSFORMER**
- MVA .....
  - $X_c$  .....
- UNIT TRANSFORMER**
- MW Load .....
  - MVar Load .....
- SYSTEM VOLTAGE**
- kV ..... (nominal)
  - (P.U. Values)

## CHAPTER 4 OPERATING CODE

### 1. DEMAND AND GENERATION FORECASTS

#### 1.1 Introduction

In order for the **DISCO** to operate the **DISCO 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 **DISCO**.

The **Transmission Code** specifies the **TRANSCO** requirements for **Demand** forecasting for **Generating Units** subject to **Central Despatch**; **Distribution Operating Code Section1 (DOC1)** specifies the information to be provided by all other **Users** of the **DISCO Distribution System** to the **DISCO** so these requirements can be met.

The information to be provided under **DOC1** is required to enable the **DISCO** to maintain the integrity of the **DISCO Distribution System**.

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

The information to be provided to the **DISCO** shall be in writing.

References in **DOC1** to data to be supplied on an hourly basis refers to it being supplied for each period of 60 minutes ending on the hour in each day.

#### 1.2 Objective

The objectives of **DOC1** are to:

- i. set out the **Demand** forecast and **Generating Plant Output** information required to be provided by **Users** to enable the **DISCO** to operate **the DISCO Distribution System**; and
- ii. specify the information required to be provided by **Users** to the **DISCO** to enable it to comply with its obligations under the **Transmission Code**.

#### 1.3 Scope

**DOC1** applies to the **Users** of the **DISCO Distribution Systems** as shown in **Schedule 1**.

## 1.4 Information flow and co-ordination

### 1.4.1 Demand forecast information

The **DISCO** will co-ordinate all **Demand** forecast information for each **Grid Supply Point** to meet the requirements of the **Transmission Code**.

### 1.4.2 Generation output information

Information relating to **Generating Plant Embedded** in the **DISCO Distribution System** and not subject to **Central Dispatch** shall be provided, where specified, to the **DISCO**. **Users with own generation** may be required to furnish such information should the **DISCO** reasonably consider that it would affect its **Demand** forecasts.

## 1.5 Demand and Generation forecast periods

Information for the following rolling timescales is required by the **DISCO**:

	Forecast Period	Schedule
Demand Forecast Period	0 hours to 3 years ahead	2

In **DOC1** year 0 means the current **DISCO Financial Year** at any time, Year 1 means the next **DISCO Financial Year**, Year 2 means the **DISCO Financial Year** after Year 1 and so on.

## 1.6 DISCO and User forecasts

The following factors will be taken into account by the **DISCO** and **Users** when conducting Demand forecasting in the Operational Planning Phase: historic Demand data;

- i. weather forecasts (NB Responsibility for weather correction of **User's** loads rests with the **User**.);
- ii. historic **Demand** trends;
- iii. incidence of major events or activities;
- iv. **Customer Generating Unit** Schedules;
- v. **Demand** transfers;
- vi. interconnection with adjacent **DISCOs**;
- vii. **Demand Control** proposed to be operated by **By-Pass Generators**; and
- viii. any other factor reasonably considered necessary.

## 2. OPERATIONAL PLANNING

### 2.1 Introduction

**Distribution Operating Code Section 2 (DOC2)** is concerned with the co-ordination through various timescales, of **Planned Outages** of **Plant** and **Apparatus** which affect the Operation of the **DISCO Distribution System** or require the commitment of **DISCO** resources.

**DOC2** supplements the obligation of each **DISCO** to provide certain information to **TRANSCO** under the **Transmission Code** and establishes procedures to enable the collection of such data from **Users** specified in **DOC2.3**.

The means of providing the information to the **DISCO** and its confirmation includes any non-transitory written form which enables the recipient to retain the information.

### 2.2 Objectives

One objective of **DOC2** is to set out the Operational Planning procedure and typical timetable for the co-ordination of outage requirements for **Plant** and **Apparatus** to be provided by **Users** to enable the **DISCO** to operate the **DISCO Distribution System**.

Another objective is to specify the information to be provided by **Users** to the **DISCO** to allow it to comply with the **Transmission Code**.

### 2.3 Scope

**DOC2** applies to the **Users** of the **DISCO Distribution System** as shown in **Schedule 1**.

### 2.4 Information flow and coordination

#### 2.4.1 Embedded generating plant

Information relating to **Embedded Generating Plant** not subject to **Central Despatch** whose **Registered Capacity** is greater than 5MW shall be provided where specified directly to the **DISCO**, This may include **Users With Own Generation** where the **DISCO** considers it appropriate.

#### 2.4.2 Other plant and apparatus

Information relating to all **Plant** and **Apparatus** connected to the **Distribution System**, or that which may affect its **Operation**, shall be co-ordinated with the **DISCO** as under schedule 3D.

## 2.5 Timescales and data

Information for the following rolling timescales is required by the **DISCO**:

	Forecast Period	Schedule
i) imminent	0 hours to 8 weeks	2
ii) short term	9 weeks to 52 weeks ahead	3c
iii) medium term	1 year to 2 years ahead	3b
iv) long term	3 years to 5 years ahead	3a

In **DOC1** Year 0 means the current **DISCO Financial Year** at any time, Year 1 means the next **DISCO Financial Year**, Year 2 means the **DISCO Financial Year** after Year 1 and so on.

Detailed implementation of data gathering and timescales will be agreed locally between the DISCO and each of the Users. Due recognition will be given by the DISCO to voltage levels and capacities of Plant and Apparatus when assessing information requirements. Timescales are as shown in the table in 1.5 above

All information shall be provided in Weeks as a minimum, where Week 1 commences in the first week of January.

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

## 2.6 Generation scheduling information

The DISCO will obtain Scheduling information from Generators for other Embedded Generating Plant not subject to Central Despatch where it considers it appropriate.

The **Scheduling** information will specify the following on an individual **Generating Unit** basis:

- i. the period the unit is required;
- ii. the planned half-hourly output; and
- iii. any other information the **DISCO** reasonably considers necessary.

### 3. TESTING AND MONITORING

#### 3.1 Introduction

To ensure that the **DISCO Distribution System** is operated efficiently and within its Licence Conditions and to meet statutory actions the **DISCO** will organise and carry out testing and/or monitoring of the effect of **Users** electrical apparatus on the **DISCO Distribution System**.

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

The testing carried out under this **Distribution Operating Code 3 (DOC3)** should not be confused with the more extensive Special System Tests outlined in **DOC10**.

#### 3.2 Objective

The objective of **DOC3** is to specify the **DISCO** requirement to test and/or monitor its **DISCO 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**.

#### 3.3 Scope

**DOC3** applies to the **Users** of the **DISCO Distribution System** as shown in **Schedule 1**.

#### 3.4 Procedure related to quality of supply

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

The requirement for specific testing and/or monitoring may be initiated by the receipt of complaints as to the quality of supply on its **DISCO Distribution System**.

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

Where testing and/or monitoring is required at the **Connection Point**, the **DISCO** will advise the **User** involved and will make available the results of such tests to the **User**.

Where the results of such tests show that the **User** is operating outside the technical parameters specified in the **DPCC**, the **User** will be informed accordingly.

Where the **User** requests, a retest will be carried out and the test witnessed by a **User** representative.



A **User** shown to be operating outside the limits specified in the **DPCC** will rectify the situation or disconnect the **Apparatus** causing the problem from its electrical **System** connected to the **DISCO Distribution System** immediately or within such time as is agreed with the **DISCO**.

Continued failure to rectify the situation may result in the **User** being disconnected or de-energised in accordance with the **Connection Agreement** from the **DISCO Distribution System** either as a breach of the **Distribution Code** or through the authority of the **Electricity Supply Regulations**, where appropriate. Any such action shall be notified to the **Bureau** as soon as possible.

### 3.5 Procedure related to connection point parameters

The **DISCO** from time to time will monitor the effect of the **User** on the **DISCO Distribution System**.

The monitoring will normally be related to amount of **Active Power** and **Reactive Power** transferred across the **Connection Point**.

Where the **User** is exporting to or importing from the **DISCO Distribution System Active Power** and **Reactive Power** in excess of the parameters in the **Connection Agreement** the **DISCO** will inform the **User** and where appropriate demonstrate the results of such monitoring.

The **User** may request technical information on the method of monitoring and, if necessary, request another method reasonably acceptable to the **DISCO**.

Where the **User** is operating outside of the specified parameters, the **User** will immediately restrict the **Active Power** and **Reactive Power** transfers to within the specified parameters.

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 **DISCO** and physically established.

## 4. DEMAND CONTROL

### 4.1 Introduction

**Distribution Operating Code Section 4 (“DOC4”)** is concerned with the provisions to be made by the **DISCO** or **User** with **Systems** connected to the **DISCO Distribution System**, in certain circumstances, to permit reductions in **Total Demand** in the event of insufficient **Generating Plant** being available to meet **Total Demand** or to avoid disconnection of **Customers** or in the event of **Breakdown** and/or **Overloading** on any part of the **TRANSCO Transmission System** and/or the **DISCO Distribution System**.

**DOC4** deals with the following method of reducing **Demand**:

- i. **Customer Demand** management initiated by **Disco**;
- ii. **Customer** disconnection;
- iii. automatic low frequency disconnection; and
- iv. emergency manual **Customer** disconnection.

The term “**Demand Control**” is used to describe any or all of these methods of achieving a **Demand** Reduction.

**Customers** determined as being in protected categories as defined in **DOC7** cannot be guaranteed protection in real time **System** incident management.

### 4.2 Objective

To establish procedures to enable the **DISCO**, following an instruction of **TRANSCO** or otherwise, to achieve a reduction in **Demand** in order to avoid a **Breakdown** or **Overloading** of any part of the **Total System** in a manner that does not unduly discriminate against or unduly prefer anyone or group of **Customers**, **By-Pass Generators** or their **Customers** in accordance with the **DISCO** Licence.

### 4.3 Scope

**DOC4** applies to the **Users** of the **DISCO Distribution System** as shown in **Schedule 1**.

## 4.4 Procedure

### 4.4.1 Operational system load reduction arrangements

The **DISCO** will arrange within the **DISCO Distribution System** a scheme to reduce load in a controlled manner by any of the following methods:

- a) disconnecting **Customers** (either manually or by a disconnection scheme)
- b) automatic low frequency disconnection
- c) by instruction
- d) by reduction of system voltage

### 4.4.2 Issue of warnings for operational system load reduction

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

### 4.4.3 Implementation of demand control

The **DISCO** will arrange to have available at all times at least two 5% stages of **Demand Control** for each interface point with either **TRANSCO** or **GENCO's** for implementation with or without notice at prescribed locations. These stages will employ methods of **Demand Control** determined by the **DISCO**.

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

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

**Embedded Generators** connected to the **DISCOs System** will need to be considered in the preparation of **DISCO Demand Control** schemes.

### 4.4.4 Automatic disconnection of demand by low frequency detectors

The **DISCO** will arrange to have available at selected locations a **System** to detect progressively low frequency conditions on the **System** and will provide for 40% of the **DISCO Demand** based on Summer Maximum Demand to be disconnected automatically.

The areas of **Demand** affected by the low frequency disconnection scheme should be such as to allow the **Demand** relief to be uniformly applied throughout the **DISCO Distribution System**, but may take into account any operational requirements and essential load.

The inclusion of **By-Pass Generators** in a low frequency disconnection scheme network must be reflected in their contractual arrangements.

#### 4.4.5 Emergency manual disconnection of demand

The DISCO will arrange to have available an emergency disconnection scheme based on Transmission Supply Points.

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.

#### 4.4.6 Co-ordination of actions

Where **Demand Control** is exercised by the **DISCO** in order to safeguard the **DISCO Distribution System** the **DISCO** will liaise with and inform **Users** accordingly so far as is practical.

Where **Demand Control** is exercised by the **DISCO** on instruction or request from **TRANSCO** in order to safeguard the **Total System** then the **DISCO** is required to respond to these requests promptly but will liaise with and inform other **Users** so far as is practical.

Where the **DISCO** issues instructions to **User(s)** to carry out disconnection or reconnection of demand the **User(s)** shall carry out instructions without delay.

Where disconnection is envisaged to be prolonged, the **DISCO** may utilise disconnection rotas to interchange connected and disconnected **Customers**.

## 5. OPERATIONAL LIAISON

### 5.1 Introduction

**Distribution Operating Code Section 5 (DOC5)** sets out the requirements for the exchange of information in relation to **Operations** and/or **Incidents** on the **DISCO Distribution System** or the **System** of any **User** connected to the **DISCO Distribution System** which have had or may have had, or will have or may have an **Operational Effect** on the **DISCO Distribution System** or the **System** of any other **User**.

The requirement to notify in **DOC5** relates generally to communicating what is to happen what has happened and not the reasons why. However, **DOC5** provides that when an **Incident** has occurred on the **DISCO Distribution System**, which itself has been caused by (or exacerbated by) an **Operation** or **Incident** on a User System, the **DISCO** in reporting the **Incident** on the **DISCO 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**.

### 5.2 Objective

To provide for the exchange of information so that the implications of the **Operation** and/or **Incident** 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 System**. **DOC5** does not seek to deal with any actions arising from the exchange of information, but merely with that exchange.

### 5.3 Scope

**DOC5** applies to the **Users** of the **DISCO Distribution System** as shown in **Schedule 1**.

### 5.4 Communication Procedure

The **DISCO** and each **User** connected to its **Distribution System** will nominate officers and agree communication channels to make effective the exchange of information required by **DOC5**.

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.

A notification under **DOC5** will be given as far in advance as possible and in any Incident shall be given in sufficient time as will reasonably allow the recipient to consider and assess the implications and risks arising.

Where given orally a notification will be dictated to the recipient who shall record it and on completion shall repeat the notification in full to the sender and check that it has been accurately recorded.

## 5.5 Requirement to Notify Operations

In the case of an **Operation** on the **System** of a **User** connected to the **DISCO Distribution System**, which will have or may have an **Operational Effect** on the **DISCO Distribution System**, the **User** will notify the **DISCO** in accordance with **DOC5**.

In the case of an **Operation** on the **DISCO Distribution System** or on receipt of notification of an **Operation** on the **TRANSCO Transmission System**, which will have or may, in the opinion of the **DISCO**, have an **Operational Effect** on the **System** of a **User** connected to the **DISCO Distribution System**, the **DISCO** will notify the **User**.

Whilst in no way limiting the general requirement to notify in advance, the following are examples of situations where, in as much as they may have or have had an effect on the **Operation** of the **DISCO Distribution System** or another **System**, notification will be required of :

- i. the implementation of a **Scheduled Outage** of **Plant** and/or **Apparatus** which has been arranged pursuant to **DOC2**;
- ii. the **Operation** of any **Circuit Breaker** or **Isolator** or any sequence or combination of the two including any temporary over-stressing, **System parallels**, or **Generating Unit** synchronising; and
- iii. voltage control.

## 5.6 Requirement to Notify Incidents

In the case of an **Incident** on the **System** of a **User** connected to the **DISCO Distribution System**, which has had or may have had an **Operational Effect** on the **DISCO Distribution System** or on the **TRANSCO Transmission System**, the **User** will notify the **DISCO** in accordance with this **DOC5**.

In the case of an **Incident** on the **DISCO Distribution System** or on receipt of notification of an **Incident** on the **TRANSCO Transmission System**, which will have or may, in the opinion of the **DISCO**, have an **Operational Effect** on the **System** of a **User** connected to the **DISCO Distribution System**, the **DISCO** will notify the **User** in accordance with this **DOC5**. This does not preclude any **User** asking the **DISCO**, to whose **System** he is connected, for information regarding the **Incident** which has affected the **User's System**.

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

The following are examples of situations where notification will be required if they have an **Operational Effect**:

- i. the actuation of any alarm or indication of any abnormal operating condition;
- ii. adverse weather conditions being experienced;
- iii. breakdown of, or faults on, or temporary changes in the capabilities of, **Plant** and/or **Apparatus** including **Protection**; and
- iv. increased risk of inadvertent **Protection Operation**.

### 5.7 Form of Notification

A notification by the **DISCO** of an **Operation** which has been caused by another **Operation** (the “First **Operation**”) or by an **Incident** on a **User’s System**, will describe the **Operation** and will contain the information which the **DISCO** has been given in relation to the First **Operation** or that **Incident** by the **User**.

The notification (other than in relation to the information which the **DISCO** is merely passing on from a **User**) will be of sufficient detail to enable the recipient of the notification reasonably to consider and assess the implications and consequences arising from the **Operation** on the **DISCO Distribution System** and will include the name of the individual reporting the **Operation** on behalf of the **DISCO**.

The recipient may ask questions to clarify the notification.

Where a **User** is reporting an **Operation** or an **Incident** which itself has been caused by an incident or scheduled or planned action affecting (but not on) its **System** the notification to the **DISCO** will contain the information which the **User** has been given by the person connected to its **System** in relation to that incident or scheduled or planned action (which the **User** must require, contractually or otherwise the person connected to its **System** to give it) and the **DISCO** may pass on the information contained in the notification.

A notification by the **DISCO** of an **Operation** under **DOC5** which has been caused by an **Operation** or an **Incident** on the **TRANSCO Transmission System**, may describe the **Operation** on the **DISCO Distribution System** and will contain the information which the **DISCO** has been given in relation to the **Operation** or an **Incident** on the **TRANSCO Transmission System** by **TRANSCO**. The notification (other than in relation to the information which the **DISCO** is merely passing on from **TRANSCO**) will be of sufficient detail to enable the recipient of the notification to consider and assess the implications and consequences arising from the **Operation** on the **DISCO Distribution System** and will include the name of the individual reporting the **Operation** on behalf of the **DISCO**. The recipient may ask questions to clarify the notification.

A **User** may pass on the information contained in a notification to it from the **DISCO** to a **Generator** with a **Generating Unit** connected to the **System** or to another **DISCO** connected to its **System** if it is required (by a contract pursuant to which that **Generating Unit** or that **DISCO** is connected to the **System**) to do so in connection with the equivalent of an **Operation** on its **System** (if the **Operation** on the **DISCO Distribution System** caused it).

Other than as provided in **DOC5**, a **User** may not pass on any information contained in a notification to it from the **DISCO** or in a notification to another **User** from the **DISCO** to any other person connected to its **System**, but may only say that there has been an incident on the **Total System** and (if known and if power supplies have been affected) an estimated time of return to service. Each **User** shall procure that any other **Users** receiving information which was contained in the notification to a **User** from the **DISCO** which is not bound by the **Distribution Code**, does not pass any information on other than as provided above.

A notification by the **DISCO** of an **Incident** which has been caused by (or exacerbated by) another **Incident** (the “first **Incident**”) or by an **Operation** on a **User’s System** will describe the **Incident** and will contain the information which the **DISCO** has been given in relation to the first **Incident** or that **Operation** by the **User**. The notification (other than in relation to the information which the **DISCO** is merely passing on from a **User**) will be of sufficient detail to enable the recipient of the notification reasonably to consider and assess the implications and risks arising from the **Incident** on the **DISCO Distribution System** and will include the name of the individual reporting the **Incident** on behalf of the **DISCO**. The recipient may ask questions to clarify the notification.

Except in an emergency situation the notification will be dictated to the recipient who shall record it and on completion shall repeat the notification in full to the sender and check that it has been accurately recorded.

Where an **Incident** has been reported to the **DISCO** by a **Generator** under **DOC5** relating to a **Generating Unit** and in order for the **Generator** to assess the implication of the **Incident** on its **System** more accurately, it may ask the **DISCO** for details of the **Fault Levels** on infeeds from the **Distribution System** to that **Generating Unit** at the time of the **Incident**, and the **DISCO** will, as soon as reasonably practicable, give the **Generator** that information provided that the **DISCO** has that information.

## 5.8 System Control

Where a part of a **DISCO Distribution System** is, by agreement, under the **System Control** of **TRANSCO** then the requirements and provisions of the **Transmission Code** shall apply to that situation as if that **DISCO Distribution System** was the **TRANSCO Transmission System**.

Where a part of a **System** of a **User** is, by agreement, under the **System Control** of the **DISCO** then the requirements and provisions of this **DOC5** shall apply to that situation as if that **System** was the **DISCO Distribution System**.



## 5.9 Significant incidents

Where an **Incident** on the **DISCO Distribution System** or the **System** of a **User** has had or may have had a significant effect on the **System** of any of the others, the **Incident** shall be reported in writing to the owner of the **System** affected in accordance with the provisions of **DOC8**. Such an **Incident** will be termed a Significant Incident.

Where a **DISCO** notifies a **User** of an **Incident** under **DOC5**, which the **User** considers has had or may have a significant effect on that **User's System**, that **User** will require a **DISCO** to report that **Incident** in writing and will notify the **DISCO** accordingly. Such an **Incident** will also be termed a Significant Incident.

A Significant Incident will include **Incidents** which result in, or may result in, the following:

- i. voltage outside statutory limits;
- ii. **System** frequency outside statutory limit, or
- iii. **System Stability** failure.

The DISCO needs to ensure that it reports any relevant incident to the **Bureau** in accordance with the requirements of Regulations issued by the **Bureau** from time to time.

## 6. SAFETY CO-ORDINATION

### 6.1 Introduction

**Distribution Operating Code Section 6 (DOC6)** requires that an approved **Safety Management System** is applied by the **DISCO** to meet statutory and other requirements.

Similar criteria and standards contained within the **DISCO Safety Management Systems** are required to be provided by other **Users** of the **Distribution System** when carrying out work or tests at the operational interface with the **DISCO**.

### 6.2 Objectives

To lay down requirements with a view to ensuring safety of persons working on the **Distribution System** and at or across operational and **Ownership Boundaries**.

### 6.3 Scope

**DOC6** applies to the **Users** of the **DISCO Distribution System** as shown in **Schedule 1**.

### 6.4 Procedure

#### 6.4.1 Approved safety management systems

A **Safety Management System** specifying the principles and procedures, and where appropriate, the documentation to be applied so as to ensure the health and safety of all who are liable to be working or testing on the **DISCO Distribution System**, or on **Plant** and **Apparatus** connected to it, will be established by the **DISCO** in conjunction with the connecting **User** as specified in **DOC6**.

#### 6.4.2 Operational boundaries and principles

At sites or locations where an Operational Boundary exists, which Safety Management System is to be adopted and when, shall be jointly agreed. This will include provision for Control Persons to operate to the Safety Management Systems in use by field personnel where appropriate.

A system of documentation shall be maintained by the **DISCO** and the **User** which records the intersystem safety precautions taken when:

work or testing is to be carried out on **High Voltage Plant** and/or **Apparatus** across the **Operational Boundary**; and

- i. isolation and/or earthing of the other's **System** is needed.

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

### 6.4.3 Authorised personnel

**Safety Management System** must include the provision for written **Authorisation** of personnel concerned with the control, **Operation**, work or testing of **Plant** and **Apparatus** forming part of, or connected to, the **DISCO Distribution System**.

Each individual **Authorisation** shall indicate the class of operation and/or work permitted and the section of the **System** to which the **Authorisation** applies.

### 6.5 Site specific safety

Arrangements shall be made to ensure site safety and security as required by statutory requirements.

Arrangements shall also be made by all parties 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.

Arrangements shall be made to facilitate inspections by **DISCO** management and safety representatives to sites accommodating **DISCO** owned **Plant** and **Apparatus**.

### 6.6 System control

#### 6.6.1 Control responsibilities

The **DISCO** 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.

The **DISCO** and each **User** shall at all times have nominated a **Control Person** or persons responsible for the co-ordination of safety from the **System** pursuant to this **DOC6**.

#### 6.6.2 Control documentation

The **DISCO** and **Users** shall maintain a suitable system of documentation which records all relevant operational events that have taken place on the **DISCO Distribution System** or any other **System** connected to it and the co-ordination of relevant safety precautions for work.

All documentation relevant to the **Operation** of the **Distribution System**, and safety precautions taken for work or tests, shall be held by the **DISCO** and the appropriate **User** for a period of not less than one year.

#### 6.6.3 System diagrams

Diagrams illustrating sufficient information for control personnel to carry out their duties shall be exchanged by the **DISCO** and the appropriate **User**.

#### **6.6.4 Communications**

Where the DISCO reasonably specifies the need, suitable communication systems shall be established between the DISCO and other Users to ensure the control function is carried out in a safe and secure manner.

Where the **DISCO** reasonably decides a back up or alternative routing of communication is necessary to provide for the safe and secure **Operation** of the **DISCO Distribution System** the means shall be agreed with the appropriate **Users**.

Schedules of telephone numbers/call signs shall be exchanged by the **DISCO** and appropriate **User** to enable control activities to be efficiently co-ordinated.

The **DISCO** and appropriate **Users** will establish 24 hour availability of personnel with suitable Authorisation where the joint operational requirements demand it.

### **6.7 Schedules of responsibility**

#### **6.7.1 Ownership, operation and maintenance schedules**

Schedules specifying the ownership and the responsibilities for Operation and maintenance shall be jointly agreed by the DISCO and the appropriate User for each location where either an operational interface or joint responsibilities exist.

For those **Users** connected at **High Voltage** and having firm supply connections (provided by more than one circuit) and where the **User** so requests the **DISCO**, these schedules shall identify those specified **DISCO** circuits on which **Planned Outages** by the **DISCO** shall be notified to the **User**. These specified circuits will be those where the **DISCO** 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.

Those **Users** connected at **High Voltage** and not having firm supply connections (provided by more than one circuit) may seek to obtain outage planning information through arrangements with the **DISCO**.

#### **6.7.2 Maintenance of schedules and diagrams**

All schedules and diagrams shall be maintained by the **DISCO** and appropriate **Users** and exchanged as necessary to ensure they reflect the current agreements and network configuration.

## 7. CONTINGENCY PLANNING

### 7.1 Introduction

#### 7.1.1 Black start

**Distribution Operating Code Section 7 (DOC7)** covers the system recovery procedures following a **Total or Partial Shutdown** of the **Total System** as recognised by **TRANSCO** and that **TRANSCO** intends to implement **Black Start** procedures after having given notification to the **DISCO**.

### 7.2 Objectives

**DOC7** lays down requirements with a view to assisting the restart of the **Total System** or to operating the **Total System** in abnormal situations which require co-ordination between all **Users** with a common approach to give uniformity of priorities. It also specifies requirements to be met during periods of declared civil emergencies.

### 7.3 Scope

**DOC7** applies to the **Users** of the **DISCO Distribution System** as shown in **Schedule 1**.

### 7.4 Procedure - black start

**Total System Shutdown** is a situation when all generation has ceased with no electricity supply from **External Interconnections**.

**Partial Shutdown** is a situation where all generation has ceased in a separate part of the **Total System** and there is no available interconnections to the other parts of the **Total System**.

#### 7.4.1 System recovery

Certain **Embedded Power Stations** may be identified as having an ability to start up from shutdown without connections to external power supplies. Such **Power Stations** are to be referred to as **Black Start** stations.

The **DISCO** will segregate its **DISCO Demand** into suitably sized components to allow progressive re-energisation of the **DISCO Distribution System**. The size of the areas of **Demand** of these will be determined by **TRANSCO** and will be commensurate with the size of **Generating Plant** being re-started.

#### 7.4.2 Resynchronising islands of supply

The overall strategy of recovery will be to re-establish stable **Islands of Supply** and **Demand** and to resynchronise these islands progressively. **Embedded Power Stations** within **DISCO Distribution Systems** will be required to operate to the **DISCO** directives.

Where there are no **Power Stations** with a **Black Start Capability** within the **DISCO Distribution System**, then restoration of supply may be substantially delayed while **TRANSCO** re-establishes the **Transmission System** from a restored island or part of the **Total System**.

The **DISCO** will re-appraise its priorities in these situations and restore supplies in accordance with such priorities.

### **7.4.3 System incident procedures**

To co-ordinate activities, **Users** and the **DISCO** will ensure that there are suitable communication paths available and that where appropriate senior members of staff are appointed to manage these abnormal situations.

## **8. SIGNIFICANT INCIDENT REPORTING AND INFORMATION SUPPLY**

### **8.1 Introduction**

**Distribution Operating Code Section 8 (DOC8)** sets out the requirements for reporting in writing those **Incidents** termed Significant Incidents which were initially reported verbally under **DOC5**.

**DOC8** also provides for the joint investigation of Significant Incidents by the **Users** involved.

### **8.2 Objectives**

The objective of **DOC8** is to facilitate the provision of more detailed information in writing and, where agreed between the **DISCO** and the **Users** involved, joint investigation of those Significant Incidents reported verbally under **DOC5**.

### **8.3 Scope**

**DOC8** applies to the **Users** of the **DISCO Distribution System** as shown in **Schedule 1**.

### **8.4 Procedure**

#### **8.4.1 Communications**

The **DISCO** and each **User** specified in **DOC8** will nominate officers and establish communication channels to ensure the effectiveness of this **DOC8**. Such officers and communication channels may be the same as those established under **DOC5**.

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.

#### **8.4.2 Written reports of Incidents by Users to the DISCO**

In the case of an **Incident** which has been reported verbally to the **DISCO** under **DOC5** and subsequently has been determined by the **DISCO** to be a Significant Incident, a written report will be given to the **DISCO** by the **User** in accordance with **DOC8**. The **DISCO** will not pass this report on to other affected **Users** but may use the information contained therein in preparing a report under **DOC8** to a **User** in relation to a Significant Incident on the **DISCO Distribution System** which has been caused by (or exacerbated by) the Significant Incident on the **User System**.

#### **8.4.3 Written reports of Incidents by the DISCO to Users**

In the case of an **Incident** which has been reported verbally to the **User** under **DOC5.4.5** and subsequently has been determined by the **User** to be a Significant Incident, a written report will be given to the **User** by the **DISCO** in accordance with **DOC8**. 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** connected to its **System** in relation to a Significant Incident which has been caused by (or exacerbated by) the Significant Incident on the **DISCO Distribution System**.

#### 8.4.4 Form

A report will be in writing and shall be sent to the **DISCO** or **User**, containing written confirmation of the verbal notification given under **DOC5** together with more details relating to the Significant Incident, although it need not state the cause of the **Incident**. The report should, as a minimum, contain those matters specified beneath:

- i) Date and time of Significant Incident;
- ii) Location;
- iii) Apparatus involved;
- iv) Brief description of Significant Incident; and
- v) Details of any Demand Control undertaken.
- vi) Effect on Disco including where appropriate:-
  - duration of incident; and
  - estimated date and time of return to normal service.
- vii) Effect on generation including, where appropriate:-
  - generation interrupted;
  - frequency response achieved;
  - MVA<sub>r</sub> performance achieved; and
  - estimated date and time of return to normal service

The above list is not intended to be exhaustive to this **DOC8** and 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.

#### 8.4.5 Timing

A written report shall be given as soon as reasonably practicable after the verbal notification under **DOC5** and in any event a preliminary report shall normally be given within 24 hours of such time.

#### 8.4.6 Duty to report Incidents

Nothing in this **DOC8** shall be construed as relieving **Users** from their duty to report **Incidents** as required by **Regulations** issued by the **Bureau** either in force or that come into force.



#### **8.4.7 Joint investigation into significant incidents**

Where a Significant Incident has been declared and a report submitted under **DOC8** either party or parties may request in writing that a joint investigation be carried out.

The composition of such an investigation panel will be appropriate to the incident to be investigated and agreed by all parties involved.

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.

A joint investigation will only take place where all parties affected by it agree to it. The form and rules of the procedure for, and all matters 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 take place.

Any joint investigation under **DOC8** is separate from any inquiry which may be carried out under the **Water and Electricity Sector** disputes resolution procedure.

## 9. NUMBERING AND NOMENCLATURE

### 9.1 Introduction

**Distribution Operating Code Section 9 (DOC9)** sets out the responsibilities and procedures for notifying the relevant owners of the numbering and nomenclature of **Apparatus** at **Ownership Boundaries**.

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

### 9.2 Objectives

The prime objective embodied in **DOC9** 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.

### 9.3 Scope

**DOC9** applies to the **Users** of the **DISCO Distribution System** as shown in **Schedule 1**.

### 9.4 Procedure

#### 9.4.1 New Apparatus

When the **DISCO** or a **User** intends to install **Apparatus** on a site having an **Ownership Boundary** the proposed numbering and/or nomenclature to be adopted for the **Apparatus** must be notified to the other owners.

The notification will be made in writing to the relevant owners and will consist of an **Operation Diagram** incorporating the proposed new **Apparatus** to be installed and its proposed numbering and/or nomenclature.

The notification will be made to the relevant owners at least eight months prior to the proposed installation of the **Apparatus**.

The relevant owners will 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.

In the event that agreement cannot be reached between the **DISCO**, and the other owners, the **DISCO**, acting reasonably, shall have the right to determine the numbering and nomenclature to be applied at that site.

#### 9.4.2 Existing apparatus

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

The DISCO 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.

#### 9.4.3 Changes to existing apparatus

Where the DISCO 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 DOC9 shall apply with any amendments necessary to reflect that only a change is being made.

Where a User changes the numbering and/or nomenclature of its Apparatus, which is the subject of DOC9, the User will be responsible for the provision and erection of clear and unambiguous labelling.

Where a DISCO changes the numbering and/or nomenclature of its Apparatus, which is the subject of DOC9, the DISCO will be responsible for the provision and erection of clear and unambiguous labelling.

## 10. SPECIAL SYSTEM TESTS

### 10.1 Introduction

**Distribution Operating Code Section 10 (DOC10)** sets out the responsibilities and procedures for arranging and carrying out **Special System Tests** which have or may have an effect on the **Systems** of the **DISCO** or **Users**. **Special System Tests** are those tests which involve either simulated or the controlled application of irregular, unusual or extreme conditions on the **Total System** or any part of the **Total System**, but which do not include commissioning or recommissioning test or any other tests of a minor nature.

### 10.2 Objectives

The objective of **DOC10** are to:

- i. ensure that the procedures for arranging and carrying out **Special System Tests** are such that, so far as practicable, **Special System Tests** do not threaten the safety of personnel or the general public and cause minimum threat to the security of supplies, the integrity of **Plant** or **Apparatus** and are not detrimental to the **DISCO** and **Users**; and
- ii. set out procedures to be followed for establishing and reporting **Special System Tests**.

### 10.3 Scope

**DOC10** applies to the **Users** of the **DISCO Distribution System** as shown in **Schedule 1**.

### 10.4 Procedure

#### 10.4.1 General

If the **System Test** proposed by the **DISCO** or the **User** connected to the **DISCO Distribution System** will or may have an effect on the **TRANSCO Transmission System** then the provisions of **DOC10** or the **Transmission Code** will apply.

**Special System Tests** which have a minimal effect on the **Distribution System** or **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**.

#### 10.4.2 Proposal Notice

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

The proposal will be in writing and will 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.

If the information set out in the proposal notice is considered insufficient by the recipient they will contact the **Test Proposer** with a written request for further information which shall be supplied as soon as reasonably practicable. The **DISCO** shall not be required to do anything under **DOC10** until it is satisfied with the details supplied in the proposal or pursuant to a request for further information.

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

#### **10.4.3 Preliminary notice and establishment of test panel**

The **DISCO** will have overall co-ordination of the **System Test**, using the information supplied to it under **DOC10** and will identify in its reasonable estimation, which **Users** other than the **Test Proposer**, may be affected by the proposed **System Test**.

A **Test Co-ordinator**, who shall be a suitably qualified person, will be appointed by the **DISCO** with the agreement of the **Users** which the **DISCO** has identified may be affected and shall act as Chairman of the **Test Panel** (the “**Test Panel**”).

All **Users** identified under **DOC10** will be given in writing, by the **Test Co-ordinator**, a preliminary notice of the proposed **System Test**. The preliminary notice will contain:

- i. the **Test Co-ordinator’s** name and nominating company;
- ii. the details of the nature and purpose of the **proposed System Test**, the extent and situation of the **Plant** or **Apparatus** involved and the **Users** identified by the **DISCO**;
- iii. an invitation to each **User** to nominate within one month a suitably qualified representative, or representatives where appropriate, to be a member of the **Test Panel** for the proposed **System Test**.

The preliminary notices will be sent with in one month of the receipt to the proposal notice or the receipt of any further information requested.

As soon as possible after the expiry of that one month period all relevant **Users** and the **Test Proposer** will be notified by the **Test Co-ordinator** of the composition of the **Test Panel**.

#### **10.4.4 Test panel**

A meeting of the **Test Panel** will take place as soon as possible after the relevant **Users** and the **Test Proposer** have been notified of the composition of the **Test Panel** and in any event within one month of the appointment of the **Test Panel**.

The **Test Panel** shall consider:

- i. the details of the nature and purpose of the proposed **System Test** and other matters set out in the proposal notice;
- ii. the economic, operational and risk implications of the proposed **System Test**;
- iii. 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 **DISCO**, **TRANSCO** and **Users**; and
- iv. implications of the proposed **System Test** on the **Scheduling** and **Despatch of Generating Plant**, insofar as it is able to do so.

**Users** identified under **DOC10** and the **DISCO** (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**.

The **Test Panel** shall be convened by the **Test Co-ordinator** as often as he deems necessary to conduct its business.

#### **10.4.5 Proposal report**

Within two months of the first meeting the Test Panel will submit a report, which in this **DOC10** shall be called a proposal report, which will contain:

- i. proposals for carrying out the **System Test** (including the manner in which the **System Test** is to be monitored);
- ii. an allocation of costs (including un-anticipated costs) between the affected parties, (the general principle being that the **Test Proposer** will bear the costs); and
- iii. such other matters as the **Test Panel** consider appropriate.

The proposals 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.

If the **Test Panel** is unable to agree unanimously on any decision in preparing its proposal report the proposed **System Test** shall not take place and the **Test Panel** shall be dissolved.

The proposal report will be submitted to all those who received a Preliminary notice.

Within fourteen days of receipt of the proposal report, each recipient will respond to the **Test Co-ordinator** with its approval of the proposal report or its reason for non-approval.

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

If the proposed **System Test** cannot be so modified then the **System Test** will not take place and the **Test Panel** will be dissolved.

If the proposed **System Test** can be so modified the **Test Panel** will 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.

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.

#### **10.4.6 Final test programme**

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** will submit to the DISCO and all recipients of the proposal notice a programme which in this DOC10 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.

The final test programme will bind all recipients to act in accordance with the provisions contained within the programme in relation to the proposed **System Test**.

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 Co-ordinator** as soon as possible in writing. If the **Test Co-ordinator** 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.

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 Co-ordinator** of this decision and the reasons for it. The **Test Co-ordinator** 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 **DOC10** shall apply.

#### **10.4.7 Final report**

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 other members of the **Test Panel**.

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.

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.

When the final report has been submitted under the **Test Panel** shall be dissolved.



## CHAPTER 5 DATA REGISTRATION CODE

### 1. INTRODUCTION

The various sections of the **Distribution Code** require **Users** to submit data to the **DISCO**. 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. 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**.

In the case of a **Generator** seeking a connection to the **DISCO Distribution System** then irrespective of the potential arrangements for **Scheduling** and **Despatch** required under the Transmission Code, discussions on connection will be with the **DISCO** concerned in relation to connection arrangements.

### 2. SCOPE

The **Users** to which the **DDRC** applies are as shown in Schedule 1.

### 3. DATA CATEGORIES

The data required by the **DISCO** is divided into two categories, **System Planning Data (SPD)** and **Operational Data ("OD")**. In order to assess the implications for making a connection the **DISCO** will require **SPD** and **OD** information, the precise requirements being decided by the **DISCO** and dependant upon the circumstances. Following an agreement to connect and not less than 6 weeks before the proposed date of connection the **User** must supply data as requested by the **DISCO** which will be referred to as **Registered Data**.

### 4. PROCEDURES AND RESPONSIBILITIES

Unless otherwise specified or agreed by the **DISCO** each **User** is required to submit data as defined below and the attached schedules. It is a requirement of the **DDRC** that data changes are advised as soon as practicable to the **DISCO** and in any case reviewed annually to ensure continued accuracy or relevance. The **DISCO** will initiate this review in writing and the **User** will respond in writing.

Where possible data will be submitted on standard forms forwarded to the **User** by the **DISCO**.

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

From time to time the **DISCO** may change its data requirements, appropriate **Users** will be advised of these changes as they occur and will be provided with a reasonable timescale by which to reply.

## SCHEDULE 1A - FOR ALL EMBEDDED GENERATORS

Data description	Units	Data category
Terminal Volts	<b>kV</b>	SPD
Rated Kva	<b>kVA</b>	SPD
Rated kW	<b>kW</b>	SPD
Maximum <b>Active Power</b> sent out	<b>kW</b>	SPD
<b>Reactive Power</b> required	<b>kVAr</b>	SPD
Type of generator	Text	SPD
Type of Prime Mover	Text	SPD
Anticipated Operating Regime	Text	SPD
<b>Fault Level</b> Contribution	<b>MVA</b>	SPD
Method of Voltage Control	Text	SPD
<b>Generator</b> Transformer Details	Text	SPD

**SCHEDULE 1B -  
FOR EMBEDDED GENERATORS GREATER THAN  
5MW**

Data description	Units	Data category
Rated <b>MW</b> at <b>Registered Capacity</b> for individual units and the <b>Power Station</b>	<b>MW</b>	SPD
Rated <b>MW</b> at <b>Minimum Generation</b> for individual units and the <b>Power Station</b>	<b>MW</b>	SPD
Auxiliary demand for individual units and the <b>Power Station</b> at <b>Registered Capacity</b> conditions	<b>MW</b> <b>MVA<sub>r</sub></b>	SPD
Auxiliary demand for individual units and the <b>Power Station</b> under <b>Minimum Generation</b> conditions	<b>MVA</b> <b>MVA<sub>r</sub></b>	SPD
Individual <b>Generator</b> Information		
Rating	<b>MVA</b>	SPD
<b>Generator MW/MVA<sub>r</sub></b> Capability Chart	Text	SPD
Inertia Constant	MWsec/MVA	SPD
Stator Resistance	% on MVA	SPD
Direct Axis Reactance	Sub-transient	% on MVA
	Transient	% on MVA
	Synchronous	% on MVA
Quadrature Axis Reactance	Sub-transient	% on MVA
	Synchronous	% on MVA
Time Constants	Direct axis sub-transient	sec
	Direct axis transient	sec
	Quadrature axis sub-transient	Sec

**SCHEDULE 1C -  
FOR EMBEDDED GENERATORS GREATER THAN  
5MW**

<b>Data description</b>	<b>Units</b>	<b>Data category</b>	
Zero Phase Sequence	Resistance	% on MVA	SPD
	Reactance	% on MVA	
Negative Phase Sequence	Resistance	% on MVA	SPD
	Reactance		
Generator Transformer	Resistance		SPD
	Reactance	% on MVA	
	MVA rating		
	Tap Arrangement		
	Vector Group		
	Earthing		
Automatic Voltage Regulator		Diagram	SPD
A block diagram for the model of the AVR system including data on the gains forward and feedback time constants and voltage control limits		Text	
Speed governor and prime mover data		Diagram	SPD
A block diagram for the turbine control system and turbine time constants together with the turbine rating and maximum power		Text	

## SCHEDULE 2 - DEMAND & GENERATION FORECASTS

Data description	Units	Time period covered	Update time	Data category
1. Hourly <b>Active Power and Power Factor</b> at <b>Annual MD Conditions</b> for specified time of the annual peak hour at the associated <b>Transmission Supply Points</b> and at the specified time of the annual peak hour of the <b>TRANSCO Demand</b> .	<b>MW/MVAr</b>	8 weeks – 2 years	Week 20	OD
2. Hourly <b>Active Power and Power Factor</b> at <b>Average Conditions</b> at the specified hour of the annual minimum <b>TRANSCO Demand</b> .	<b>MW/MVAr</b>	8 weeks - 3 years	Week 20	OD
3. The annual energy forecast requirement at <b>Average Conditions</b> identified under the following categories of Domestic, Farms, Commercial, Industrial, Public Lighting and <b>Distribution System</b> losses.	<b>MWh</b>	8 weeks - 3 years	Week 20	OD
4. Hourly Power output of <b>Embedded Generating Plant</b> at the specified hour of the annual peak hour of the <b>TRANSCO Demand</b> .	<b>MW</b>	8 weeks - 3 years	Week 20	OD
5. Schedule s for the operation of <b>Embedded Generating Units</b> whose output is greater than 5MW on a hourly basis (but which are not subject to <b>Central Despatch</b> ).	<b>MW</b> Date time	2 weeks to 8 weeks ahead	1600 hrs each Wednesday	OD

Data description	Units	Time period covered	Update time	Data category
6. <b>DISCO Customers</b> , and other <b>DISCOs</b> connected to the <b>DISCO Distribution System</b> shall notify the <b>DISCO</b> where their or their <b>Customers</b> operations are likely to result in an aggregate change in <b>Demand</b> at the <b>DISCO Connection Point</b> of supply of greater than <b>5MW</b> of the <b>Demand</b> at that time on an hourly basis.	<b>MW</b> Date Time	2 weeks to 8 weeks ahead	1600 hrs each Wednesday	OD
7. Items 5, 6 above updated.		2 days to 12 days ahead	0900 hrs each Monday	OD
8. Details of differences greater than <b>5MW</b> from the schedules of operation of any <b>Embedded Generating Plant</b> on an hourly basis submitted under item5 above.	<b>MW</b> Date Time	0 - 24 hrs ahead	As specified	OD
9. Details from each <b>User</b> connected to the <b>DISCO Distribution System</b> of any change in aggregate <b>Demand</b> at the point of surplus of greater than <b>5MW</b> of the <b>Demand</b> .	<b>MW</b> Date Time	0 - 24 hrs ahead	As specified	OD
10. Detail of half hour <b>Active Power</b> and <b>Reactive Power</b> output sent out to the <b>DISCO Distribution System</b> by <b>Embedded Generating Plant</b> not subject to Scheduling and <b>Despatch</b> during the previous day on a hourly basis.	<b>MW</b> <b>MVAr</b>	Previous day	0300 hrs	OD

<b>Data description</b>	<b>Units</b>	<b>Time period covered</b>	<b>Update time</b>	<b>Data category</b>
11. <b>Other DISCOs</b> connected to the <b>DISCO Distribution System</b> will provide details of the amount and duration of <b>Demand Control</b> at the <b>DISCO Connection Point</b> aggregated to 5MW or more (arranged over any hour) which was implemented during the previous <b>Schedule Day</b> .	<b>MW</b> Time	Previous day	0300 hrs	OD

## SCHEDULE 3A - OPERATIONAL PLANNING: LONG TERM (YEARS 3-5)

Data description	Units	Time period covered	Update time	Data category
1. For individual <b>Generating Units</b> the unit number <b>and Generating Plant</b> capacity. Preferred outage dates earliest start date latest finish date.	MW Date	Years 3 - 5	Week 2	OD
2. <b>DISCO</b> advise <b>Generators</b> of :  details of <b>Generating Plant</b> they may withdraw from service.  <b>Output Usable</b> requirements.	Date  MW Date	Years 3 – 5  Years 3 - 5	Week 12  Week 12	OD  OD
3. <b>Generators</b> provide <b>DISCO</b> with:  update of provisional <b>Generating Plant</b> outage programme.  Registered Capacity.  Neutral weekly Output Usable forecasts.	Date  MW Date	Years 3 - 5	Week 12	OD
4. <b>DISCO</b> following discussion with <b>Generator</b> will notify, with reason, revision to the provisional <b>Generating Plant</b> outage programme	Date	Years 3 – 5	Week 28	OD
5. <b>DISCO</b> following discussion with <b>Generator</b> will notify, with reason, revisions to the provisional <b>Generating Plant</b> outage programme. (This taken into account User outages received in Week 28 ).	Date	Years 3 – 5	Week 42	OD
6. <b>DISCO</b> following discussion with <b>Users</b> agree <b>Users</b> outages.	Date	Years 3 - 5	Week 43	OD



## SCHEDULE 3B - OPERATIONAL PLANNING: LONG TERM (YEARS 1- 2)

Data description	Units	Time period covered	Update time	Data category
1. For individual <b>Generating Units</b> the unit number <b>and Generating Plant</b> capacity. Preferred outage dates earliest start date latest start date.	<b>MW</b> Date	Years 1 - 2	Week 2	OD
2. <b>Generators</b> provide the <b>DISCO</b> with estimates of :  <b>Output Usable.</b>	<b>MW</b> Date	Years 1 - 2	Week 10	OD
Outage programme.	Date	Year 1	Week 12	OD
3. <b>DISCO</b> following discussion with <b>Generator</b> provide:  Details of <b>.Generating Plant</b> they may withdraw from service for an outage  Update of <b>Generator</b> outage programme				
4. <b>DISCO</b> notify each <b>Generator</b> of <b>Output Usable</b> requirements.	<b>MW</b> Date	Years 1 - 2	Week 12	OD
5. <b>Generator</b> provide estimates of <b>Output Usable</b> of each <b>Generating Plant</b>	<b>MW</b> Date	Years 1 - 2	Week 41	OD

## SCHEDULE 3C - OPERATIONAL PLANNING: SHORT TERM

Data description	Units	Time period covered	Update time	Data category
For individual <b>Generating</b> Units the unit number and <b>Generating Plant</b> capacity. Duration of outage earliest start date latest finishing date.	<b>MW</b> Date	Weeks 9 - 52		
<b>Output Usable</b> estimates.	<b>MW</b> Date	Weeks 9 - 52	Week 2	OD
<b>DISCO</b> informs <b>Generators</b> of <b>Output Usable</b> requirements.	<b>MW</b> Date	Weeks 9 - 52	Week 4	OD
<b>Generators</b> provide <b>DISCO</b> with <b>Generating Plant Output Usable</b> estimates.	<b>MW</b> Date	Weeks 18 - 52	Week 10	OD
<b>DISCO</b> informs <b>Generators</b> of change to <b>Output Usable</b> requirements.	<b>MW</b> Date	Weeks 18 - 52	Week 12	OD
<b>Generators</b> provide <b>DISCO</b> with <b>Generating Plant Output Usable</b> estimates.	<b>MW</b> Date	Weeks 28 - 52	Week 25	OD
<b>DISCO</b> informs <b>Generators</b> of changes to <b>Output Usable</b> requirements	<b>MW</b> Date	Weeks 31 - 52	Week 27	OD
<b>Generator</b> will provide estimates of <b>Generating Plant Output Usable</b> .	<b>MW</b> Date	Weeks 44 – 52	Week 41	OD
<b>DISCO</b> inform contracted <b>Generators</b> of changes to <b>Output Usable</b> requirements.	<b>MW</b> Date	Weeks 44 - 52	Week 43	OD

## SCHEDULE 3D - OPERATIONAL PLANNING: USER PLANT AND APPARATUS

Data description	Units	Time period covered	Update time	Data category
<p><b>Users</b> provide the <b>DISCO</b> with details of proposed outages which may affect the performance of the <b>DISCO Distribution System</b>. Details of trip testing, risks of trip and other information where known which may affect the security and stability of the <b>DISCO Distribution System</b> shall also be included.</p> <p>Update of previously submitted data for years 3-5.</p>	Dates	Years 1 – 2 and Years 3 - 5	Week 28	OD
<p>Following consultation with <b>Users</b> and <b>DISCO</b> will include agreed outage proposals in the programme</p> <p>As changes occur.</p>	Date	Years 3 – 5 Years 1 – 2	Week 43 Week 48	OD OD
		Update of <b>Users</b> proposals agreed in the Medium Term Plan.		

## SCHEDULE 4 - SYSTEM DESIGN INFORMATION

Data description	Units	Data category
<p>1. <b>Reactive Compensation</b></p> <p>Rating of individual shunt reactors (not associated with cables)</p> <p>Details of any automatic control logic such that operating characteristic can be determined.</p> <p>Point of connection to the system</p> <p>Lumped Network Susceptance</p> <p>Details of the equivalent lumped network susceptance of the <b>User's System</b> referred back to the connection with the <b>DISCO Distribution System</b></p> <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 <b>User's System</b></p> <p>and: any susceptance of the <b>User's System</b> inherent in the active and reactive <b>Demand</b></p>	<p><b>MVar</b></p> <p><b>MVar</b></p> <p>Text/ Diagrams</p> <p>Diagram</p> <p><b>MVar</b></p>	<p>SPD</p> <p>SPD</p> <p>SPD</p> <p>SPD</p> <p>SPD</p>
<p>2. <b>Fault Infeeds</b></p> <p>Maximum and minimum short circuit infeeds into the <b>DISCO System</b></p> <p>X/R ratio under maximum and minimum short circuit conditions [Contribution from rotating plant ]</p> <p>Equivalent network information at the request of the <b>DISCO</b></p> <p>Interconnection Impedance</p>	<p>MVA</p>	<p>SPD</p> <p>SPD</p>

Data description	Units	Data category
<p>For User interconnections that operate in <b>parallel</b> with <b>DISCO Distribution System</b> details of the interconnection impedance shall be exchanged between the DISCO and User, including</p> <p style="padding-left: 40px;">Positive Sequence Resistance</p> <p style="padding-left: 40px;">Zero Sequence Resistance</p> <p style="padding-left: 40px;">Positive Sequence Resistance</p> <p style="padding-left: 40px;">Zero Sequence Resistance</p> <p style="padding-left: 40px;">Susceptance</p> <p>If the impedance in the view of the <b>DISCO</b> is low then more detailed information will be requested.</p>	<p style="padding-left: 40px;">% on 100</p> <p style="padding-left: 40px;">% on 100</p> <p style="padding-left: 40px;">% on 100</p> <p style="padding-left: 40px;">% on 100</p> <p style="padding-left: 40px;">% on 100</p>	<p style="padding-left: 40px;">SPD</p> <p style="padding-left: 40px;">SPD</p> <p style="padding-left: 40px;">SPD</p> <p style="padding-left: 40px;">SPD</p> <p style="padding-left: 40px;">SPD</p>
<p><b>3. Demand Transfer Capability</b></p> <p>Information shall be exchanged on <b>Demand</b> transfer capability where the same <b>Demand</b> may be supplied from alternative <b>DISCO</b> or <b>User</b> points of supply including the proportion of <b>Demand</b> normally fed from each point of supply.</p> <p>The arrangements for manual/automatic transfer under planned/outage conditions should be provided</p>	<p style="text-align: center;"><b>MW</b></p>	<p style="text-align: center;">SPD</p>
<p><b>4. Non DISCO System Data</b></p> <p>The <b>DISCO</b> will request information on circuit parameters, switchgear and protection arrangements.</p>		
<p><b>5. TRANSCO Transmission System Data</b></p> <p>The <b>DISCO</b> will request, as appropriate, information on circuit parameters, switchgear and protection arrangements including protection settings</p>	<p style="text-align: center;">Text/ Diagrams</p> <p style="text-align: center;">Text/ Diagrams</p>	<p style="text-align: center;">SPD</p> <p style="text-align: center;">SPD</p>

## SCHEDULE 5 - LOAD CHARACTERISTICS

Data description	Units	Data category
Types of Demand :		
Maximum <b>Active Power Demand</b>	<b>kW</b>	SPD
Maximum and minimum <b>Reactive Power</b> requirement	<b>kVAr</b>	SPD
Type of load and control arrangements, eg variable speed motor type of starter employed	Text	SPD
Maximum load on each phase at the time of maximum demand	Amps/Phase	SPD
Maximum phase unbalance	Amps/Phase at the time	SPD
Maximum harmonic content	% of harmonic number	SPD
Fluctuating Loads :		
Rate of change of active and reactive power both increasing and decreasing	kW/sec kVAr/sec	SPD
Shortest repetitive time interval between fluctuation in active and reactive power	Sec	SPD
Largest step change in active and reactive power both increasing and decreasing.	kW kVAr	SPD

## ANNEX 1 : ENGINEERING RECOMMENDATIONS & RELEVANT DOCUMENTS

The following table identifies documents that are referenced to in the Code and which are integral to the operation and understanding of the Code. This Annex shall be kept and maintained by the Distribution Code Review Panel as part of the Code. The latest version of the Annex shall be that most recently approved by the Bureau and shall be available to any User of the Code on the same basis as the Code.

Any change to the Annex or to a document contained therein shall be made in accordance with the governing procedures of the originating authority, which maybe outside of the Panel's Authority. It shall however be the duty of the Panel to ensure that any such modification is reflected in the Code and Annex as appropriate, and to ensure that any necessary alteration to the Annex is made as if it were an integral part of the Code.

Item No	Title
1.	Engineering Recommendation No. 1 LIMITS FOR HARMONICS IN THE ELECTRICITY SUPPLY SYSTEM.
2.	<del>Engineering Recommendation [ ], Requirements For The Application Of Protective Multiple Earthing To Low Voltage Networks. (Withdrawn - Number not to be used)</del>
3.	Engineering Recommendation No. 3 CONNECTION OF EMBEDDED GENERATING PLANT UP TO 5MW.
4.	Engineering Recommendation [ ], SECURITY OF SUPPLY.
5.	<del>Engineering Recommendation [ ], The Short Circuit Characteristics Of Low Voltage Distribution Networks And The Coordination Of Overcurrent Protective Devices On 230v Single Phase Supplies Up To 100a. (Withdrawn - Number not to be used)</del>
6.	<del>Engineering Recommendation [ ], The Estimation Of The Maximum Prospective Short Circuit Current For Three Phase 415v Supplies. (Withdrawn - Number not to be used)</del>
7.	Engineering Recommendation No. 7 LIMITS FOR VOLTAGE FLUCTUATIONS IN THE ELECTRICITY SUPPLY SYSTEM
8.	Engineering Recommendation [ ], EARTHING INSTALLATIONS IN SUBSTATIONS.
9.	Engineering Recommendation [ ], A GUIDE FOR ASSESSING THE RISE OF EARTH POTENTIAL AT SUBSTATION SITES.
10.	Engineering Recommendation No. 10 LIMITS FOR VOLTAGE UNBALANCE IN THE ELECTRICITY SUPPLY SYSTEM

# Annex 1

## of The Electricity Distribution Code

- Engineering Recommendation No. 1:  
Limits for Harmonics in the Electricity Supply System
- Engineering Recommendation No. 3:  
Connection of Embedded Generation Plant up to 5MW
- Engineering Recommendation No. 7:  
Limits for Voltage Fluctuations in the Electricity Supply System
- Engineering Recommendation 10:  
Limits for Voltage Unbalance in the Electricity Supply System