NORTHERN IRELAND ELECTRICITY NETWORKS LIMITED

DISTRIBUTION CODE

ISSUE 5 – 26 APRIL 2019

SUMMARY OF CHANGES

Issue	Date	Details of Change
1	01/05/2010	Original Issue
2	12/02/2015	• Introduction of Setting Schedules • Amendments to Planning Code with references to Setting Schedules • Amendments to **Connection Conditions** • Amendments to **CC** 7 • Amendments to **CC** 7.4 o Clarifications regarding Type A and Type B Power Stations o Introduction of Type C Power Stations (Registered Capacity ≥ 5MW) o Introduction of minimum reactive capability charts for Type A, Type B and Type C Power Stations • **CC** 7.6 Introduction of Reactive Power control modes • **CC** 7.10 Introduction of Fault Ride Through requirements • **CC** 7.14 Amendments to Power Station Control Requirements • **CC** 7.15 Amendments to Power Station SCADA and control o Removal of specific signal lists. These are now set out in the Setting Schedules • **CC** 8.1 o Responsibilities for SCADA and RTUs set out based on registered capacity • **CC** 10 o Amendments with references to Setting Schedules • **CC** 11 o Amendments with references to Setting Schedules o Amendments to Compliance Testing Process o Introduction of Temporary Compliance Certificates and Restricted Compliance Certificates o **CC** 11.3 Introduction of Compliance process for Non Centrally Dispatched Generation Units
3	17/10/2017	• Amendments to **Connection Condition** 7 o Statements of 'this paragraph' now reference specific paragraph numbers. o Introduction of two new paragraphs inserted as **CC** 7.10 and **CC** 7.11 Relating to amendments to generator interface protection o Introduction of Appendix 4: Guidance on Risk Assessment when Using RoCoF LoM Protection • Amendments to Setting Schedules • For Power Stations with a Registered Capacity from 100kW to under 5MW, name change to SSG Setting Schedule
4	11/05/18	• Amendments to **Connection Condition** 7 o Revision to the table in **CC** 7.11 to make requirements apply to all generators with G59 protection o Revision to **CC** 7.11.3 to place requirements on generators with G59 protection connected after 11th May 2018 o Additional paragraph **CC** 7.11.5 to place requirements on generators with G59 protection connected prior 11th May 2018 • Amendments to SSG Setting Schedule o References to paragraph numbers of **Connection Conditions** updated
5	26/04/2019	• Modification to **Connection Condition** 7 to allow for compliance with the European Network Code Requirements for Generators • Modification to defined terms to align with the European Network Code Requirements for Generators.

		• New Annex 1 documents that form part of the Distribution Code.

TABLE OF CONTENTS

Introduction

1 The **Distribution Code** is designed to permit the development, maintenance and operation of an efficient, co-ordinated and economical **Distribution System** and generally to facilitate competition in the generation and supply of electricity. It is conceived as a statement of what is optimal (particularly from a technical point of view) for all **Users** and the **DNO** itself in relation to the planning, operation and use of the **Distribution System**. It seeks to avoid any undue discrimination between **Users** and categories of **Users**.

2 The operating procedures and principles governing the **DNO's** relationship with all **Users** of the **Distribution System**, be they **Generators**, **Suppliers**, or **Demand Customers**, are set out in the **Distribution Code**. The **Distribution Code** specifies day-to-day procedures for both planning and operational purposes and covers both normal and exceptional circumstances.

3 The **Distribution Code** is divided into the following sections:-

(a) a **Planning Code** which provides generally for the supply of certain information by **Users** in order that the planning and development of the **Distribution System** may be undertaken;

(b) **Connection Conditions** which specify the minimum technical, design and certain operational criteria which must be complied with by **Users** connected to or seeking connection with the **Distribution System**;

(c) an **Operating Code** which is split into a number of sections and deals with:-

(i) Generation and **Demand** forecasting (OC1);

(ii) the co-ordination of the **Outage** planning process in respect of **Generating Units** and **Power Generating Module Equipment** and **Outages** of equipment on the **Distribution System** for construction, repair and maintenance (OC2);

(iii) different methods of reducing **Demand** (OC3);

(iv) the reporting between the **DNO** and **Users** of scheduled and planned actions and unexpected occurrences such as faults (OC4);

(v) the provision of written reports on occurrences such as faults in certain circumstances (OC5);

(vi) the co-ordination, establishment and maintenance of **Isolation** and **Earthing** in order that work and/or testing can be carried out safely (OC6);

(vii) certain aspects of contingency planning (OC7);

(viii) the procedures for determining the number and nomenclature of **Plant** and **Apparatus** at **Connection Sites** (OC8);

(ix) the procedures for the establishment of **System Tests** (OC9); and

(x) **Testing**, **Monitoring** and **Investigations** in relation to **User's Plant** and **Apparatus** (OC10);

(d) **General Conditions** which are intended to ensure, so far as possible, that the various sections of the **Distribution Code** work together and work in practice and which include provisions relating to the establishment of a **Distribution Code Review Panel** and other provisions of a general nature; and

(e) a **Distribution Metering Code** which deals with the basic requirements for metering.

4 A matrix is provided as Appendix 1 to this section which sets out, for information only, a guide to the applicability of each section of the **Distribution Code** to different categories of **Users**. It is, however, for each **User** to review the relevant sections of the **Distribution Code** to decide itself with which sections it must comply.

5 This Introduction is provided to **Users** and to prospective **Users** for information only and does not constitute part of the **Distribution Code**.

Appendix 1

This matrix provides, for information only, a guide to the applicability of each section of the Distribution Code to different categories of **Users**. It is, however, for each **User** to review the relevant sections of the **Distribution Code** to decide itself with which sections it must comply.

	GC	PC	**CC**	OC1	OC2	OC3	OC4	OC5	OC6	OC7	OC8	OC9	OC10	MC
Generator with a CDGU	✓✓	✓✓	✓✓		✓✓	✓	✓	✓	✓	✓	✓	✓✓	✓✓	✓✓
Generator with a Controllable PPM	✓✓	✓✓	✓✓		✓✓	✓	✓	✓	✓	✓	✓	✓✓	✓✓	✓✓
Generator with a connection at 33kV	✓✓	✓✓	✓✓	✓	✓	✓	✓✓	✓✓	✓✓	✓	✓✓	✓✓	✓✓	✓
Generator with a connection at 11kV	✓✓	✓✓	✓✓	✓					✓✓	✓	✓	✓✓	✓✓	✓
Generator with a connection at 6.6kV	✓✓	✓✓	✓✓	✓					✓✓	✓	✓	✓✓	✓✓	✓
Generators with a rating of 70kVA and above	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Generator with Independent Generating Plant > 1MW	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓	✓	✓	✓	✓	✓✓	✓✓	✓✓
Suppliers	✓✓	✓✓		✓	✓	✓✓	✓	✓		✓				✓✓
Demand Customer	✓✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓✓	✓	✓
Demand Customer with a connection at 33kV	✓✓	✓	✓✓	✓	✓	✓	✓✓	✓✓	✓✓	✓	✓✓	✓✓	✓✓	✓
Demand Customer with a connection at 11kV	✓✓	✓	✓✓	✓			✓✓	✓✓	✓✓	✓	✓	✓✓	✓✓	✓
Demand Customer with a connection at 6.6kV	✓✓	✓	✓✓	✓			✓✓	✓✓	✓✓	✓	✓	✓✓	✓✓	✓
Demand Customer > 1MW	✓✓	✓✓	✓✓	✓✓	✓	✓	✓	✓	✓	✓	✓	✓✓	✓✓	✓✓
Demand Customer > 10MW	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓	✓	✓	✓	✓	✓✓	✓✓	✓✓
Demand Customer ≥70kVA	✓✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓✓	✓✓	✓✓

✓ - **Users** in this category have relevant information but no specific obligations set out in this section.

✓✓ - **Users** in this category have specific obligations set out in this section.

General Conditions

1 Introduction

1.1 The **General Conditions** contain provisions which are of general application to all sections of the **Distribution Code**. Their objective is to ensure, to the extent possible, that the various sections of the **Distribution Code** work together and work in practice for the benefit of all **Users**.

2 Scope

2.1 The **General Conditions** apply to the **DNO** and to all **Users**. The term "**Users**" in these **General Conditions** means all persons (other than the **DNO** and the **TSO**) referred to in any individual section of the **Distribution Code** is expressed to apply.

2.2 Some **Users** whose **Plant** and **Apparatus** are connected to the **Distribution System** may also be required to comply with the **Grid Code**. **Users** should therefore check the **Grid Code** to see whether they are required to comply with the **Grid Code** as well as the **Distribution Code**. It is intended by the **DNO** that there should be no provision in the **Distribution Code** which would require a **User** to act in a way which would require it to be in breach of its **Grid Code** obligations.

2.3 The **Distribution Code** affects any person whose **Plant** and/or **Apparatus** is connected to the **Distribution System** or who otherwise uses the **Distribution System**, even where they are not expressed to be "**Users**" under any individual section of the **Distribution Code**. Anything done by the **DNO** under or pursuant to the **Distribution Code** which affects, or which may affect such persons, shall be deemed to be undertaken under the **Distribution Code** in relation to those persons.

3 Assistance in Implementation

3.1 The **Licence** held by the **DNO** imposes a duty upon the **DNO** to implement the **Distribution Code** and it is accepted by the **DNO** and all **Users** that the **Distribution Code** must, therefore, be capable of being enforced by the **DNO**. In certain cases the **DNO** may need access across boundaries, services and facilities from **Users** or to issue instructions to **Users** in order to be able to implement and enforce the **Distribution Code**. It is hoped that these cases would be exceptional and it is not, therefore, possible to envisage precisely or comprehensively what the **DNO** might reasonably require in order to put it in a position to be able to carry out its duty to implement and enforce the **Distribution Code**, in these cases.

3.2 Accordingly, all **Users** are required not only to abide both by the letter and the spirit of the **Distribution Code**, but also to provide the **DNO** with such rights of access, services and facilities and to comply with such instructions as it may reasonably require to implement and enforce the **Distribution Code**.

4 Unforeseen Circumstances

4.1 If circumstances arise which the provisions of the **Distribution Code** have not foreseen, the **DNO** shall, to the extent reasonably practicable in the circumstances, consult promptly and in good faith all affected **Users** in an effort to reach agreement as to what

action should be taken. If agreement between the **DNO** and such **Users** cannot be reached in the time available, the **DNO** shall determine what is to be done. Whenever the **DNO** makes a determination, it shall do so having regard, wherever possible, to the views expressed by **Users** and, in any event, to what is reasonable in all the circumstances. Each **User** shall comply with all instructions given to it by the **DNO** following such a determination provided that the instructions are consistent with the then current technical parameters of the relevant **User's System** registered under the **Distribution Code**. The **DNO** shall, as soon as reasonably practicable following the occurrence of unforeseen circumstances, notify all relevant details thereof to the Panel for consideration in accordance with paragraph 6.2 (e).

5 Hierarchy

5.1 In the event of any conflict between the provisions of any direction of the **Secretary of State** or the **Minister** on the one hand and any provisions of the **Distribution Code** on the other, the provisions of such direction shall prevail (provided that such direction or ruling is binding upon the person to whom it is addressed), and neither the **DNO** nor any **User** shall be liable for failing to comply with the conflicting provision of the **Distribution Code**.

5.2 In the event of any conflict between the provisions of the **Distribution Code** unless otherwise specified and any contract, agreement or arrangement between the **DNO** and a **User**, the provisions of the **Distribution Code** shall prevail unless the **Distribution Code** expressly provides otherwise.

6 The Distribution Code Review Panel

6.1 The **DNO** shall establish and maintain the **Panel**, which shall be a standing body carrying out the functions referred to in paragraph 6.2.

6.2 The **Panel** shall:

(a) keep the **Distribution Code** and its working under review;

(b) review all suggestions for amendments to the **Distribution Code** which the **Authority** or any **User** may submit to the **DNO** for consideration by the **Panel** from time to time;

(c) determine recommendations for amendments to the **Distribution Code** which the **DNO** or the **Panel** feels are necessary or desirable and the reasons for the recommendations;

(d) issue guidance in relation to the **Distribution Code** and its implementation, performance and interpretation upon the reasonable request of any **User**;

(e) consider what changes are necessary to the **Distribution Code** arising out of any unforeseen circumstances referred to it by the **DNO** under paragraph 4.1; and

(f) establish and maintain governance arrangements for national electricity industry standards that implement **Distribution Code** requirements, and which are listed in Annex 1 of the **Distribution Code** and form part of the **Distribution Code**.

6.3 The **Panel** shall consist of the following persons, each of whom shall have the right to vote:-

(a) a chairman appointed by the **DNO**;

(b) four persons representing the **DNO**;

(c) three persons representing **Generators**;

(d) one person representing **Demand Customers** with large energy usage;

(e) three persons representing electricity **Suppliers**; and

(f) one person appointed by and representing the **Authority**.

6.4 The Chairman may invite a representative of the **TSO** to attend meetings of the **Panel**.

6.5 The **Panel** shall establish and comply at all times with its own rules and procedures relating to the conduct of its business, which shall be approved by the **Authority**.

6.6 The **DNO** shall submit all proposed amendments to the **Distribution Code** (regardless of which party proposes such amendment) to the **Panel** for discussion prior to fulfilling any obligations under its **Licence** in relation to wider consultation.

7 Communication between the DNO and Users

7.1 Unless otherwise specified in the **Distribution Code**, all instructions given by the **DNO** and communications (other than those relating to the submission of data and notices) between the **DNO** and **Users** (other than **Generators**) shall take place between the Duty Shift Manager and the relevant **User's Responsible Engineer/Operator** or such other person as the **DNO** or the **User** (as the case may be) may from time to time notify to the other for such purposes.

7.2 Unless otherwise specified in the **Distribution Code**, all instructions given by the **DNO** and communications (other than those relating to the submission of data and notices) between the **DNO** and a **Generator** shall take place between the Duty Shift Manager and the **Generator** or such other person as the **DNO** or the **Generator** (as the case may be) may from time to time notify to the other for such purposes.

7.3 Unless otherwise specified in the **Distribution Code**, all instructions given by the **DNO** and communications (other than relating to the submission of data and notices which shall be submitted pursuant to paragraph 8.2) between the **DNO** and **Users** will be by means of telephone with a facility to record messages permanently or by electronic mail (using only e-mail addresses which have either been previously communicated to the **User** by the **DNO** or to the **DNO** by the **User**.). Any responses required to a communication shall make use of the same means, telephone with a facility to record messages permanently or by electronic mail, as the original communication.

7.4 Where instructions or communications are given under the **Distribution Code** by means of a communications system with a facility to record (by whatever means) messages permanently, such recording shall be accepted by the **DNO** and **Users** as evidence of those instructions or communications.

8 Data and Notices

8.1 Data collected by, or otherwise passed to, the **DNO** under the **Distribution Code** may be given to the **TSO** under the **Grid Code** or under the **Transmission Interface Agreement**, where the **DNO** is required or permitted to pass that data across.

8.2 Data and notices to be submitted to the **DNO** under the **Distribution Code** (other than data which is the subject of a specific requirement of the **Distribution Code** as to the manner of its delivery) shall be delivered in writing either by hand or sent by registered first class pre-paid post, or by facsimile transmission, or by electronic mail (using only an e-mail address which has been previously communicated to the **User** by the **DNO**).

8.3 Data delivered pursuant to paragraph 8.2 shall:

(a) in the case of data to be submitted by a **User** prior to the connection of its **Plant** and/or **Apparatus** to the **Distribution System**, in relation to that **Plant** and/or **Apparatus**, be addressed to the Network Risk and Investment Manager at the address notified by the **DNO** to the **User** following receipt of an application for connection to the **Distribution System**, or to such other department within the **DNO** or address as the **DNO** may notify to the **User** from time to time; and

(b) in the case of data to be submitted by a **User** in respect of **Plant** and/or **Apparatus** connected to the **Distribution System**, be addressed to the Distribution Service Centre Manager at the address notified by the **DNO** to the **User** prior to connection to the **Distribution System**, or to such other department within the **DNO** or address as the **DNO** may notify to the **User** from time to time.

8.4 Notices submitted to **Users** shall be addressed to such person as may be notified in writing to the **DNO** from time to time by the relevant **User** at its address(es) notified by the **User** to the **DNO** in writing from time to time for submission of data and service of notices under the **Distribution Code** (or failing which to the registered or principal office of the **User**).

8.5 Where applicable all data items will be referenced to nominal voltage and **Frequency** unless otherwise stated.

9 Ownership of Plant and/or Apparatus

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

10 Emergency Situations

Users should note that the provisions of the **Distribution Code** may be suspended in whole or in part pursuant to any directions given and/or orders made by the **Secretary of State** under Article 58 of the **Order**.

11 Illegality and Partial Invalidity

If any provision of the **Distribution Code** should become or be declared unlawful or partially invalid for any reason, the validity of all remaining provisions of the **Distribution Code** shall not be affected. If part of a provision of the **Distribution Code** is invalid or unlawful but the rest of such provision would remain valid if part of the wording were deleted, the provision shall apply with such modifications as may be necessary to make it valid and effective but without affecting the meaning or validity of any other provision of the **Distribution Code**.

Planning Code

1 Introduction

1.1 The **Planning Code** ("**PC**") and **Setting Schedules** specifies the requirements for the supply of information to the **DNO** by persons connected or persons seeking a new or modified connection to the **Distribution System** in order to enable the planning and development of the **Distribution System** and, where required, the co-ordinated planning and development of the **Transmission System**.

1.2 It also specifies the technical and design criteria and procedures to be applied in the planning and development of the **Distribution System** and to be taken account of by persons connected or seeking connection to the **Distribution System** in the planning and development of their own **Systems**.

1.3 The **DNO** has obligations under the **Grid Code** planning code to provide data to the **TSO** in order for the development of the **Transmission System** to be planned. Certain information received by the **DNO** from **Users** under this **PC** and **Setting Schedules** may be passed on to the **TSO** in accordance with the **DNO's** obligations under the **Grid Code**.

1.4 **System** developments must be planned with sufficient lead time to allow any necessary consents to be obtained and detailed engineering design and construction works to be completed. Therefore, the **PC**, **Setting Schedules** and the relevant **Connection Agreement** impose appropriate timescales on the exchange of information between the **DNO** and **Users** subject to all parties having regard, where appropriate, to the confidentiality of such information

2 Objectives

2.1 The objectives of the **PC** are to:-

(a) provide for the supply of information from **Users** to the **DNO** which is required by the **DNO** in order for the development (including reinforcement and extension) of the **Distribution System** to be planned;

(b) provide for the supply of information from **Users** to the **DNO** which is required by both the **DNO** and the **TSO** in order to enable the planning and development of the **Transmission System**;

(c) reflect the **Licence** requirements for the supply of information from the **DNO** to **Users** in the form of **Statements on Distribution System Capacity**;

(d) set out the requirements for the supply of information from **Users** to the **DNO** in respect of any proposed development on a **User's System** which may impact on the performance of the **Distribution System** or the **Transmission System**; and

(e) specify the technical and design criteria and procedures which will be applied by the **DNO** in the planning and development of the **Distribution System** and which are to be taken into account by **Users** in the planning and development of their own **Systems**.

3 Scope

3.1 The **PC** applies to the **DNO** and to **Users**, which in the **PC** means:-

(a) **Generators** in respect of their **Plant** and/or **Apparatus** connected to the **Distribution System**;

(b) **Suppliers**; and

(c) **Demand Customers** in respect of their **Connection Sites** with a **Demand** of 1**MW** and above.

3.2 Persons whose prospective activities would place them in any of the above categories of **User** will, as a result of the application procedure for a **Connection Agreement**, become subject to the **PC** prior to their generating, supplying or consuming electricity, as the case may be, and references to the various categories (or to the general category) of **User** should, therefore, be taken as referring to them in that prospective role as well as to **Users** actually connected.

4 Categories of planning data

4.1 Planning data required under the **PC** from **Users** is allocated to one of two categories:-

(a) **Standard Planning Data**; and

(b) **Detailed Planning Data**.

4.2 Lists of **Standard Planning Data** and **Detailed Planning Data** are set out in Appendices A and B to this **PC**.

5 Manner of provision by Users

5.1 All data to be supplied by **Users** to the **DNO** pursuant to this **PC** shall reflect the best possible estimate or measurement available to the **User** in the circumstances, shall be supplied in writing by the date specified for the purpose of the **PC** or, where no date is so specified, in a prompt and timely manner. The **DNO** shall be entitled to require any **User** to submit further information in the event that it considers any data supplied to it by such **User** to be unclear or incomplete.

5.2 Failure by a **User** to comply with its obligation under paragraph 5.1 may result in the **Distribution System**, and, in certain circumstances, the **Transmission System**, being planned in accordance with incorrect data and/or a delay in the offer of terms being made to the **User** by the **DNO** for connection.

6 Distribution System Planning Criteria

The **DNO** shall ensure that the relevant **Licence Standards** are applied in the planning and development of the **Distribution System** and these shall be taken into account by **Users** in the planning and development of their own **System**s.

7 Statement on Distribution System Capacity

7.1 By way of information for **Users**, and generally without imposing any other or further obligation to that contained in the **Licence** of the **DNO**, this paragraph 7 sets out a brief description of the position regarding the provision by the **DNO** to **Users** of **Statements on Distribution System Capacity**.

7.2 One of the means by which **Users** and intending **Users** are able to assess available **Distribution System** capacity is the **Statement on Distribution System Capacity**, prepared by the **DNO** under its **Licence** where requested by any person, showing present and future circuit capacity, forecast power flows and loading on the part or parts of the **Distribution System** specified in the request and fault levels for each network node covered by the request.

7.3 A **Statement on Distribution System Capacity** will, unless the **DNO** is relieved of its obligation by the **Authority** pursuant to its **Licence**, be prepared if requested by any person and the **DNO** will, subject to paragraph 7.4, give or send such statement to the person making the request. Where a **User** requested a **Statement on Distribution System Capacity** the **User** must provide sufficient information to the **DNO** to enable the statement to be made, including, but not limited to, the relevant **Standard Planning Data**. The statement shall, in addition to those matters set out in paragraph 7.2 include:

7.3.1 such further information as shall be reasonably necessary to enable the person requesting it to identify and evaluate the opportunities available when connecting to and making use of the part or parts of the **Distribution System** specified in the request; and

7.3.2 if so required, a commentary prepared by the **DNO** indicating its view as to the suitability of the part or parts of the **Distribution System** specified in the request for new connections and transport of further quantities of electricity.

7.4 The **DNO** may within 10 days after receipt of the request for a **Statement on Distribution System Capacity** provide the requester with an estimate of its reasonable costs in the preparation of the statement and the provision of the statement under paragraph 7.3 shall be conditional upon the person requesting the statement agreeing to pay the charge (or such other amount as the **Authority** may direct). The statement shall be given or sent within 28 days (or, where the **Authority** so approves, such longer period as the **DNO** may reasonably request, having regard to the nature and complexity of the request) of the later of the date of receipt of the request or the date on which the **DNO** receives agreement from the requester to pay the charge estimated or the date on which the amount is determined by the **Authority**. Where no charge is to be levied, the statement shall be given or sent within 28 days of the receipt of the request.

8 Status of Planning Data

8.1 For **Planning Code** purposes, planning data supplied by **Users** is allocated to one of three status levels which provide a progression related to degrees of confidentiality, commitment and validation, as follows:-

8.2 Preliminary Project Planning Data

8.2.1 Data supplied by a **User** in conjunction with an application for connection to the **Distribution System** shall be considered as **Preliminary Project Planning**

Data until such time as a binding **Connection Agreement** is established between the **DNO** and the **User**.

8.2.2 Subject to paragraph 8.2(c), this data shall not be disclosed by the **DNO** unless and until it becomes **Committed Project Planning Data** and/or **Registered Project Planning Data** whereupon the following applicable disclosure provisions of this paragraph 8 will apply.

8.2.3 The **DNO** may disclose **Preliminary Project Planning Data** to the **TSO** for the purposes of consideration of developments such as, for example, reinforcement or upgrading of the **Transmission System**.

8.2.4 **Preliminary Project Planning Data** will normally contain only **Standard Planning Data**, unless **Detailed Planning Data** is specifically requested by the **DNO** to permit more detailed **Distribution System** or **Transmission System** studies.

8.3 Committed Project Planning Data

When the offer for a **Connection Agreement** is accepted, the data relating to the **User's** development submitted as **Preliminary Project Planning Data** and data required or received subsequently by the **DNO** under this **PC** shall have the status of **Committed Project Planning Data**. Until such time as **Registered Project Planning Data** is received for a new or modified connection to the **Distribution System**, **Committed Project Planning Data,** together with other data held by the **DNO** relating to the **Distribution System,** shall form the background against which new applications from **Users** shall be considered and against which planning of the **Distribution System** and the **Transmission System** shall be undertaken. Accordingly, **Committed Project Planning Data** may be disclosed by the **DNO** to the extent that the **DNO**:-

(a) needs to disclose it in **Statements of Distribution System Capacity** and in any further information which the **DNO** is required to provide together with **Statements of Distribution System Capacity**;

(b) needs to disclose it when considering and/or advising on applications (or possible applications) of **Users**, including disclosure of it or data from it both orally and in writing, to other **Users** making an application (or considering or discussing a possible application) which is, in the **DNO's** view, relevant to that application or possible application;

(c) needs to disclose it to the **TSO** for the purposes of the planning and/or the development of the **Transmission System**; or

(d) needs to disclose it for operational purposes.

Committed Project Planning Data may contain both **Standard Planning Data** and **Detailed Planning Data**.

8.4 Registered Project Planning Data

8.4.1 The **Connection Conditions** require that, before an agreed connection to the **Distribution System** may be physically established, any estimated values contained within the **Committed Project Planning Data** shall be replaced, where practicable, by validated actual values and as appropriate by updated forecasts for future data items such as **Demand**. Data provided at this stage is termed **Registered Project Planning Data**.

8.4.2 **Registered Project Planning Data** may contain both **Standard Planning** and **Detailed Planning Data**.

8.4.3 **Registered Project Planning Data**, together with other data held by the **DNO** relating to the **Distribution System** will form the background against which new applications by any **User** will be considered and against which planning of the **Distribution System** and the **Transmission System** will be undertaken. Accordingly, **Registered Project Planning Data** may be disclosed by the **DNO** to the extent that the **DNO**:-

(a) needs to disclose it in the preparation of **Statements of Distribution System Capacity** and in any further information which the **DNO** is required to provide together with the **Statement of Distribution System Capacity**;

(b) needs to disclose it when considering and/or advising on applications (or possible applications) of **Users**, including disclosure of it or data from it both orally and in writing, to other **Users** making an application (or considering or discussing a possible application) which is, in the **DNO's** view, relevant to that application or possible application;

(c) needs to disclose it to the **TSO** for the purposes of the planning and/or the development of the **Transmission System**; or

(d) needs to disclose it for operational purposes.

8.5 For the avoidance of doubt, the **DNO** may additionally use the data supplied for the purposes referred to in this **PC**, in complying with the requirements of its **Licence** and for operational purposes and nothing herein shall limit the **DNO's** rights to disclose information pursuant to any provisions relating to confidentiality in any **Connection Agreement** or in the **Licence** held by the **DNO**.

9 Application for a new or modified Connection Agreement

9.1 Any person seeking to establish a new or modified **Connection Agreement** pursuant to the **Licence** held by the **DNO** must make application on the standard application form which is available from the **DNO** on request. The application shall include:-

(a) a description of the **Plant** and/or **Apparatus** to be connected to the **Distribution System** or, as the case may be, of the modification relating to the **User's Plant** and/or **Apparatus** already connected to the **Distribution System** each of which shall be termed a "**Development**" in this **PC**;

(b) the relevant **Standard Planning Data** as listed in Appendix A; and

(c) the desired completion date of the proposed **Development**.

9.2 A **User** must, within 28 days after acceptance of an offer made by the **DNO** for a new **Connection Agreement** (or such longer period as the **DNO** may reasonably agree in a particular case), supply (to the extent not already supplied) to the **DNO** the relevant **Detailed Planning Data** as listed in Appendix B.

9.3 Any **User** seeking to establish modified arrangements for connection to the **Distribution System** must, in addition to the provisions set out above, apply to the **DNO** in accordance with the procedure set out in the relevant **Connection Agreement**.

10 Offers Conditional on Consents and Statutory Obligations

10.1 An offer by the **DNO** to a **User** for connection to the **Distribution System** may be conditional upon the obtaining of or compliance with any necessary consents, approvals, permissions, wayleaves, or other external requirements (whether of a statutory, contractual or other nature).

10.2 A **User** whose **Development** requires the **DNO** to obtain any of the consents, approvals, permissions and wayleaves or to comply with any other requirements referred to in paragraph 10.1 shall:-

(a) provide any necessary assistance, supporting information or evidence; and

(b) ensure attendance by such witness as the **DNO** may reasonably request.

10.3 If any planning or other consent or approval is granted, but is conditional upon a change in the design arrangements originally offered by the **DNO** (e.g. undergrounding), then the **DNO** shall make a revised offer to the **User**, including revised terms and timing. This revised offer shall form the basis of any **Connection Agreement**.

10.4 The **Connection Agreement** will deal with the consequences if any necessary consent is not granted.

11 Annual Planning Data Requirements

11.1 Requirement to provide annual planning data

11.1.1 **Users** must provide sufficient planning data annually as set out below, or as reasonably requested by the **DNO** from time to time, to enable the **DNO** to comply with the requirements under its **Licence** and under the **Grid Code**.

11.1.2 Planning data submissions must be:-

(a) provided by the categories of **Users** specified in paragraph 11.2.1 on a routine annual basis by the end of calendar week 9 of each year or such other annual date as the **DNO** may, upon not less than 6 months' notice, notify to such **Users** in writing; and

(b) provided by a **User** at the time that it notifies the **DNO** of any proposed significant changes to its operating regime.

11.1.3 Annual planning data submissions must be in respect of the remainder of the current year and each of the seven succeeding calendar years (other than in the case of **Registered Project Planning Data** which will reflect the current position).

11.1.4 In the case of submission on a routine annual basis, where from the date of one annual submission to another there is no change in the data (or some of the data) to be submitted, instead of re-submitting the data a **User** may submit a written statement that there has been no change from the data (or the relevant data) submitted the previous time.

11.1.5 In the case of submissions under paragraphs 11.1.2(b), the notification must include the time and date at which the proposed change will become, or is expected to become, effective. Notice must be given as soon as practicably possible in advance to enable the **DNO** to implement properly any necessary System modifications. In the event of unplanned changes in a **User's** operating regime the **User** shall notify the **DNO** as soon as is practicably possible to ensure that any contingency measures, which the **DNO** considers necessary, can be implemented by the **DNO**.

11.2 Data to be provided

11.2.1 **Standard Planning Data** in every case, and **Detailed Planning Data** if required by the **DNO**, by reasonable notice in advance of the submission ("reasonableness" being judged in this context by reference to the amount of time which it may take to collate the required data), shall (unless there has been no change from the data submitted the previous time, in which case the provisions of paragraph 11.1.4 shall apply) be submitted to the **DNO** annually by **Users** in the following categories:-

(a) in respect of all **Generators** with distribution connected **Generating Units** which have an **Output** of 1**MW** and above; and

(b) **Demand Customers** in respect of their **Connection Sites** with a **Demand** of 1**MW** and above.

11.2.2 **Standard Planning Data** shall be provided by **Users** at the time that they notify the **DNO** of any significant changes to their **System** or operating regime. **Detailed Planning Data** shall be provided by **Users** in these circumstances if required by the **DNO**.

Appendix A - Standard Planning Data Requirements

1 Introduction

1.1 This Appendix A specifies the **Standard Planning Data** to be submitted to the **DNO** by **Users** pursuant to the **Planning Code**.

1.2 Data marked thus "‡" is only required where the **Registered Capacity** of a **Generating Unit** is 100kW or more.

2 Connection Site and User System data

2.1 General

All **Users** shall provide the **DNO** with the details as specified in paragraphs 2.2 and 2.3 relating to their **User System**.

2.2 **User System** layout

2.2.1 Single line diagrams of existing and proposed arrangements of main connections and primary distribution systems showing equipment ratings and if available numbering and nomenclature.

2.3 Short Circuit Infeed

(a) The maximum 3-phase short circuit current infeed into the **Distribution System**.

(b) The minimum zero sequence impedance of the **User System** at the **Connection Point**.

3 Demand data

3.1 General

3.1.1 All **Users** with **Demand** shall provide the **DNO** with the **Demand** data, both current and forecast, as specified in paragraphs 3.2 to 3.4.

3.1.2 So that the **DNO** is able to estimate the diversified total **Demand** at various times throughout the year each **User** shall provide such additional forecast **Demand** data as the **DNO** may reasonably request ("reasonableness" being judged in this context by reference to the level of forecast **Demand** data which may be required in order to estimate the diversified total **Demand** at various times throughout the year).

3.2 **Demand** (**Active** and **Reactive Power**) Data Requirements

(a) Forecast peak day **Demand** profile (Active and Reactive) and monthly peak **Demand** variations net of the output profile of all **Independent Generating Plant** in time marked half hours throughout the day.

(b) Type and electrical loading of equipment to be connected:-

(i) number and size of motors;

(ii) types of drive and control arrangements; and

(iii) other large items of equipment.

(c) The sensitivity of the **Demand** to any variations in voltage and **Frequency** on the **Distribution System**.

(d) The maximum harmonic content which the **User** would expect its **Demand** to impose on the **Distribution System**.

(e) The average and maximum phase unbalance which the **User** would expect its **Demand** to impose on the **Distribution System**.

3.3 Fluctuating **Load**s > 5 MVA

(a) Details of the cyclic variation of **Demand** (**Active Power** and **Reactive Power**).

(b) The rates of change of **Demand** (**Active Power** and **Reactive Power**) both increasing and decreasing.

(c) The shortest repetitive time interval between fluctuations in **Demand** (**Active Power** and **Reactive Power**).

(d) The magnitude of the largest step changes in **Demand** (**Active Power** and **Reactive Power**), both increasing and decreasing.

(e) Maximum **Energy** demanded per half hour by the fluctuating load cycle.

(f) Steady state residual **Demand** (**Active Power**) occurring between **Demand** fluctuations.

3.4 **User's** abnormal **Load**s

3.4.1 Details should be provided on any individual **Loads** which have characteristics differing from the normal typical range of **Loads** in the domestic, commercial or industrial fields. In particular, details on arc furnaces, rolling mills, traction installations etc which are liable to cause flicker problems.

4 Generating Unit and Power Generating Facility Data

4.1 General

All **Generating Unit** and **Power Generating Facility** data submitted to the **DNO** shall be in the form of:-

(a) one set of **Generating Unit** and **Power Generating Facility** data where it is connected to the **Distribution System** via a busbar arrangement which is not normally operated in a split configuration; and

(b) separate sets of **Generating Unit** and **Power Generating Facility** data where they are connected to the **Distribution System** via a busbar arrangement which is, or is expected to be, operated in a split configuration.

4.2 **Power Generating Facility** data requirements

(a) Point of connection to the **Distribution System** in terms of geographical and electrical location and system voltage.

(b) Capacity of **Power Generating Facility** (being an aggregate of all **Generating Units** in the **Power Generating Facility**) in **MW** sent out for **Registered Capacity**, **Minimum Generation** (which in the case of **PPMs** shall be assumed to be zero unless a different value is notified by the **User**).

(c) In the case of controllable **PPMs** or dispatchable **PPMs**, a diagram that shows wind speed and direction (for wind **PPMs**) or Global Horizontal Irradiance (for solar photovoltaic **PPMs**) against electrical output in **MW,** is required. For wind **PPMs**, the diagram is in 'rose' format.

(d) Maximum auxiliary **Demand** (**Active Power** and **Reactive Power**).

(e) Where **Generating Units** form part of a **User's System**, the output from these units is to be taken into account by the **User** in his **Demand** profile submissions to the **DNO**. In such cases the **User** must inform the **DNO** of the number of such **Generating Units** together with their total capacity. On receipt of such data the **User** may be further required, at the **DNO's** discretion, to provide details of the **Generating Units** together with their **Energy** output profile.

(f) Operating regime of **Generating Units** not subject to **Central Dispatch** (e.g. continuous, intermittent, peak-lopping).

4.3 **Generating Unit** data requirements

In relation to **Generating Units** other than those comprised within a **PPM**:

(a) Prime mover type;

(b) **Generating Unit** type;

(c) **Generating Unit** rating and terminal voltage (MVA & kV);

(d) **Generating Unit** rated power factor;

(e) **Registered Capacity** sent out (**MW**);

(f) **Minimum Generation** capability (**MW**);

(g) **Reactive Power** capability (both leading and lagging) at the lower voltage terminals of the **Generator** Transformers, where applicable at **Registered Capacity**;

(h) Maximum auxiliary demand in **MW** and **MVAr**;

(i) Inertia constant (**MW**s/MVA) ‡;

(j) Short circuit ratio ‡;

(k) Direct axis transient reactance ‡;

(l) Direct axis sub-transient time constant ‡; and

(m) **Generator Transformer** rated MVA, positive sequence reactance, and tap change range ‡.

In relation to the **Generating Units** comprised within a **PPM**, such data equivalent to that listed in paragraph 4.3 (a) to (m) as the **DNO** shall reasonably require and such additional data as the **DNO** may reasonably require relating to the combined performance where more than one **Generating Unit** is connected at the **Connection Site**.

Appendix B – Detailed Planning Data Requirements

1 Introduction

1.1 This Appendix B specifies the **Detailed Planning Data** to be submitted to the **DNO** by **Users** pursuant to the **Planning Code**, some of which by its nature is also **Standard Planning Data**.

1.2 Data marked thus "‡" is only required where the **Registered Capacity** of a **Generating Unit** is 100kW or more.

2 Connection Site and User System data

2.1 General

2.1.1 All **Users** shall provide the **DNO** with the details as specified in paragraphs 2.2 to 2.8 relating to their **Users System**.

2.2 **HV User System** layout

Single line diagrams of existing and proposed arrangements of main connections and primary distribution systems including:-

(a) Bus bar layouts

(b) Electrical circuitry (i.e. lines, cables, transformers, switchgear etc)

(c) Phasing arrangements

(d) **Earthing** arrangements

(e) Switching facilities and interlocking arrangements

(f) Operating voltages

(g) Numbering and nomenclature

2.3 **HV** reactive compensation equipment

For all independently switched reactive compensation equipment on the **User's System** at 11kV and above, other than power factor correction equipment associated directly with the **User's Plant** and **Apparatus**, the following information is required:

(a) Type of equipment (e.g. fixed or variable);

(b) Capacitive and/or inductive rating or its operating range in **MVAr**;

(c) Details of any automatic control logic to enable operating characteristics to be determined;

(d) The point of connection to the **User's System** in terms of electrical location and voltage.

2.4 Short circuit infeed to the **Distribution System**

Each **User** is required to provide the total short circuit infeeds calculated in accordance with good industry practice into the **Distribution System** from its **User System** at the **Connection Point** as follows:

(a) the maximum 3-phase short circuit infeed including infeeds from any synchronous motor or **Generating Units** forming part of the **User's System**;

(b) the additional maximum 3-phase short circuit infeed from induction motors or **Generating Units** on the **User's System**; and

(c) the minimum zero sequence impedance of the **User's System**.

2.5 Lumped **System** susceptance

Details of equivalent lumped network susceptance of the **User's System** at normal **Frequency** at the **Connection Point**. 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:-

(a) independent reactive compensation plant on the **User's System**; or

(b) any susceptance of the **User's System** inherent in the **Active** and **Reactive Power Demand** data given under subsection paragraph 3.

2.6 **System** data

Each **User** with an existing or proposed **User System** connected at **HV** shall provide the following details relating to that **HV System**:-

(a) Circuit parameters (for all circuits):

Rated voltage (kV)

Operating voltage (kV)

Positive phase sequence reactance

Positive phase sequence resistance

Positive phase sequence susceptance

Zero phase sequence reactance

Zero phase sequence resistance

Zero Phase sequence susceptance

(b) Switchgear including circuit breakers, switch disconnectors and isolators on all circuits connected to the **Connection Point** including those at **Power Generating Facility(s)**:

Rated voltage (kV)

Operating voltage (kV)

Rated short-circuit breaking current, 3-phase (kA)

Rated short-circuit breaking current, 1-phase (kA)

Rated load-breaking current, 3-phase (kA)

Rated load-breaking current, 1-phase (kA)

Rated short-circuit making current, 3-phase (kA)

Rated short circuit making current, 1-phase (kA)

2.7 **Protection** data

The information essential to the **DNO** relates only to **Protection** which can trip or intertrip or close any **Connection Point** circuit breaker or any circuit breaker on the **DNO System**. The following information is required:-

(a) a full description of the **Protection** philosophy, including estimated settings, for all relays and protection systems installed or to be installed on the **User's System**;

(b) a full description of any auto-reclose facilities installed or to be installed on the **User's System**, including type and time delays;

(c) a full description, including estimated settings, for all relays and **Protection** systems installed or to be installed on the **Generating Unit**, **Generator Transformer**, station transformer and their associated connections;

(d) for **Generating Units** having (or intended to have) a circuit breaker on the circuit leading to the **Generating Unit** terminals, at the same voltage, clearance times for electrical faults within the **Generating Unit** zone; and

(e) the most probable fault clearance time for electrical faults on the **User's System**.

2.8 **Earthing** arrangements

Full details of the means of connecting the **User System** to earth, either temporarily or permanently, including impedance values.

3 Demand data

3.1 General

(a) All **Users** with **Demand** shall provide the **DNO** with the **Demand** data both current and forecast as specified in paragraphs 3.2 and 3.3.

(b) So that the **DNO** is able to estimate the diversified total **Demand** at various times throughout the year, each **User** shall provide such additional forecast **Demand** data as the **DNO** may reasonably request.

3.2 **User's System Demand** (**Active** and **Reactive Power**)

Forecast daily **Demand** profiles net of the output profile of all **Independent Generating Plant** directly connected to the **User's System** in time marked half hours throughout the day as follows:-

(a) peak day on the **User's System**;

(b) day of peak **NI Demand** (**Active Power**); and

(c) day of minimum **NI Demand** (**Active Power**).

3.3 **User Demand** management data

The potential reduction in **Demand** available from the **User** in **MW** and **MVAr**, the notice required to put such reduction into effect, the maximum acceptable duration of the reduction in hours and the permissible number of reductions per annum.

4 Generating Unit and Power Generating Facility Data

4.1 General

All **Generators)** which have a **Registered Capacity** of 1 **MW** and above shall provide the **DNO** with the details as specified in paragraphs 4.2 to 4.6.

4.2 Auxiliary **Demand**

(a) The normal **Generating Unit**-supplied auxiliary **Load** is required for each **Generating Unit** at rated **MW** output.

(b) The **Power Generating Facility** auxiliary **Load**, if any, additional to the **Generating Unit** - supplied auxiliary **Load**, where the **Power Generating Facility** auxiliary **Load** is supplied from the **NI System**, is required for each **Power Generating Facility**.

4.3 **Generating Unit** parameters

(a) Rated terminal voltage (kV)

(b) Rated MVA

(c) Rated **MW**

(d) **Minimum Generation** (**MW**)

(e) Short circuit ratio

(f) Direct axis synchronous reactance ‡

(g) Direct axis transient reactance ‡

(h) Direct axis sub-transient reactance ‡

(i) Direct axis transient time constant ‡

(j) Direct axis sub-transient time constant ‡

(k) Quadrature axis synchronous reactance ‡

(l) Quadrature axis transient reactance ‡

(m) Quadrature axis sub-transient reactance ‡

(n) Quadrature axis transient time constant ‡

(o) Quadrature axis sub-transient time constant ‡

(p) Stator time constant ‡

(q) Stator resistance ‡

(r) Stator leakage reactance ‡

(s) **Power Generating Module** inertia constant (**MW**s/MVA) ‡

(t) **Synchronous Power Generating Modules**, rated field current ‡

(u) **Synchronous Power Generating Modules**, field current (amps) open circuit saturation curve for voltages at the **Generating Unit** terminals ranged from 50% to 120% of rated value in 10% steps as derived from appropriate manufacturers' test certificates ‡

4.4 Parameters for **Generating Unit** step-up transformers

(a) Rated MVA

(b) Voltage ratio

(c) Positive sequence reactance (at max, min, & nominal tap)

(d) Positive sequence resistance (at max, min, & nominal tap)

(e) Zero phase sequence reactance

(f) Tap changer range

(g) Tap changer step size

(h) Tap changer type: on **Load** or off circuit

4.5 Auxiliary transformer parameters, if applicable

(a) Rated MVA

(b) Voltage ratio

(c) Zero sequence reactance as seen from the higher voltage side

4.6 Excitation control **System** parameters (not for **PPMs**)

(a) DC gain of excitation loop ‡

(b) Rated field voltage ‡

(c) Maximum field voltage ‡

(d) Minimum field voltage ‡

(e) Maximum rate of change of field voltage (rising) ‡

(f) Maximum rate of change of field voltage (falling) ‡

(g) Details of excitation loop described in block diagram form showing transfer functions of individual elements ‡

(h) Dynamic characteristics of over-excitation limiter ‡

(i) Dynamic characteristics of under-excitation limiter ‡

4.7 **Power Generating Module** models (for **Type C** and **Type D**) **Power Generating Modules**

(a) Governor and prime mover model (see note 1) ‡

(b) AVR / excitation model (see note 1) ‡

(c) **Power Generating Module Generator Performance Chart** (gross, at either the **Connection Point** or the **Power Generating Module** terminals as agreed between the **DNO** and the **Generator**)

Notes:

1. Where the **DNO** considers that the stability and security of the network is at risk, **Detailed Planning Data** should be provided in order to build up a suitable **Power Generating Module** dynamic model for analysis. Alternatively, a 'Black Box' dynamic model of the **Power Generating Module** may be provided. All models should be suitable for the software analysis package used by the **DNO**.

Connection Conditions (CC)

1 Introduction

1.1 The **Connection Conditions** and **Setting Schedules** specify the technical, design and certain operational criteria which must be complied with by the **DNO** and by **Users** whose **Plant** and **Apparatus** is connected to, or who are seeking a connection to, the **Distribution System**.

1.2 They also set out the procedures by which the **DNO** shall seek to ensure compliance with these criteria as a prerequisite to granting approval for the connection of a **User's Plant** and **Apparatus**.

1.3 Procedures by which the **DNO** and **Users** may conclude a **Connection Agreement** are reflected in the **Planning Code**. Each **Connection Agreement** shall require **Users** to comply with the terms of the **Distribution Code** and the **DNO** will not grant approval to connect the **User's** installation to the **Distribution System** unless and until it is satisfied that the criteria laid down by the **Connection Conditions** and **Setting Schedules** have, subject to any derogations issued by the **Authority**, been met. The **DNO's** grant of approval to connect a **User's** installation to the **Distribution System** shall also be subject to the provisions of paragraph 5 of Condition 30 of the **Licence** held by the **DNO** as amended from time to time.

1.4 Some **Users** may also be required to comply with the **Grid Code**. Where this is the case the **DNO** will not energise the connection prior to the **TSO** confirming its agreement to the connection being energised.

2 Objectives

2.1 The **Connection Conditions** are designed to ensure that:-

(a) no new or modified connection will impose unacceptable effects on the **Distribution System**, on any **User System** or on the **Transmission System** nor will it be subject itself to unacceptable effects by its connection to the **Distribution System**; and

(b) the basic rules for connection treat all **Users** of an equivalent category in a non-discriminatory fashion, in accordance with the **DNO's** statutory and **Licence** obligations.

3 Scope

3.1 The **Connection Conditions** apply to the **DNO** and to **Users** which, in the **Connection Conditions**, means:-

(a) **Generators** to the extent further specified in these **Connection Conditions** and **Setting Schedules**; and

(b) **Demand Customers** in respect of their **Connection Site**s with a **Demand** of 1**MW** and above.

3.2 Persons whose prospective activities would place them in any of the above categories of **User** will, as a result of the application procedures for a **Connection Agreement**, become bound by the **Connection Conditions** and **Setting Schedules** prior to their generating or consuming electricity, as the case may be, and references to the various categories (or to the general category) of **User** should, therefore, be taken as referring to them in that prospective role as well as to **Users** actually connected.

4 Connection Design

4.1 The design of connections between the **Distribution System** and **Users' Systems** shall be in accordance with the **Licence Standards** where such standards are applicable.

4.2 The **DNO** will determine the point, including the voltage, at which each **User** may be connected to the **Distribution System**.

5 Distribution System Electrical Parameters

5.1 General

5.1.1 The **Frequency**, voltage, harmonic content and phase unbalance design criteria of the **Distribution System** are set out in paragraphs 5.2 to 5.5. **Users** should take these factors into account in the design of **Plant** and **Apparatus**.

5.1.2 Each **User** shall ensure that its **Plant** and **Apparatus** connected to the **Distribution System** are capable of operating under any variation in the **Distribution System Frequency** and voltage as set out in paragraphs 5.2 and 5.3.

5.2 **Distribution System Frequency** and **Frequency** variations

The **Frequency** of the **Distribution System** is outwith the control of the **DNO** but, as set out by the **TSO** in the **Grid Code**:

5.2.1 The **Frequency** is nominally 50 Hz and shall normally be within the limits of 49.5 Hz to 50.5 Hz in accordance with the Electricity Supply Regulations (N.I.) 1991.

5.2.2 In exceptional circumstances, **System Frequency** could rise to 52 Hz or fall to 47 Hz but sustained operation outside the range specified in the Electricity Supply Regulations (N.I.) 1991 is not envisaged.

5.3 Voltage variations

5.3.1 The voltage variation to **Demand Customers**, as measured at the **Connection Point**, shall comply with the Electricity Supply Regulations (N.I.) 1991, that is, will normally remain within ± 6% of the nominal value or as otherwise agreed.

5.3.2 The design criteria in respect of voltage fluctuations shall be in accordance with Engineering Recommendation P28.

5.3.3 The design criteria in respect of voltage unbalance shall be in accordance with Engineering Recommendation P29.

5.3.4 Under fault and circuit switching conditions the rated **Frequency** component of voltage may fall or rise transiently. The fall and rise in voltage will be affected by the method of **Earthing** of the respective system voltage neutral point.

5.3.5 Each connection to the **Distribution System** must not adversely affect the method of **Voltage Control** employed by the **DNO**. Information on the voltage regulation and control arrangements will be made available by the **DNO** on request by the **User**.

5.4 Harmonic content

5.4.1 The design criteria in respect of harmonic distortion shall be in accordance with Engineering Recommendation G5/4.

6 General Technical Criteria for Plant and Apparatus Connected to the Distribution System

6.1 The **User's Plant** and **Apparatus** shall comply with the principles outlined in Regulation 28 of the Electricity Supply Regulations (N.I.) 1991 and Regulations 4-12 and 15 of the Electricity at Work Regulations (N.I.) 1991 or any amendments to or re-statements of those provisions.

6.2 The detail of such technical criteria for **Generators** is in some cases as specified by the **DNO** from time to time in the **Setting Schedules** published on the **DNO** website (or such other place or by such other means as may be notified to the **Generator** from time to time), for the reasons set out in the introduction to the **Setting Schedules**. The version of the **Setting Schedules** at any time current is therefore deemed to form part of the **Distribution Code Connection Conditions,** with any changes governed accordingly.

6.3 **CC 7** and **CC** 11, the **Setting Schedules** and EREC G99/NI as applicable set out technical and compliance test criteria that **Generators** must comply with in respect of their **Power Generating Facility**. In the event of any inconsistency between the provisions of **CC** 7 and **CC** 11 and the current version of the **Setting Schedules** and EREC G99/NI, the provisions of the current version of the **Setting Schedules** and EREC G99/NI shall prevail.

6.4 All **Users' Plant** and **Apparatus** which are connected to the **Distribution System** shall meet the technical design and operational criteria set out in this paragraph 6. Detailed information relating to a particular connection will, where indicated below, be made available by the **DNO** on request by the **User**.

6.5 **Plant** and **Apparatus**

6.5.1 The **DNO** shall ensure in respect of its equipment, and **Users** shall ensure in respect of their own equipment, that subject as provided in

paragraph 6.5.2 below, the principles of design, manufacture, installation and testing of overhead lines, underground cables and other **Plant** and **Apparatus** designed after 31 March 1992 shall conform to (and such equipment shall comply with) all applicable statutory obligations and the applicable requirements of the following standards, each as current at the date of design of such **Plant** and **Apparatus**, which shall apply (to the extent of any inconsistency) in the following order of precedence:-

(a) relevant European Technical and Quality Assurance Standards or European Specification;

(b) relevant IEC Publications or other international standards; and

(c) relevant British Standards or other equivalent national standard.

6.5.2 In the case of **Plant** or **Apparatus**:-

(a) designed prior to 31 March 1992 and in use or awaiting re-use at such date (or about to be used at such date); and

(b) designed after 31 March 1992 and subsequently re-used;

the applicable standards under paragraph 6.5.1 above shall be those which were current at the date when the **Plant** or **Apparatus** was originally designed, provided that the **DNO** reasonably considers the **Plant** and/or **Apparatus** to be fit for its purpose having full regard to the respective obligations of the **DNO** and the relevant **User**, and otherwise shall be those current at the date of re-use.

6.6 The short circuit rating and insulation level of a **User's Apparatus** at the relevant **Connection Point** shall not be less than that specified in the relevant **Connection Agreement**.

6.7 Each of the **DNO** and a **User** shall ensure that the specification of their respective **Plant** and **Apparatus** at the **Connection Site** shall be such as to permit operation within the applicable **Local Safety Instructions**.

6.8 Metering

6.8.1 The requirements to be met by each **User** in respect of metering equipment are set out in the **Distribution Metering Code**.

6.9 **Protection**

6.9.1 All **User Systems** and the **Distribution System** must incorporate **Protection** in accordance with the requirements of the Electricity Supply Regulations (N.I.) 1991 as amended or re-stated.

6.9.2 The basic requirement in all cases is that **Users**' arrangements for **Protection** at the **Connection Point**, including types of equipment and **Protection** settings must be compatible with standard practices on the **Distribution System** from time to time, whilst maintaining necessary discrimination and co-ordination. Relevant details of the application of

these requirements to a particular connection will be made available to the **User** upon request pursuant to paragraph 6.4.

In particular:-

(a) maximum fault clearance times (from fault inception to arc extinction) must be within the limits established by the **DNO** in accordance with the **Protection** and equipment short circuit rating policy adopted by the **DNO** from time to time for the **Distribution System**;

(b) auto reclosing or sequential switching features may be in use on the **Distribution System**. The **DNO** will on request provide details of the auto-reclose or sequential switching features;

(c) the **Protection** arrangements on some parts of the **Distribution System** may cause disconnection of, or low voltages on, one or more phases only of a three phase supply for certain types of fault. **Users** should make provision to safeguard their equipment from the effects of such events; and

(d) in the case of a three phase and neutral supply system, a fault disconnecting the neutral can lead to higher than normal voltage appearing on one or more phases.

6.10 During the course of an application for a **Connection Agreement** the **DNO** shall specify the **Protection** standards applicable to the **Distribution System** and agree with the **User** (or, in the event that agreement cannot be reached, the **DNO** will determine acting reasonably) any conditions for compatibility with the **DNO's Protection** arrangements which shall be complied with by the **User**.

In particular:-

(a) in order to ensure satisfactory operation of the **Distribution System**, **Protection** systems, operating times, discrimination and sensitivity at the **Connection Point** shall be agreed between the **DNO** and the **User** (or, in the event that agreement cannot be reached, shall be determined by the **DNO**) and may be reviewed from time to time by the **DNO**. If, as a consequence of such review, the **DNO** identifies a requirement for some variation to such **Protection** arrangements, the relevant provisions of the **Connection Agreement** shall apply;

(b) 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 by the **User**. The **DNO** will inform the **User** if it is not required. If the back-up circuit breaker is owned by the **DNO**, it may be equipped with **Protection** that is limited to that required to provide excess **Energy Protection** to the **Distribution System**; and

(c) unless the **DNO** specifies otherwise, it is not acceptable for **Users** to limit the fault current infeed to the **Distribution System** by the use of **Protection** and associated equipment if the failure of the **Protection** and associated equipment to

operate as intended in the occurrence of a fault could cause equipment owned by the **DNO** to operate outside its short-circuit rating.

Certain provisions on working on certain **Protection** equipment are included in paragraph 9.

6.11 **Intertripping**

6.11.1 In all circumstances where the isolation of faults or **System** abnormalities is dependent upon the operation of both the **DNO's** and the **User's** circuit breakers, **Intertripping** facilities may be required. These **Intertripping** facilities shall be in accordance with the requirements of the relevant **Connection Agreement**.

6.12 Automatic reclosure

6.12.1 Where automatic reclosure of the **DNO** circuit breaker is required following faults on a **User's System**, automatic switching equipment shall be provided in accordance with the requirements of the relevant **Connection Agreement**.

6.13 Voltage fluctuations and unbalance and harmonic distortion

6.13.1 The design criteria to be applied to **Users**' **Loads** connected to the **Distribution System** to limit voltage fluctuations and unbalance and harmonic distortion will be notified to the **User** in the course of an application for connection to the **Distribution System** and will be in accordance with the **Licence Standards**, which are listed in Appendix 3 to these **Connection Conditions**. In the event that a **User** causes any such limits to be breached, the **DNO** shall be entitled to require the **User** to take such steps as the **DNO** reasonably considers to be necessary in order to prevent such breach from continuing and the **User** shall comply with the **DNO's** instructions without delay.

6.14 Neutral **Earthing**

6.14.1 The specification of a **User's Apparatus** shall meet the voltages which will be imposed on the **Apparatus** as a result of the method of **Earthing** of the **Distribution System** as specified in the relevant **Connection Agreement**.

6.14.2 The **Earthing** of a **User's Apparatus** at the **Connection Point** must be in accordance with current **DNO** practice which will be notified to the **User**, initially, during the course of an application for connection to the **Distribution System**. In the event that the **DNO** wishes to change its current practice, the **DNO** will notify the **User** as soon as reasonably practicable in advance of the change and any modifications which such change will require to be undertaken on the **User's System** will be implemented in accordance with the modifications procedure set down in the **User's Connection Agreement**, if it is applicable.

6.14.3 **Users** shall take all reasonable precautions in relation to a particular **Connection Point** to limit the occurrence and effects of circulatory currents in respect of neutral points of any interconnected system (e.g. where there is more than one source of **Energy**).

6.15 Superimposed signals

6.15.1 Where a **User** proposes to use mains borne signalling equipment to superimpose signals on the **Distribution System**, the prior written agreement of the **DNO** is required (which agreement will not be unreasonably withheld).

7 Additional Technical Criteria for Generating Units

7.1 All **Power Generating Facility**(s) shall, in addition to the requirements of paragraph **CC** 6, meet the technical design and operational criteria in this paragraph **CC** 7 (if connected before 27th April 2019), and the **Setting Schedules** insofar as each requirement is applicable to them, which contains more detailed requirements for **Power Generating Facility**(s) than those set out in paragraph **CC** 6 and are intended to be complementary to paragraph **CC** 6. However, in the event of any conflict between the requirements of paragraph **CC** 6 and the requirements of this paragraph **CC** 7 and the **Setting Schedules**, the provisions of the **Setting Schedules** shall prevail. Detailed information relating to a particular connection will, where indicated below, be made available by the **DNO** on request by the **Generator**. The technical design and operational criteria in **CC** 7.4 to **CC** 7.18 inclusive do not apply to **Power Generating Facility**(s) connected on or after 27th April 2019.

7.2 Each connection between a **Power Generating Facility** and the **Distribution System**, unless specified otherwise in the **Connection Agreement**, must be controlled by a circuit breaker capable of interrupting the maximum short circuit current at the **Connection Point**. The short circuit current design values at a **Connection Point** will be set out in the **Connection Agreement**.

7.3 All **Power Generating Facility**(s) connected:

(a) Before 27th April 2019 must comply with the requirements of NIE Networks Engineering Recommendation G59/1/NI, Recommendations for the connection of embedded generating plant to Public distribution systems above 20kV G75/1 or with outputs over 5MW, and Engineering Recommendation G83/1, each as applicable and as amended, supplemented, varied or replaced from time to time and with all other relevant Engineering Recommendations and relevant regulations and the particular requirements of the **DNO** which will take account of the conditions prevailing on the **Distribution System** at the **Connection Point** at the relevant time.

(b) On or after 27th April 2019 must comply with the requirements of NIE Networks Engineering Recommendation G98/NI, Engineering Recommendation G99/NI and the PPM **Setting Schedule**, each as applicable and as amended, supplemented, varied or replaced from time to time and with all other relevant Engineering Recommendations and relevant regulations and the particular requirements of the **DNO** which will take account of the conditions prevailing on the **Distribution System** at the **Connection Point** at the relevant time.

(c) Between 27th April 2018 and 27th April 2019 must comply with either (a) or (b).[1]

The **DNO** will notify its particular requirements to the **Generator** during the course of the **Generator's** application for connection to the **Distribution System**.

7.4 **Reactive Power** capability

7.4.1 Each **Power Generating Facility** must be capable of operating at its **Registered Capacity** in a stable manner as a minimum within the following power factor ranges:

	Range
Type A Generating Units	0.95 absorbing - 0.98 absorbing
Type B Generating Units	0.95 absorbing – 0.98 generating
Type C Power Generating Facility(s)	0.95 absorbing – 0.95 producing

7.4.2 In this paragraph **CC** 7 **Type A Power Generating Facility**(s) means **Induction Generating Units**.

7.4.3 In this paragraph **CC** 7 **Type B Power Generating Facility**(s) means:

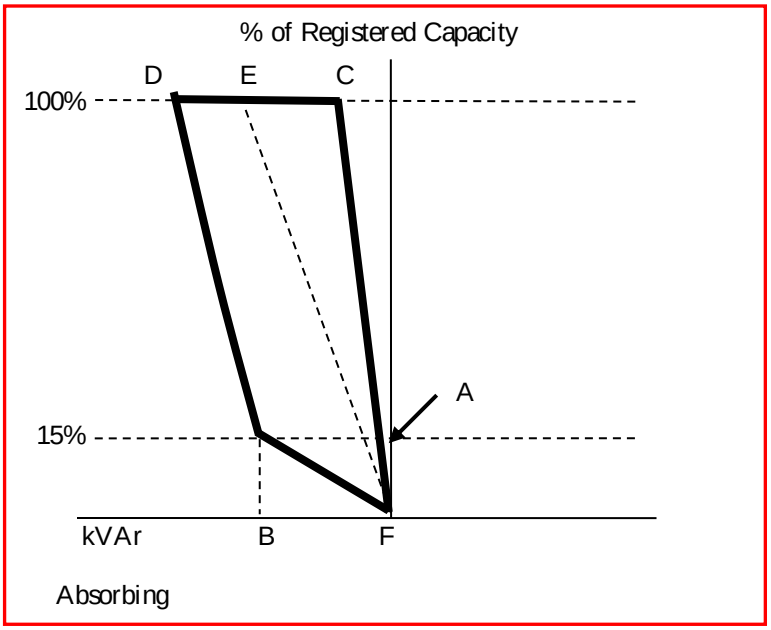
(a) **Synchronous Generating Units**; with a **Registered Capacity** from 100 kW to under 5MW;

(b) **Generating Units** of all types connected in part or in total through convertor technology with a **Registered Capacity** from 100kW; to under 5MW

7.4.4 In this paragraph **CC** 7 **Type C Power Generating Facility**(s) means **Power Generating Facility**(s) with a **Registered Capacity** of 5MW and above

7.4.5 Each **Power Generating Facility with a Registered Capacity** of 100kW or more shall have a **Reactive Power** capab**ility at its Registered Capacity** as described in the following **Generator Performance Charts**:-

[1] Readers should note that Type A, Type B, Type C and Type D have different meanings in EREC G99/NI than in this document



Type A Reactive Power Performance

a) Point A is the minimum absorbing **Reactive Power** capability at 15% **Registered Capacity** (voltage and power factor control modes);

b) Point B defines the maximum absorbing **Reactive Power** capability at 15% **Registered Capacity** (voltage control mode);

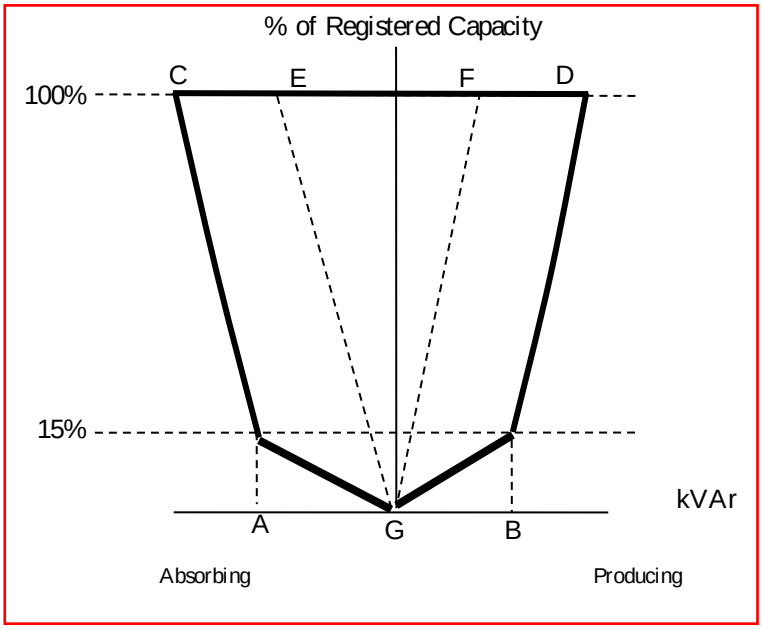
c) Point C is the minimum absorbing **Reactive Power** capability at 100% **Registered Capacity** and power factor limit of 0.98 absorbing either in power factor or voltage control modes;

d) Point D is the maximum absorbing capability at 100% **Registered Capacity** (voltage control mode);

e) Point E is the power factor limit of 0.95 absorbing at 100% **Registered Capacity** (power factor control mode);

f) Points A,B & D i.e. reactive capabilities are defined by the capability declared by the **Generator** during the application process; and

g) Point 'F' is the kVAr capability below 15% of **Registered Capacity** which may not be zero.



Type B Reactive Power Performance

a) Point A is the maximum absorbing **Reactive Power** capability at 15% **Registered Capacity** (voltage control);

b) Point B is the maximum producing **Reactive Power** capability at 15% **Registered Capacity** (voltage control);

c) Point C is the maximum absorbing **Reactive Power** capability at 100% **Registered Capacity** (voltage control);

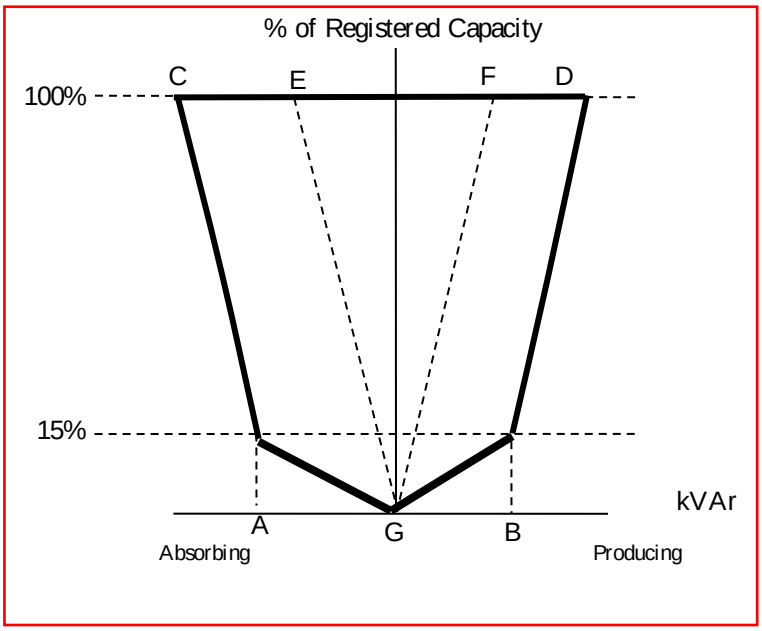
d) Point D is the maximum producing **Reactive Power** capability at 100% **Registered Capacity** (voltage control);

e) Point E is the power factor limit of 0.95 absorbing at 100% **Registered Capacity**;

f) Point F is the power factor limit of 0.98 producing at 100% **Registered Capacity**;

g) Point G is the kVAr capability, which may not be zero, at zero kW output; and

h) Points A,B,C & D i.e. reactive capabilities are defined by the capability declared by the **Generator** during the application process.



Type C Reactive Power Performance

a) Point A is the maximum absorbing **Reactive Power** capability at 15% **Registered Capacity** (voltage control);

b) Point B is the maximum producing **Reactive Power** capability at 15% **Registered Capacity** (voltage control);

c) Point C is the maximum absorbing **Reactive Power** capability at 100% **Registered Capacity** (voltage control);

d) Point D is the maximum producing **Reactive Power** capability at 100% **Registered Capacity** (voltage control);

e) Point E is the power factor limit of 0.95 absorbing at 100% **Registered Capacity**;

f) Point F is the power factor limit of 0.95 producing at 100% **Registered Capacity**;

g) Point G is the kVAr capability, which may not be zero, at zero kW output; and

h) Points A,B,C & D i.e. reactive capability are defined by the capability declared by the **Generator** during the application process.

7.5 A **Power Generating Facility** shall maintain the voltage at the **Connection Point** within its reactive capability power limits as outlined in paragraph **CC** 7.4, the

appropriate **Setting Schedules** and the statutory voltage limits as described in paragraph **CC** 5.3.

7.6 All **Power Generating Facility**(s) connecting to the **Distribution System** shall be capable of providing the following **Reactive Power** control modes. All **Power Generating Facility**(s) shall operate in the control mode instructed by the **DNO**.

7.6.1 **Power Generating Facility**(s) with a **Registered Capacity** of 5MW and above shall be capable of providing three control modes**,** Power Factor Control, Voltage Control and VAr Control.

7.6.1.1. Whilst the **Power Generating Facility** is operating in Power Factor control mode its reactive capability is described by the envelope EFG within the Type C **Generator Performance Chart** of paragraph **CC** 7.4.5.

7.6.1.2. Whilst the **Power Generating Facility** is operating in Voltage Control Mode, the minimum reactive capability is described by the envelope ACDBG within the Type C **Generator Performance Chart** of paragraph **CC** 7.4.5.

7.6.1.3. Whilst the **Power Generating Facility** is operating in VAr Control Mode the **Power Generating Facility** must be capable of importing or exporting VArs within the envelope described by ACDBG within the Type C **Generator Performance Chart** of paragraph **CC** 7.4.5.

7.6.2 **Power Generating Facility**(s) with a **Registered Capacity** of less than 5MW shall be capable of providing two control modes, Power Factor Control and Voltage Control.

7.6.2.1. Whilst the **Power Generating Facility** is operating in Power Factor control mode its reactive capability is described by the envelope ACE within the Type A and EGF for Type B within their associated **Generator Performance Charts** of paragraph **CC** 7.4.5.

7.6.2.2. Whilst the **Power Generating Facility** is operating in Voltage Control mode its reactive capability is described by the envelope ACDB for Type A and ACDBG for Type B within their associated **Generator Performance Chart** of paragraph **CC** 7.4.5.

7.7 The short circuit ratio for each **Power Generating Facility** shall not be less than 0.5.

7.8 For the avoidance of doubt, all **Power Generating Facility**(s) must be capable of delivering **Reactive Power** performance at the **Connection Point**. However, where complex **User Systems** involve **Generating Units** and **Load**, the **User** may submit calculations to support compliance.

7.9 Co-ordination with existing **Protection**

7.9.1 Each **Generator** must meet, in relation to each of its **Power Generating Facility**(s), the target clearance times for fault current interchange with the **Distribution System** in order to reduce to a minimum the impact on the **Distribution System** of faults on circuits owned by a **Generator**.

The target clearance times are measured from fault current inception to arc extinction and will be specified by the **DNO** to meet the requirements of the relevant part of the **Distribution System**. A **Generator** may obtain relevant details specific to its **Power Generating Facility**(s) pursuant to paragraph **CC** 6.4. The **DNO** shall ensure that (subject to any necessary discrimination) the same target fault clearance times can be achieved by its own **Apparatus** at each **Connection Point**.

7.9.2 Unless otherwise agreed, the fault clearance times required by the **Connection Agreement** shall not be faster than 120ms but, if otherwise agreed, nothing in this paragraph **CC** 7.9.2 shall prevent a **Power Generating Facility** or the **DNO's Apparatus** at the **Connection Point** from having faster clearance times (subject to necessary discrimination being maintained). The times specified in the **Connection Agreement** will reflect the **DNO's** view of the requirements of the **Distribution System**, and the **User's System**, for the expected life time of the **Protection** (for example, 15 years). The probability that the fault clearance times stated in the **Connection Agreement** will be exceeded by any given fault must be less than 2%.

7.9.3 To cover for failure of the above **Protection** systems to meet the above fault clearance times, the **Generator** may be required to provide back up **Protection**. The back up **Protection** shall be required to discriminate with other **Protections** fitted on the **Distribution System**. Relevant details will be made available to a **Generator** upon request pursuant to paragraph **CC** 7.1.

7.9.4 The setting of any **Protection** controlling a circuit breaker or the operating values of any automatic switching device at any **Connection Point** shall have been agreed between the **DNO** and the **User** during the course of the application for a **Connection Agreement**. The settings and operating values will only be changed if both the **DNO** and the **User** agree provided that neither the **DNO** nor the **User** shall unreasonably withhold their consent.

7.9.5 If in the opinion of the **DNO** following an overall review of **Distribution System Protection** requirements improvements to any **Power Generating Facility Protection** scheme are necessary, the relevant provisions of the **Connection Agreement** shall be followed.

7.9.6 The **Power Generating Facility Protection** must co-ordinate with any auto reclose policy specified by the **DNO**.

7.10 Specific **Protection** Required for **Power Generating Facility**(s)

In addition to any **Protection** installed by the **Generator** to meet its own requirements and statutory obligations, the **Generator** must install **Protection** to achieve the following objectives:

i. For all **Power Generating Facility**(s):

a. To disconnect the **Power Generating Facility** from the **System** when a **System** abnormality occurs that results in an unacceptable deviation of the **Frequency** or voltage at the **Connection Point**;

b. To ensure the automatic disconnection of the **Power Generating Facility**, or where there is constant supervision of an installation, the operation of an alarm with an audio and visual indication, in the event of any failure of supplies to the protective equipment that would inhibit its correct operation.

ii. For polyphase **Power Generating Facility**(s)**:**

a. To inhibit connection of **Power Generating Facility** to the **System** unless all phases of the **DNO's Distribution System** are present and within the agreed ranges of **Protection** settings;

b. To disconnect the **Power Generating Facility** from the **System** in the event of the loss of one or more phases of the **DNO's Distribution System**;

iii. For single phase **Power Generating Facility**(s)**:**

a. To inhibit connection of **Power Generating Facility** to the **System** unless that phase of the **DNO's Distribution System** is present and within the agreed ranges of **Protection** settings;

b. To disconnect the **Power Generating Facility** from the **System** in the event of the loss of that phase of the **DNO's Distribution System**;

7.11 Suitable **Protection** arrangements and settings will depend upon the particular **Generator**'s installation and the requirements of the **Distribution System**. These individual requirements must be ascertained in discussions with the **DNO**. To achieve the objectives above, the **Protection** must include the detection of:

a. Over Voltage (O/V)

b. Under Voltage (U/V)

c. Over **Frequency** (O/F)

d. Under **Frequency** (U/F)

e. Loss of Mains (LoM)

Protection Function	All Power **Generating Facility**(s) >11.04kW[2]	
	Setting	Time Delay
U/V stage 1	0.85pu[$]	3.0s
U/V stage 2	0.6pu[$]	2.0s
O/V	1.1pu[$]	0.5s
U/F	48Hz	0.5s
O/F	52Hz[#]	1.0s
LoM(RoCoF)¥	1.0Hz/s	0.5s[∝]

Note: ∝ The required **Protection** requirement is expressed in Hertz per second (Hz/s). The time delay should begin when the measured rate exceeds the threshold expressed in Hz/s and be reset if it falls below that threshold. The relay must not trip unless the measured rate remains above the threshold expressed in Hz/s continuously for 500ms. Setting the number of cycles on the relay used to calculate the RoCoF is not an acceptable implementation of the time delay since the relay would trip in less than 500ms if the rate was significantly higher than the threshold.

¥ RoCoF – Rate of Change of Frequency

$ Base unit is defined as the nominal voltage at the **Connection Point.** This applies to phase-phase and phase-neutral voltages.

A default setting of 52Hz will apply unless a lower setting is requested by the **DNO**.

7.11.1 For each of the protection functions, the CB opening should occur with no inherent time delay following a protection trip operation from the relay.

7.11.2 All **Power Generating Facilities** with an output ≥5MW and connected to the **System** on or after 1st October 2017 must apply **Protection** settings as per paragraph **CC** 7.11. For the avoidance of doubt, **Power Generating Facilities** with an output ≥5MW and connected on or after 1st October 2017 shall not employ vector shift as a LoM technique.

[2] The lower limit for single phase **Power Generating Facility** is 3.68kW

7.11.3 All **Power Generating Facilities** with an output > 11.04kW[2] and < 5MW and connected to the **System** on or after 11th May 2018 must apply **Protection** settings as per paragraph **CC** 7.11. For the avoidance of doubt, **Power Generating Facilities** with an output > 11.04kW**Error! Bookmark not defined.** and < 5MW and connected on or after 11th May 2018 shall not employ vector shift as a LoM technique.

7.11.4 **All Power Generating Facilities** ≥5MW connected to the system prior to 1st October 2017 shall ensure that the **Protection** settings as per paragraph **CC** 7.11 are applied by 31st December 2017. For the avoidance of doubt, **Power Generating Facilities** with an output ≥5MW and connected to the **System** prior to 1st October 2017 shall not employ vector shift as a LoM technique.

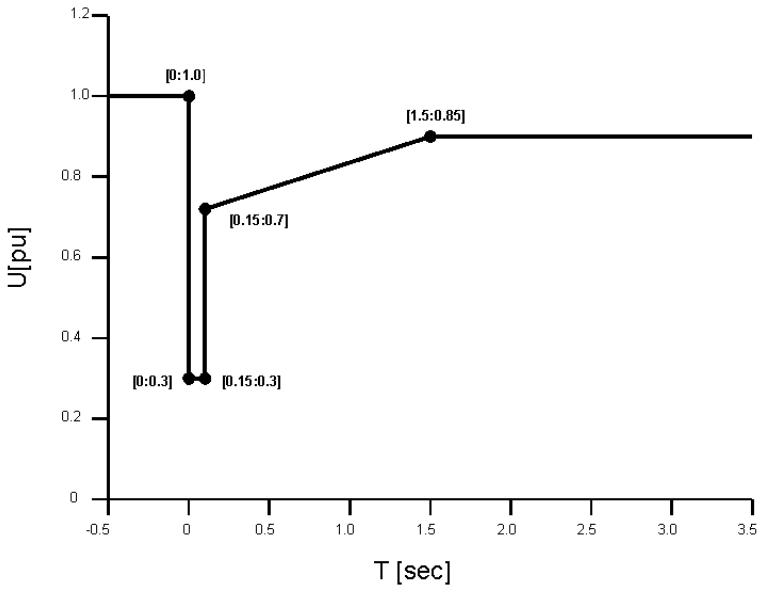
7.11.5 All **Power Generating Facilities** with an output > 11.04kW**Error! Bookmark not defined.** and < 5MW connected to the system prior to 11th May 2018 shall ensure that the **Protection** settings as per paragraph **CC** 7.11 are applied by 30th September 2019. For the avoidance of doubt, **Power Generating Facilities** with an output > 11.04kW**Error! Bookmark not defined.** and < 5MW and connected to the **System** prior to 11th May 2018 shall not employ vector shift as a LoM technique

7.11.6 For the avoidance of doubt, the requirements of paragraph **CC** 7.11 shall take precedence in any conflict arising between this **Distribution Code** and Engineering Recommendation G59/1/NI or G99/NI

7.11.7 In line with HSENI recommendations, all **Generators** should review and update relevant risk assessments to take account of the risks associated with islanding, with particular emphasis on out of phase re-closure, when adhering to the requirements of paragraph **CC** 7.11. Further information on this is included in Appendix 4.

7.12 Fault Ride Through Requirements

7.12.1 **Power Generating Modules** Types A and B shall be capable of remaining connected to the **Distribution System** for voltage dips on any or all phases, where the **Distribution System** phase voltage measured at the **Connection Point** remains above the heavy black line in the diagram titled Fault ride through capability of **Power Generating Modules** < 5MW (below).

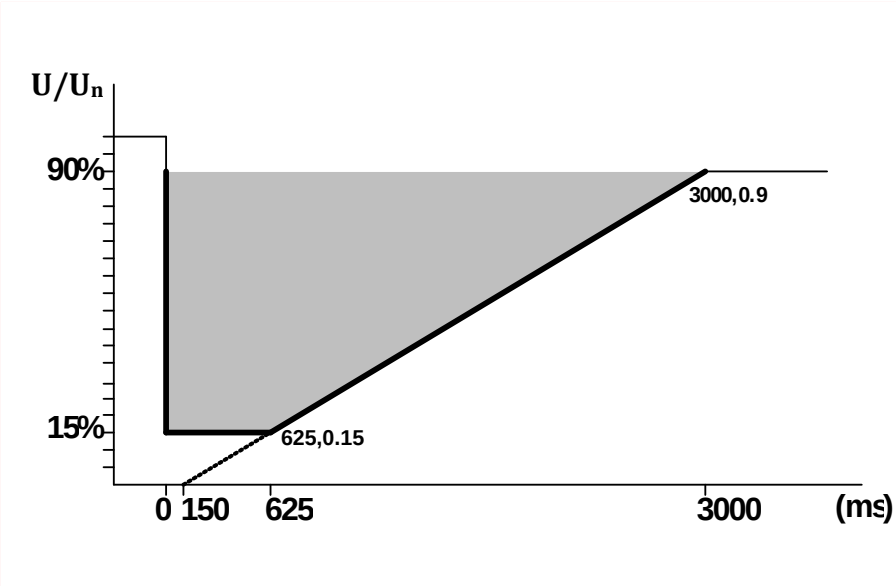


Fault Ride Through capability for Power Generating Modules < 5 MW

7.12.1.1. After fault clearance the **Power Generating Module** shall have the technical capability to provide at least 90% of its maximum available **Active Power** as quickly as the technology allows and in any event within 5 seconds of the voltage at the **Connection Point** recovering to within the normal operational range, as specified within the **Connection Agreement** for the particular site.

7.12.2 A **Power Generating Module** with a **Registered Capacity** > 5MW shall have the technical capability to remain connected to the **Distribution System** for voltage dips on any or all phases, and remain stable, where the **Distribution System** phase to phase voltage measured at the **Connection Point** remains above the heavy black line in the diagram below titled "Fault Ride-Through Capability for Generation units ≥ 5MW connected to the Distribution System".

7.12.2.1. After Fault Clearance the **Power Generating Module** shall have the technical capability to provide at least 90% of its maximum available **Active Power** as quickly as the technology allows and in any event within 5 seconds of the voltage at the **Connection Point** recovering to within the normal operational range as specified within the **Connection Agreement** for the particular site.



Fault Ride Through Capability for Power Generating Modules ≥ 5MW connected to the Distribution System

7.12.3 In addition to remaining connected to the **Distribution System**, the **Centrally Dispatched Generation Units** shall have the technical capability to provide the following functions:

7.12.3.1. During voltage dips, the **Power Generating Module** shall provide **Active Power** in proportion to retained voltage and provide **Reactive Power** to the **Distribution System.** The provision of **Reactive Power** shall continue until the distribution voltage recovers to within the normal operational range, as specified within the **Connection Agreement** for the particular site, and in any case within the statutory limits as specified under paragraph **CC** 5.3, of

the voltage level at which the **Power Generating Module** is connected, or for at least 500ms, whichever is the sooner. The **Power Generating Module** may use all or any available **Reactive Power** sources, including installed statcoms or SVCs, when providing reactive support during voltage dips.

7.12.3.2. For voltage dips cleared within 140ms, the **Power Generating Module** shall provide at least 90% of its maximum available **Active Power** as quickly as the technology allows and in any event within 500ms of the voltage at the **Connection Point** recovering to the normal operating range, as specified within the **Connection Agreement** for the particular site, and in any case within the statutory limits as specified under paragraph **CC** 5.3 of the voltage level at which the **Power Generating Module** is connected**,**. For longer duration voltage dips, the **Power Generating Module** shall provide at least 90% of its maximum available **Active Power** within 1 second of the voltage at the **Connection Point** recovering to the normal operating range for the voltage at which it is connected.

7.12.3.3. During and after faults, priority shall always be given to the **Active Power** response as defined in paragraphs **CC** 7.12.3.1 and **CC** 7.12.3.2. The reactive current response of the **Power Generating Module** shall attempt to control the voltage back towards the voltage at which the **Power Generating Module** is connected and should be at least proportional to the voltage dip. The reactive current response shall be supplied within the rating of the **Power Generating Module** with a rise time no greater than 100ms and a settling time no greater than 300ms. For the avoidance of doubt, the **Power Generating Module** may provide this reactive current response directly from a **Generating Unit**, or other additionally installed dynamic reactive devices on the site, or a combination of both.

7.12.3.4. The **Power Generating Module** shall be capable of providing its transient reactive response irrespective of the reactive control mode in which it was operating at the time of the voltage dip. The **Power Generating Module** shall revert to its pre-fault reactive control mode and set point within 500ms of the voltage at which the **Power Generating Module** is connected, recovering to its normal operating range

7.12.3.5. The DNO may seek to reduce the magnitude of the dynamic reactive response of the **Power Generating Module** if it is found to cause over-voltages on the **Distribution System**. In such a case, the **DNO** will make a formal request to the **Generator.** The **Generator** and the **DNO** shall seek to agree on the required changes, and the **Generator** shall formally confirm that any requested changes have been implemented within 120 days of receiving the formal request from the **DNO**.

7.13 Minimum connected impedance

7.13.1 For **Generating Units** which do not form part of a **PPM** the minimum connected impedance applicable to the generator and **Generator Transformer** will be specified in the **Connection Agreement**. The **DNO's** requirements for the impedances will reflect the needs of the **Distribution System** from the fault level and stability points of view.

7.13.2 For **PPMs** the minimum connected impedance applicable to the whole **PPM** as a single unit will be specified in the **Connection Agreement**. The **DNO's** requirements for the impedance will reflect the needs of the **Distribution System** from the fault level and stability points of view.

7.14 Variations in **System Frequency**

7.14.1 In order to comply with its **Grid Code** obligations, the **DNO** requires that, apart from those circumstances set out in paragraph **CC** 7.14.2, all **Independent Generating Plant** with an **Output** of 100kW or more shall stay connected and operate:

(a) continuously where the **Distribution System Frequency** varies within the range 49.5 to 52.0 Hz;

(b) for a period of up to one hour where the **Distribution System Frequency** varies within the range 48.0 to 49.5 Hz; and

(c) for a period of up to 5 minutes where the **Distribution System Frequency** varies within the range 47.0 to 48.0 Hz.

7.14.2 The requirements of paragraph **CC** 7.14.1 do not apply where:

(a) The G59 or G99/NI relay has operated correctly, consistent with the settings agreed pursuant to paragraph **CC** 7.11; or

(b) The **Distribution System Frequency** has changed at a rate greater than 1.0 Hz/s measured over a rolling 500ms

(c) There is manual intervention by the **Generator**.

7.15 Agreement of rate-of-change-of-frequency settings

7.15.1 Where **Power Generating Facilities** are equipped with rate-of-change-of-frequency relays or other devices which measure and operate in relation to a rate-of-change-of frequency the procedure in paragraphs **CC** 7.15.2 to **CC** 7.15.5 below will be followed to ensure satisfactory operation of the **Power Generating Facility**.

7.15.2 At a reasonable time prior to a **Power Generating Facility** being connected to the **Distribution System**, and prior to any relevant modification to a **Power Generating Facility** or any relevant **Power Generating Facility Equipment**, the **Generator** shall contact the **DNO** with details of the proposed rate-of-change-of-frequency setting.

7.15.3 The **DNO** shall, within a reasonable period and in any case no more than 28 days after being contacted pursuant to paragraph **CC** 7.15.2, discuss with the **Generator** whether the proposed settings are satisfactory. The agreed settings shall be specified in the **Connection Agreement**.

7.15.4 In relation to any **Generator** which has agreed the settings with the **DNO** under these provisions, the **DNO** shall notify that **Generator** of any

change of which it is aware in the expected rate-of-change-of-frequency on the **Distribution System** which may require new settings to be agreed.

7.15.5 Each **Generator** shall be responsible for protecting the **Generating Unit** owned or operated by it against the risk of damage which might result from any **Frequency** excursion outside the range 52Hz to 47Hz and for deciding whether or not to interrupt the connection between its **Plant** and/or **Apparatus** and the **Distribution System** in the event of such a **Frequency** excursion.

7.16 **Power Generating Facility** control arrangements

7.16.1 All **Power Generating Facilities** in use after 1 January 2010 must be fitted with a device capable of setting the **power factor** of the **Power Generating Facility** within the relevant range, as set out in paragraph **CC** 7.4.

7.16.2 All **Power Generating Facilities** first connected on or after 1 January 2010 with an **Output** of 100kW or more, all **PPMs** with an **Output** of 5MW or more first connected on or after 1 November 2007 and all **Power Generating Facilities** with an **Output** of 10MW or more (other than **PPMs**) connected to the **Distribution System** since 31 March 1992, must be fitted with a Fast Acting control system capable of being switched between **Voltage Control** mode and power factor control mode within a voltage band as specified within the **Connection Agreement** for the particular site , and in any case within statutory limits as specified under paragraph **CC** 5.3. If the voltage is outside the specified limit the power factor control must revert to Emergency **Voltage Control** as described within the appropriate **Setting Schedules.** The control of voltage and power factor must ensure stable operation over the entire operating range of the **Power Generating Facility**. In the event that action by the **Power Generating Facility Active** and **Reactive Power** control functions is unable to achieve a sustained voltage within the statutory limits, the **Power Generating Facility** must detect and remain connected to the distribution system unless disconnected directly by a protection operation.

7.16.3 All **Power Generating Facilities** first connected on or after 1 January 2010 with an **Output** of 5MW or more, must be fitted with a **Fast Acting** control system capable of being switched between **Voltage Control** mode, VAr control mode and power factor control mode within a voltage band as specified within the **Connection Agreement** for the particular site, and in any case within statutory limits as specified in paragraph **CC** 5.3.

All **Power Generating Facilities** connected after 1 January 2012 must be fitted with voltage, power and frequency control and droop capabilities as described within the appropriate **Setting Schedules.**

7.16.4 Other **Voltage Control** schemes may be possible, but agreement between the **Generator** and the **DNO** must be reached at the application stage for connection about their suitability. If **Voltage Control** is implemented for the **Controllable PPM** or **Dispatchable PPM**, rather than on individual **Generating Units**, then the range of **Reactive Power** available should not be less than that which would have been available if **Voltage Control** had been on individual **Generating Units**. **Voltage Control** schemes based upon equipment located on the **DNO's** side of the connection may be possible, but such schemes are considered special, and the details, responsibilities and cost schedule must be agreed between the **Generator** and the **DNO** in the **Connection Agreement.**

7.17 **Power Generating Facility** SCADA and control

7.17.1 **Generators** shall in respect of their **Power Generating Facility** in any of the following three categories comply with the SCADA signal requirements set out in this paragraph **CC** 7.17 and, in addition, such other SCADA signal requirements as the **DNO** may require because of network reasons, which will be specified prior to entry into the **Connection Agreement**:

(a) **Power Generating Facilities** with an **Output** of 1MW or more which are first connected after 1 January 2010;

(b) **Power Generating Facilities** with an **Output** of 100kW or more up to 1MW which are first connected after 1 January 2010 where the **DNO** decides that SCADA is required because of local network reasons; and

(c) **Power Generating Facilities** with an **Output** of 5**MW** or more which were connected prior to 1 January 2010.

7.17.2 The **DNO** shall issue control instructions by means of the SCADA signals set out in the appropriate **Setting Schedules** or, in the event of a SCADA malfunction, such other means as are determined by the **DNO** in consultation with the **User**.

7.17.3 The **User** shall acknowledge, where relevant, receipt of a control instruction issued under this paragraph **CC** 7.17 and shall comply promptly with the control instruction.

7.17.4 The following signal formats shall be used where required by the particular connection:

(a) Analogue signals: 4 to 20mA

(b) Digital pulse from the **DNO**: 24V dc

(c) Digital input from the **User**: 0 and 24V dc

(d) The use of any additional signal formats will be detailed in the appropriate **Setting Schedules**

7.17.5 Analogue signals:

7.17.5.1. The analogue signal requirements for connecting Generators are set out in the appropriate **Setting Schedules.**

7.17.6 Digital signals:

7.17.6.1. The digital signal requirements for connecting Generators are set out in the appropriate **Setting Schedules**

7.18 Neutral **Earthing**

7.18.1 The winding configuration and method of **Earthing** of **Generating Units** and associated **Generator Transformers** shall be agreed with the **DNO** or, if agreement cannot be reached, determined by the **DNO**.

8 Technical Criteria for Communications

8.1 Communications equipment

8.1.1 Where required by the **DNO** in order to ensure control of the **Distribution System**, communications between **Users** and the **DNO** shall be established in accordance with the relevant **Connection Agreement**.

8.1.2 For **Power Generating Facilities** with a registered capacity of 5MW or more, the **DNO** will provide for SCADA by the installation of its own Remote Telemetry Unit (RTU). The RTU will be the physical interface between the Distribution Control Centre and **Power Generating Facilities** connected to the **Distribution System** plant to be monitored and controlled in accordance with the relevant **Setting Schedules.**

8.1.3 Where a **Power Generating Facility** with a registered capacity greater than 100kW and less than 5MW is connected to the **Distribution System** at a nominal voltage of 33kV or greater, then the **DNO** may provide its own RTU in accordance with the relevant **Setting Schedules** or EREC G99/NI as applicable.

8.1.4 Where a **Power Generating Facility** with a registered capacity greater than 100kW and less than 5MW is connected to the **Distribution System** at a nominal voltage less than 33kV, then the **DNO** will allow the **Generator** to provide the RTU in accordance with the relevant **Setting Schedules** or EREC G99/NI as applicable.

8.2 Telemetry

8.2.1 In addition to the requirements of the **Distribution Metering Code**, each **User** shall provide such voltage, current, **Frequency**, **Active** and **Reactive Power** measurements and status points and alarms and controls at the **DNO** telemetry outstation interface (if any) as required and specified by the **DNO** in EREC G99/NI and the relevant **Connection Agreement and Setting Schedules**.

8.2.2 If it is agreed between the **DNO** and a **User** that the **DNO** will telecontrol the **User's** switchgear on the **User's Site**, the **DNO** shall

install the necessary telecontrol facilities. 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.

8.3 Telecontrol connection standards

8.3.1 All communication connections between each **User** and the **DNO** shall conform to:

(a) appropriate Telecommunication Standardization Sector (ITU-T) standards and other standards required by licensed public telephone operators; and/or

(b) appropriate standards for radio systems as required by Ofcom from time to time.

8.3.2 In respect of (b) above, each **User** shall, except to the extent that an alternative means of communication has been agreed with the **DNO** in a **Connection Agreement**, provide where required by the **DNO**, as set out in the **DNO's** connection offer, facilities on which a small radio aerial can be mounted and shall obtain where necessary any planning permissions required therefor.

9 Site Related Conditions

9.1 Ownership, control, operation & maintenance at the **Connection Point**

9.1.1 The ownership boundary between the **Distribution System** and a **User's System** shall be agreed between the **User** and the **DNO**. For supplies at **Low Voltage** the general rule is that the ownership boundary will be at the **User's** terminals of the **DNO** owned metering equipment. For **High Voltage** supplies and busbar connected supplies at **Low Voltage**, the ownership boundary will be subject to specific agreement between the **DNO** and the **User** in each case.

9.1.2 In the absence of a separate written agreement between the parties to the contrary, construction, commissioning, control, operation and maintenance responsibilities follow ownership.

9.1.3 For connections to the **Distribution System** for which a **Connection Agreement** is required and those covered by regulation 26 and parts 1 and 2 of schedule 3 of the Electricity Supply Regulations (N.I.) 1991, as amended or re-stated from time to time, a **Site Responsibility Schedule** shall be prepared by the **DNO** (reflecting the details agreed between the **DNO** and the **User**) in respect of each **Connection Site** pursuant to the relevant **Connection Agreement** and signed by both parties (by way of confirmation of its accuracy), detailing the division of responsibilities at interface sites in respect of ownership, control, operation, maintenance and safety. The format, principles and basic procedure to be used in the preparation of **Site Responsibility Schedules** are set down in Appendix 1.

9.1.4 An **Ownership Diagram** shall be included in the above **Site Responsibility Schedule**. The diagram shall show all **HV Apparatus** and the connections to all external circuits and shall incorporate numbering, nomenclature and labelling as set out in OC9. A guide to the types of **HV Apparatus** to be shown in the **Ownership Diagram** is shown in Appendix 2 together with the principles to be followed in the preparation of the diagram and the preferred graphical symbols to be used.

9.1.5 A copy of the **Site Responsibility Schedule** and any **Ownership Diagrams** shall be retained by the **DNO** and by the **User**.

9.1.6 The **User** shall notify the **DNO** of any changes at or relating to the **Connection Site** which may affect the **Site Responsibility Schedule** or **Ownership Diagrams** and the **DNO** shall carry out any necessary updating and the principles set out in paragraph 9.1.3 shall apply to such updating.

9.2 Access to **Sites**

The provisions relating to access to **DNO Sites** by **Users** and to **User's Sites** by members or representatives of the **DNO** shall be set out in the relevant **Connection Agreement** and/or lease.

9.3 Work on **Protection** at **Connection Points**

No busbar **Protection**, mesh corner **Protection**, circuit breaker fail **Protection**, AC or DC wiring (other than power supplies or DC tripping associated with a **Generating Unit**) at a **Connection Point** shall be worked upon or altered by or on behalf of a **User** unless the **DNO** has been given a reasonable opportunity to arrange for a **DNO** representative to attend. The **DNO** shall not work upon or alter any **Generating Unit Protection** unless it has given the **Generator** a reasonable opportunity for a representative of the **Generator** to attend.

9.4 Standard of maintenance

9.4.1 It is a requirement that all **User's Plant** and **Apparatus** on **DNO Sites** is maintained adequately for the purpose for which it is intended and to ensure that it does not pose a threat to the safety of any of **DNO's Plant**, **Apparatus** or personnel on the **DNO Site**.

9.4.2 The **DNO** shall ensure that all of the **Distribution System Plant** and **Apparatus** on **Users' Site**s is maintained adequately for the purpose for which it is intended and to ensure that it does not pose a threat to the safety of any **User's Plant**, **Apparatus** or personnel on the **User's Site**.

9.4.3 The **DNO** or the **User** (as the case may be) will have the right to inspect the test results and maintenance records relating to such **Plant** and **Apparatus** at any time.

9.5 Responsibility for safety

9.5.1 The **Site Responsibility Schedule** referred to in paragraph 9.1.3 shall detail the demarcation of responsibility for safety of persons carrying out work or testing at **Connection Sites** and on circuits which cross a **Connection Site** at any point.

9.5.2 More detailed information on procedures and responsibilities involved in the provision of **Safety Precautions** is set out in OC6.

10 Approval To Connect

10.1 Readiness to connect

10.1.1 A **User** whose development is under construction in accordance with the relevant **Connection Agreement** and who wishes to establish a connection, or to modify an existing connection, to the **Distribution System** shall apply to the **DNO** by submitting a standard connection card or otherwise in writing, stating readiness to connect and giving the following:-

(a) confirmation that the **User's** installation complies with the principles outlined in Regulation 28 of the Electricity Supply Regulations (N.I.) 1991 and Regulations 4-12 and 15 of the Electricity at Work Regulations (N.I.) 1991 (or as amended or re-stated);

(b) where relevant, updated **Planning Code** data based on actual values; and

(c) a proposed connection date.

10.1.2 The **DNO** may require a **User** to provide in addition to its written application to the **DNO** for connection in accordance with paragraph 10.1.1, a report, prepared by such person as the **DNO** may reasonably consider to be competent to issue the same, certifying to the **DNO** that all matters required by paragraph 5 have been considered and that paragraphs 6 to 8 inclusive have been complied with by the **User** and incorporating:-

(a) all available type test reports and test certificates produced by Nationally Accredited Laboratories (or other equivalent testing organisations) showing that the **Plant** and **Apparatus** specified in the **Connection Conditions** meets the criteria specified;

(b) copies of the manufacturer's test certificates relating to **Plant** and **Apparatus** referred to in the **Connection Conditions**, including measurements of positive and zero sequence impedance of **Apparatus** which will contribute to the fault current at the **Connection Point**;

(c) details of **Protection** arrangements and settings;

(d) a certificate declaring the maximum short circuit current in amperes which the **User's System** would contribute to a three-phase short circuit at the **Connection Point**, and the minimum zero sequence impedance of the **User's System** at the **Connection Point** and taking into account the

contributions of any **Generating Unit** or **Power Generating Facility** motors and transformers; and

(e) confirmation that designs conform to the standards referred to in paragraph 6.

10.1.3 A **User** shall supply the following information to the **DNO** together with its notification under paragraph 10.1.1:-

(a) a list of persons proposed to be appointed by the **User** to undertake, and to be responsible for, the application and removal of **Safety Precautions** on those parts of the **User's System** which are directly connected to the **Distribution System**, in accordance with OC6;

(b) a list of persons appointed by the **User** to undertake operational duties on the **User's System** and to issue and receive operational messages and instructions in relation to the **User's System**;

(c) a list of names and telephone numbers of responsible management representatives in accordance with OC7;

(d) site common drawings as specified in the **Connection Agreement**;

(e) a single line diagram of the **User's Apparatus** showing all items to which these **Connection Conditions** apply; and

(f) information to enable the **DNO** to prepare a **Site Responsibility Schedule**.

10.1.4 In order that the **DNO** may verify that the requirements of these **Connection Conditions** can be met, the **User** shall provide a proposed commissioning programme, in accordance with EREC G99/NI or the appropriate **Setting Schedules** as applicable (or a period as the **DNO** may reasonably consider to be appropriate in the circumstances), and detailing all proposed site testing of main and ancillary equipment, together with the names of the organisations which are to carry out such testing and the proposed timetable for such testing. The required period of notice will be notified to the **User** by the **DNO** during the course of an application for connection. The **DNO** will consider the proposed commissioning programme and, as soon as reasonably practicable, will notify the **User**:-

(a) that it approves the programme, in which case the **DNO** and the **User** shall take all reasonable steps to ensure that the **Commissioning/Acceptance Testing** is undertaken in accordance with the commissioning programme (subject to **Distribution System** conditions); or

(b) that it considers that the **Commissioning/Acceptance Testing** proposed in the programme may involve the application of irregular, unusual or extreme conditions and which may have a material effect on the

Distribution System, beyond the **User's System** and that such testing therefore falls within the scope of OC10, "**System Tests**", in which event the proposed commissioning programme shall be treated as a **Proposal Notice** submitted under paragraph 4.1 of OC10 and the relevant provisions of OC10 shall apply to the proposed testing; or

(c) that it requires the proposed commissioning programme to be amended in which event the **User** and the **DNO** shall endeavour to agree an appropriate amendment to the commissioning programme, failing which the programme will be as determined by the **DNO** acting reasonably and, in either case, the **DNO** and the **User** shall take all reasonable steps to ensure that the **Commissioning/Acceptance Testing** is undertaken in accordance with the commissioning programme as amended; or

(d) that it rejects the proposed commissioning programme and the reasons for such rejection in which event, subject to the resolution of any dispute in accordance with the relevant **Connection Agreement**, the proposed **Commissioning/Acceptance Testing** shall not take place but the **User** shall be entitled to submit a revised commissioning programme for the **DNO's** consideration.

10.1.5 The **DNO** shall be entitled to witness site testing of equipment whose performance can reasonably be regarded as affecting the integrity of the **Distribution System**. The **User** shall provide the **DNO** with certified results of all such tests and the **DNO** may withhold agreement to energise the **User's Equipment** where test results establish that the **Connection Conditions** have not been complied with.

10.1.6 Where in advance of the proposed connection date, a **Generator** requires connection to the **Distribution System** for the purpose of testing, the **Generator** will be required to satisfy the **DNO** of the following:-

(a) compliance with those requirements of the **Connection Conditions** and **Connection Agreement** necessary to give assurance that it is safe to connect; and

(b) where applicable, provision of a commissioning programme in accordance with paragraph 10.1.4.

10.2 Confirmation of approval to connect

10.2.1 Within 30 days of notification by a **User** pursuant to paragraph 10.1.1 the **DNO** shall (except where it has rejected the **User's** application in accordance with paragraph 10.1.4(d)) inform the **User** whether or not the requirements of paragraph 10.1 and the other requirements of the **Connection Conditions** are satisfied and the making of the connection is approved subject to satisfactory results of those tests (including **Commissioning/Acceptance Tests**) which cannot be performed prior to energisation of the **User's Plant** and **Apparatus**. Where approval is withheld, reasons shall be stated by the **DNO**.

10.2.2 Where the notification given by the **DNO** pursuant to paragraph 10.2.1 is in the affirmative, the **DNO** will in addition supply to the **User** the following information:-

(a) a list of persons appointed by the **DNO** to undertake, and to be responsible for, the application and removal of **Safety Precautions** in relation to the **Connection Site**, in accordance with OC6;

(b) a list of persons appointed by the **DNO** to undertake operational duties on the **Distribution System** and to issue and receive operational messages and instructions in relation to the **User's System**; and

(c) list of names and telephone numbers of responsible management representatives in accordance with OC7.

10.2.3 When indicating agreement to the energising of a connection, the **DNO** shall, to the extent not previously determined in a commissioning programme, specify the contents and sequence of the energising programme and associated testing. In either case, the **DNO** shall be entitled to postpone or suspend the programme where, due to circumstances which could not reasonably have been foreseen by the **DNO**, continuation of the programme would impose an unacceptable level of risk to the integrity of the **Distribution System**.

10.3 Approval of staff

10.3.1 At the same time that the **User** submits to the **DNO** in relation to safety requirements the list of information pursuant to paragraph 10.1.3, it shall submit to the **DNO** a list of staff which will be used to implement **Safety Precautions**. The **DNO** may ask the **User** questions to clarify the suitability of persons named on the list.

10.3.2 At the same time that the **DNO** submits to the **User** the list of information pursuant to paragraph 10.2.2 it shall submit to the **User** a list of **DNO** staff which will be used to implement **Safety Precautions**. The **User** may ask the **DNO** questions to clarify the suitability of persons named on the list.

10.3.3 The **DNO** and each **User** have the right to object to the inclusion of particular members of staff on the other's list, on technical grounds, and in the event of objection which is accepted by the other, that member of staff will not be used to implement **Safety Precautions**.

10.3.4 A party must accept an objection to the extent it is reasonable to do so. In the event of a disagreement, the disputes resolution procedure in the relevant **Connection Agreement** will be used.

10.3.5 As part of the approval process, each party may (upon reasonable notice and at reasonable times) interview members of staff on the other's list or the parties may agree to hold joint interviews.

10.3.6 If the list of the **DNO** or a **User**, as the case may be, changes, the relevant party must notify the other without delay and the relevant provisions of this paragraph 10.3 shall apply to any new names included as part of that change.

10.3.7 Neither the **DNO** nor any **User** shall have any liability to the other by reason of or arising from their approval under this paragraph 10.3 of the other's list of staff entitled to implement **Safety Precautions**.

11 Connection Conditions compliance testing

11.1 The **DNO** will specify to each **User** within EREC G99/NI and/or the **Setting Schedule** as appropriate the testing to be undertaken to demonstrate compliance with the **Connection Conditions** and **Setting Schedule** in relation to a particular connection. The specification and the timing of the test will be consistent with the overall requirements, including timing of the **Connection Agreement** and **Setting Schedule**. The following sets out the requirements for testing for **Generators** and **Demand Customers**.

11.2 **Centrally Dispatched Generation Unit** Testing

11.2.1 The testing will be undertaken in three phases as outlined in the EREC G99/NI or the PPM **Setting Schedule**:

(a) Phase 1 – Pre-energisation

(b) Phase 2 – Post-energisation

(c) Post-energisation monitoring

11.2.2 .Phase 1 – Pre-energisation

11.2.2.1. The testing in Phase 1 will require the **Generator** to demonstrate, in the presence of a representative of the **TSO** or **DNO**, as required by EREC G99/NI the **PPM Setting Schedule,** compliance with requirements specified by the **DNO** as being the relevant parts of the **Connection Conditions,** EREC G99/NI and the **PPM Setting Schedule** against which compliance needs to be demonstrated.

11.2.2.2. A Pre-energisation Connection Report shall be completed by the **Generator** to the satisfaction of the **DNO**, demonstrating compliance, which will include such information as the **DNO** may reasonably specify.

11.2.3 Phase 2 – Post-energisation

11.2.3.1. Following energisation, the **TSO** and/or the **DNO** will issue for the **Power Generating Facility**, an Interim Operational Notification (previously known as a Temporary Compliance Certificate) valid for twelve months from when the **Generator** is due to begin exporting active power as outlined in the appropriate **Setting Schedule**.

11.2.3.2. Phase 2 covers certain EREC G99/NI or **Setting Schedule** tests which require to be carried out in line with the time scales specified within the **Setting Schedule** (or such other period may reasonably be specified by the **DNO**) following energisation. The tests will be specified by the **DNO**, and will be based on the individual test descriptions as set out in the **Connection Agreement,** EREC G99/NI and the **Setting Schedule**, and such further tests as the **DNO** may reasonably specify to demonstrate compliance with the **Connection Conditions**.

11.2.3.3. The tests in Phase 2 will be based on an on-site demonstration of the operation of the **Power Generating Facility** as specified by EREC G99/NI or the **Setting Schedule**. Any test which relies upon some level of generation may be replaced with either a simulated power output signal or be demonstrated through the analysis of individual turbine event logs to confirm receipt of the appropriate control signal, in each case subject to the reasonable agreement of the **DNO** to such alternative approach.

11.2.3.4. In the event that conditions (relating to weather conditions or the conditions on the network generally) do not allow the test to be performed, then a demonstration of the control functionality would normally be sufficient to demonstrate compliance with Phase 2, subject to the agreement of the **DNO**. The **DNO** may agree that any physical tests which were not completed as part of the Phase 2 tests will be included in the Phase 3 monitoring phase.

11.2.4 Phase 3 – Post-energisation **Monitoring**

11.2.4.1. The operation of the **Power Generating Facility** over a range of conditions will be confirmed by operational monitoring in Phase 3 as specified in EREC G99/NI or the **Setting Schedule**. During the twelve month period after energisation, a number of operations, as specified by the **DNO**, will be required. The results of monitoring the performance of those operations will be included in the **Final Connection Report**. The operational monitoring period of Phase 3 will be required to confirm to the **DNO's** reasonable satisfaction the **Power Generating Facility's** and its individual **Plant** and/or **Apparatus**' behaviour and capability under various conditions and subject to disturbances, which generally cannot be simulated during the commissioning tests. The undertaking of the operational monitoring will require the installation of an event recorder or similar device by the DNO at or near to the **Connection Point**.

11.2.4.2. On the satisfactory completion of Phase 3, the **TSO** and/or **DNO** will issue a Final Operational Notification (previously known as a final compliance certificate) to the **Generator.**

11.2.4.3. If the relevant conditions necessary to complete the Phase 3 are not experienced during the twelve months following energisation, then nevertheless the Final Operational Notification will be issued by the **TSO and /or DNO** at the expiration of that twelve month period.

11.2.4.4. A Interim Operational Notification or a Final Operational Notification, as determined by EREC G99/NI or the **Setting Schedule,** may be

subsequently withdrawn by the **TSO** and/or DNO for the non- compliance of the **Power Generating Facility** with the **Distribution Code** and replaced with a Limited Operational Notification (previously known as a restricted compliance certificate) as outlined in EREC G99/NI or the **Setting Schedule**. A Limited Operational Notification shall be issued to the **Generator** which shall set out the matters in respect of which there is non compliance; the MVA rating at the **Connection Point** to which the **Power Generating Facility** is restricted; the timescales for resolution of the non compliance. Upon resolution of the non compliance, the **TSO** and/or **DNO** in its absolute discretion may re-issue a Interim Operational Notification or a Final Operational Notification to the **Generator.**

11.3 Non **Centrally Dispatched Generation Unit** Testing

11.3.1

11.3.2 The testing will be undertaken in two phases as outlined in EREC G99/NI or the Schedule:

(a) Phase 1 – Pre-energisation

(b) Phase 2 – Post-energisation monitoring

11.3.2 Pre Energisation

11.3.2.1 The **Power Generating Facility** will not be connected unless all relevant agreements are signed in accordance with the requirement of the appropriate Setting Schedules, which would normally be at least four weeks in advance of the connection date.

11.3.2.2 The **Generator** shall, prior to energisation, confirm compliance with the G59 or G99/NI protection section as applicable, the relevant sections of BS7671 and that the **Power Generating Facility** will become fully compliant with all parts of the **Distribution Code**.

11.3.3 Post Energisation Monitoring

11.3.3.1 Following energisation the **TSO** and/or **DNO** shall issue the **Generator** with an Interim Operational Notification valid for 12 months from when the **Power Generating Facility** begins exporting active power. During this period the **Power Generating Facility** will be monitored for compliance with the **Distribution Code**, **Connection Agreement** criteria and the appropriate **Setting Schedules.**

11.3.3.2 On the satisfactory completion of Phase 2 the **TSO** and/or **DNO** will issue the **Generator** with a Final Operational Notification.

11.3.3.3 If the relevant conditions necessary to complete Phase 2 are not achieved during the twelve months following energisation, then nevertheless the Final Operational Notification will be issued by the **TSO** and/or **DNO** at the expiration of that twelve month period.

11.3.3.4 An Interim Operational Notification or a Final Operational Notification, as determined by EREC G99/NI or the **Setting Schedule,** may be subsequently withdrawn by the **TSO** and/or **DNO** for the non-compliance of the **Power Generating Facility** with the **Distribution Code,** EREC G99/NI or a **Setting Schedule** and replaced with a Limited Operational Notification as outlined in EREC G99/NI and the **Setting Schedules**. A Limited Operational Notification shall be issued to the **Generator** which shall set out the matters in respect of which there a non compliance; the kVA rating at the **Connection Point** to which the **Power Generating Facility** is restricted and the timescales for resolution of the non compliance.

11.3.3.5 Upon resolution of the non compliance the **TSO** and/or **DNO** in its absolute discretion, will require the **Generator** to fully complete the tests as outlined in EREC G99/NI or the **Setting Schedule** before re-issue of an Interim Operational Notification or a Final Operational Notification.

11.4 Demand Customer Testing

In the case of **Demand Customers** a Pre-energisation Connection Report will be completed by the **User** to the satisfaction of the **DNO**, which includes such information as may be reasonably specified by the **DNO** to demonstrate compliance with the **Connection Conditions** and any other relevant part of the **Distribution Code**.

12 Fuel Security Code

Each **Generator** agrees to comply with the **Fuel Security Code** to the extent that it is expressed to apply to it and with any instructions from the **DNO** or the **TSO** pursuant to the **Fuel Security Code**.

13 Demand Side Services

13.1 Scope

13.1.1 This **CC** 13 applies to **Demand Customers** in relation to their **Demand Units** that are providing any of the demand side services defined in **CC** 13.2. For the avoidance of doubt it does not apply to **Demand Customers'** installations and **Equipment** in general.

13.1.2 **CC** 13 also applies to **Demand Service Providers.**

13.2 Demand Side Service Definitions

13.2.1 **Active Power** control – a service where a **Demand Customer** makes available the modulation by the **DNO** of **Demand** within the **Demand Customer's Demand Facility**. This service can also be provided by a **Demand Service Provider** from a collection of **Demand Units** in various **Demand Facilities.**

13.2.2 **Reactive Power** control – a service where a **Demand Customer** makes available the modulation by the **DNO** of the **Demand Customer's** reactive power production or consumption within the **Demand Customer's Demand Facility**. This service can also

be provided by a **Demand Service Provider** from a collection of **Demand Units** in various **Demand Facilities.**

13.3 Technical Requirements

13.3.1 Voltage Ranges

13.3.1.1 Any **Demand Unit** must be able to remain connected and operating normally when the supply voltage is within the range of 0.94pu to 1.06pu of nominal declared voltage.

13.3.2 Frequency Ranges

13.3.2.1 The **System Frequency** could rise to 52Hz or fall to 47Hz in exceptional circumstances. Any **Demand Unit** must be able to remain connected and operating normally in accordance with the following table:

Frequency Range	Requirement
47Hz - 47.5Hz	Operation for a period of at least 20 seconds is required each time the **Frequency** is below 47.5Hz.
47.5Hz - 49.0Hz	Operation for a period of at least 90 minutes is required each time the **Frequency** is below 49.0Hz.
49.0Hz - 51Hz	Continuous operation is required
51Hz - 51.5Hz	Operation for a period of at least 90 minutes is required each time the **Frequency** is above 51Hz.
51.5Hz - 52Hz	Operation for a period of at least 60 minutes is required each time the **Frequency** is above 51.5Hz.

13.3.2.2 **Demand Units** must remain connected and operating normally for rates of change of frequency up to $1Hzs^{-1}$.

13.3.3 Modulation

13.3.3.1 A **Demand Unit** or **Demand Units** must be capable controlling its **Demand** or **Reactive Power** production or consumption over the range specified in any contract with the **DNO**.

13.3.3.2 **Demand Units** must be equipped to receive modulation instructions either directly, or indirectly via a **Demand Service Provider**, from the **DNO**.

a) **DNOs** currently are developing active network management approaches and there is no common standard for communication protocols.

b) The **DNO** will provide details of the method to be employed on a site by site basis, or as will be deployed between the **DNO** and the **Demand Service Provider**. Protocols currently in use between **DNOs** and **Demand Customers** include simple current loop; DNP3; IEC 61850.

c) The **DNO** will agree with the **Demand Customer** for each **Demand Facility**, or with the **Demand Service Provider** as appropriate, the protocol to be used.

d) By default if nothing it specified by the **DNO** then the interface will take the form of a simple binary output that can be operated by a simple switch or contactor. When the switch is closed the **Demand Unit** or **Demand Facility** can operate normally. When the switch is opened the **Demand Unit** will modulate its **Demand** (**Active Power** consumption or **Reactive Power** production or consumption) as required by the contract. The signal from the **Demand Unit** that is being switched can be either AC (maximum value 240 V) or DC (maximum value 110 V).

13.3.3.3 The **DNO** will publish the standard response times it expects for the services it wishes to contract for. Having received the signal or command from the **DNO** the **Demand Unit** will modulate its behaviour to the full extent of the contract within the standard response time, unless agreed otherwise with the **DNO**. In the absence of a specific published **DNO** requirement the response time will be 5 minutes.

13.3.3.4 The modulated behaviour will be maintained for the duration of the signal to do so from the **DNO** unless otherwise agreed with the **DNO**.

13.3.3.5 If the modulation, or any part of it, ceases to be fully available for operation at any time, either temporarily or permanently, the **Demand Customer**, or **Demand Service Provider** as appropriate, will notify the **DNO** without delay, and no more than 12 hours after the modulation ceases to be fully available.

13.3.3.6 The **DNO** will advise what operational monitoring and/or metering is to be installed in a **Demand Facility**, or agreed with a **Demand Service Provider**. For **Demand Facilities** connected at **HV** the **DNO** in some cases will install the **DNO's** own telemetry which can form part of the necessary operational monitoring,

13.4 Operational Notification

13.4.1 As part of the contractual arrangements for the provision of demand side services to the **DNO**, the **Demand Customer** must provide the following information one month in advance of the commencement of a contract for demand side services:

a) Full contact details of the **Demand Facility** owner;

b) The exact address and location of the **Demand Facility**;

c) The capacity of the modulated behaviour of the **Demand Unit** expressed in kW or kVAr (including production or consumption) as appropriate;

d) Confirmation that the **Demand Unit** complies with the technical and modulation requirements of **CC** 13.3;

e) The name and contact details of the **Demand Service Provider** if the **Demand Customer** has contracted with a **Demand Service Provider** for the provision of the demand side services;

f) For **Demand Customers** providing demand side services via a **Demand Service Provider**, the information above should be submitted to the **Demand Service Provider**, who in turn will submit it to the **DNO** in aggregated form;

g) The above information must be submitted for each and every **Demand Unit.**

13.4.2 The above information, together with the statement of compliance required by **CC** 13.5.1.4 below shall be submitted by either the **Demand Customer**, or **Demand Services Provider** as appropriate, on the proforma provided by the **DNO** for that purpose.

13.4.3 The **Demand Customer** or **Demand Services Provider,** as appropriate, must notify the **DNO** of any planned change or modification to the capabilities of the **Demand Unit** must be notified at least one month in advance unless agreed otherwise with the **DNO**.

13.4.4 The **Demand Customer** or **Demand Services Provider,** as appropriate, must notify the **DNO** of any unplanned incident or failure of a **Demand Unit** immediately, which means within the same day, unless otherwise agreed with the **DNO**.

13.4.5 In the case of an aggregated service, the **Demand Service Provider** must notify the **DNO** of any planned changes to the specification and availability of the contracted service at least one month in advance of the planned implementation date.

13.4.6 In the case of an aggregated service, any unplanned incident or failure of the contracted service should be notified to the **DNO** immediately, which means within the same day.

13.4.7 For any **Demand Facility** connected at **HV**, the demand side services cannot be called upon until the **DNO** has issued a final operational notice to the **Demand Customer** responsible for the **Demand Facility**. The **DNO** will issue the final operational notice to the **Demand Customer** on receipt of the complete information required in **CC** 13.4.1. The **DNO** will recognize practical difficulties in completing all appropriate tests for confirmation of compliance in specific situations and will not unreasonably withhold the issuing of the final operation notification.

13.5 Compliance

13.5.1 Where the **Demand Customer** has a direct contract with the **DNO**:

13.5.1.1 Where a **Demand Customer** has contracted directly with the **DNO** for demand side services, the **Demand Customer** is wholly responsible for the compliance of the **Demand Customer's Demand Units** with the requirements of this **CC** 13 and for the conduct of any tests necessary to demonstrate compliance.

13.5.1.2 The **Demand Customer** must demonstrate the modulation of behaviour of the **Demand Unit** on receipt of the appropriate signal (or simulated sign) from the **DNO**. Where appropriate such tests can be undertaken off site, for example by the manufacturer.

13.5.1.3 To the extent that the **Demand Customer** requires the **DNO** to assist or participate in compliance testing the **DNO** will co-operate to achieve an agreed timetable.

13.5.1.4 The **Demand Customer** will supply to the **DNO** a statement of compliance detailing how compliance with the relevant parts of **CC** 13 has been demonstrated. The statement can include **Manufacturer's Information** to support the demonstration of compliance.

13.5.2 Where the **DNO** has contracted with a **Demand Service Provider** who is not a single **Demand Customer** and is aggregating a response from many **Demand Customer**s:

13.5.2.1 Where the **DNO** has contracted with a **Demand Service Provider** it is the responsibility of that **Demand Service Provider** to ensure that relevant **Demand Units** comply with **CC** 13 and are also responsible for any necessary tests etc needed to demonstrate compliance.

13.5.2.2 The **Demand Service Provider** must demonstrate the modulation of behaviour of **Demand Unit**s on receipt of the appropriate signal (or simulated sign) from the **DNO**. Where appropriate such tests can be undertaken off site, for example by the manufacturer and aggregated by the **Demand Service Provider**.

13.5.2.3 To the extent that the **Demand Service Provider** requires the **DNO** to assist or participate in compliance testing the **DNO** will co-operate to achieve an agreed timetable.

13.5.2.4 The **Demand Service Provider** will provide a statement of compliance detailing how the **Demand Service Provider** has ascertained that the **Demand Unit**s that it is using to provide demand side services to the **DNO** are compliant with the requirements of this **CC** 13.

13.5.3 The **DNO** may require the **Demand Customer** or **Demand Service Provider** to repeat compliance tests in accordance with a plan, or following any modification or failure of the **Demand Unit** to perform as required.

APPENDIX 1

FORMAT, PRINCIPLES AND BASIC PROCEDURE TO BE USED IN THE PREPARATION OF SITE RESPONSIBILITY SCHEDULES

1 Principles

1.1 **Site Responsibility Schedules** shall be drawn up covering the following:

(a) Schedule of **HV Apparatus**;

(b) Schedule of **Plant**, **LV**/**MV Apparatus**, services and supplies;

(c) Schedule of telecommunications and measurements **Apparatus**.

Other than at **Generating Unit** and **Power Generating Facility** locations (including **PPMs**), the schedules referred to in (b) and (c) may be combined.

1.2 Each **Site Responsibility Schedule** for a **Connection Site** shall be prepared by the **DNO** in consultation with other **Users** at least 2 weeks prior to the date for connection proposed by the **User** pursuant to paragraph 10.1.1(c) in the **Connection Conditions**. Each **User** shall provide information to the **DNO** to enable it to prepare the **Site Responsibility Schedule**.

1.3 Each **Site Responsibility Schedule** shall detail for each item of **Plant** and **Apparatus**:-

(a) **Plant**/**Apparatus** ownership;

(b) Site Manager;

(c) Safety (applicable **Safety Rules** and **Control Person** or other responsible person (**Safety Co-ordinator**), or such other person who is responsible for safety);

(d) **Operation**s (applicable **Operational Procedures** and control engineer);

(e) Responsibility to undertake maintenance.

Each **Connection Point** shall be precisely shown.

1.4 In the case of **Site Responsibility Schedules** referred to in paragraph 1.1 (b) and (c), with the exception of **Protection** and **Intertrip Apparatus** operation, it will be sufficient to indicate the responsible **User** or the **DNO** as the case may be. In the case of the **Site Responsibility Schedule** referred to in 1.1 (a) for **Protection** and **Intertrip Apparatus**, the responsible management unit must be shown in addition to the **User** or the **DNO** as the case may be.

1.5 The **HV Apparatus Site Responsibility Schedule** for each **Connection Site** must include lines and cables emanating from the **Connection Site**.

1.6 Every page of each **Site Responsibility Schedule** shall bear the date of issue and the issue number.

1.7 When a **Site Responsibility Schedule** is prepared it shall be sent by the **DNO** to the **Users** involved for confirmation of its accuracy

1.8 The **Site Responsibility Schedule** shall then be signed on behalf of the **DNO** by the Manager responsible and on behalf of each **User** involved by its **Responsible Manager** (see paragraph 3.1), by way of written confirmation of its accuracy if they agree on its accuracy.

1.9 Once signed, two copies will be distributed by the **DNO**, not less than two weeks prior to its implementation date, to each **User** which is a party on the **Site Responsibility Schedule**, accompanied by a note indicating the issue number and the date of implementation.

1.10 The **DNO** and **Users** must make the **Site Responsibility Schedules** readily available to their respective operational staff at the **Site**.

2 Alterations to existing Site Responsibility Schedules

2.1 Without prejudice to the provisions of paragraph 2.4, when a **User** identified on a **Site Responsibility Schedule** becomes aware that an alteration is necessary, it must inform the **DNO** immediately and in any event 8 weeks prior to any change taking effect (or as soon as possible after becoming aware of it, if less than 8 weeks remain when the **User** becomes aware of the change).

2.2 Where the **DNO** has been informed of a change by a **User**, or itself proposes a change, it will prepare a revised **Site Responsibility Schedule** by not less than six weeks prior to the change taking effect (subject to it having been informed or knowing of the change eight weeks prior to that time) and the procedure set out in paragraph 1.7 shall be followed with regard to the revised **Site Responsibility Schedule**.

2.3 The revised **Site Responsibility Schedule** shall then be signed in accordance with the procedure set out in paragraph 1.8 and distributed in accordance with the procedure set out in paragraph 1.9, accompanied by a note indicating where the alteration(s) has/have been made, the new issue number and the date of implementation.

2.4 When a **User** identified on a **Site Responsibility Schedule**, or the **DNO**, as the case may be, becomes aware that an alteration to the **Site Responsibility Schedule** is necessary urgently to reflect, for example, an emergency situation, the **User** shall notify the **DNO**, or the **DNO** shall notify the **User**, as the case may be, immediately and will discuss:

(a) what change is necessary to the **Site Responsibility Schedule**;

(b) whether the **Site Responsibility Schedule** is to be modified temporarily or permanently; and

(c) the distribution of the revised **Site Responsibility Schedule**.

The **DNO** will prepare a revised **Site Responsibility Schedule** as soon as possible and in any event within seven days of it being informed of or knowing the necessary alteration. The **Site Responsibility Schedule** will be confirmed by **Users** and signed on behalf of the **DNO** and **Users** (by the persons referred to in paragraph 1.8 of this

appendix) as soon as possible after it has been prepared and sent to **Users** for confirmation.

3 Responsible Managers

3.1 Each **User** and the **DNO** shall, prior to the date for connection proposed by the **User** pursuant to paragraph 10.1.1(c), exchange names and status of managers with authority to sign **Site Responsibility Schedules**.

APPENDIX 2

PROCEDURES RELATING TO OWNERSHIP DIAGRAMS

1 Basic Principles

(a) Where practicable, all the **HV Apparatus** on any **Connection Site** shall be shown on one **Ownership Diagram**. Provided the clarity of the diagram is not impaired, the layout shall represent as closely as possible the geographical arrangement on the **Connection Site**.

(b) Where more than one **Ownership Diagram** is unavoidable, duplication of identical information on more than one **Ownership Diagram** must be avoided.

(c) The **Ownership Diagram** must show accurately the current status of the **Apparatus**, e.g. whether commissioned or decommissioned. Where decommissioned, the associated switch bay will be labelled "spare bay".

(d) Provision will be made on the **Ownership Diagram** for signifying approvals, together with provision for details of revisions and dates.

(e) **Ownership Diagrams** will be prepared in A4 format or such other format as may be agreed with the **DNO**.

2 Apparatus to be shown on Ownership Diagrams

1 Busbars

2 Circuit Breakers

3 **Disconnector** (Isolator) and Switch **Disconnectors** (Switching Isolators)

4 **Disconnectors** (Isolators) - Automatic Facilities

5 Bypass Facilities

6 **Earthing** Switches

7 Maintenance Earths

8 Overhead Line Entries

9 Overhead Line Traps

10 Cable and Cable Sealing Ends

11 **Generating Unit**

12 **Generator Transformers**

13 **Generating Unit** Transformers, Station Transformers, including the lower voltage circuit-breakers

14 **PPM** Transformers, including the lower voltage circuit-breakers

15 Synchronous Compensators

16 Static Variable Compensators

17 Capacitors (including Harmonic Filters)

18 Series or Shunt Reactors

19 Supergrid and Grid Transformers

20 Tertiary Windings

21 **Earthing** and Auxiliary Transformers

22 Three Phase VTs

23 Single Phase VT & Phase Identity

24 High Accuracy VT and Phase Identity

25 Surge Arrestors/Diverters

26 Neutral **Earthing** Arrangements on **HV Apparatus**

27 Fault Throwing Devices

28 Quadrature Boosters

29 Arc Suppression Coils

30 Current Transformers (where separate items)

31 Wall Bushings

3 Recommended Graphical Symbols

Where appropriate, the recommended graphical symbols shown in the attachment to this Appendix 2 shall be used in the preparation of an **Ownership Diagram**.

APPENDIX 3

LIST OF LICENCE STANDARDS

1. ER-P2/5 - Security of Supply, dated October 1978, and NIE Networks amendment sheet, Issue 2, dated 7 August 1992.

2. PLM-SP-1 - Planning Standards of Security for the Connection of Generating Stations to the System Issue 1, dated September 1975, and NIE Networks amendment sheet Issue 2, dated 7 August 1992.

3. PLM-ST-4 - CEGB Criteria for System Transient Stability Studies Issue 1, dated September 1975, and NIE Networks amendment sheet Issue 2, dated 7 August 1992.

4. PLM-ST-9 - Voltage Criteria for the Design of the 400kV and 275kV Supergrid System Issue 1, dated 1 December 1985 and NIE Networks amendment sheet Issue 2, dated 7 August 1992.

5. ER-P28 - Planning limits for Voltage Fluctuations.

6. ER-P16 - EHV or HV Supplies to Induction Furnaces.

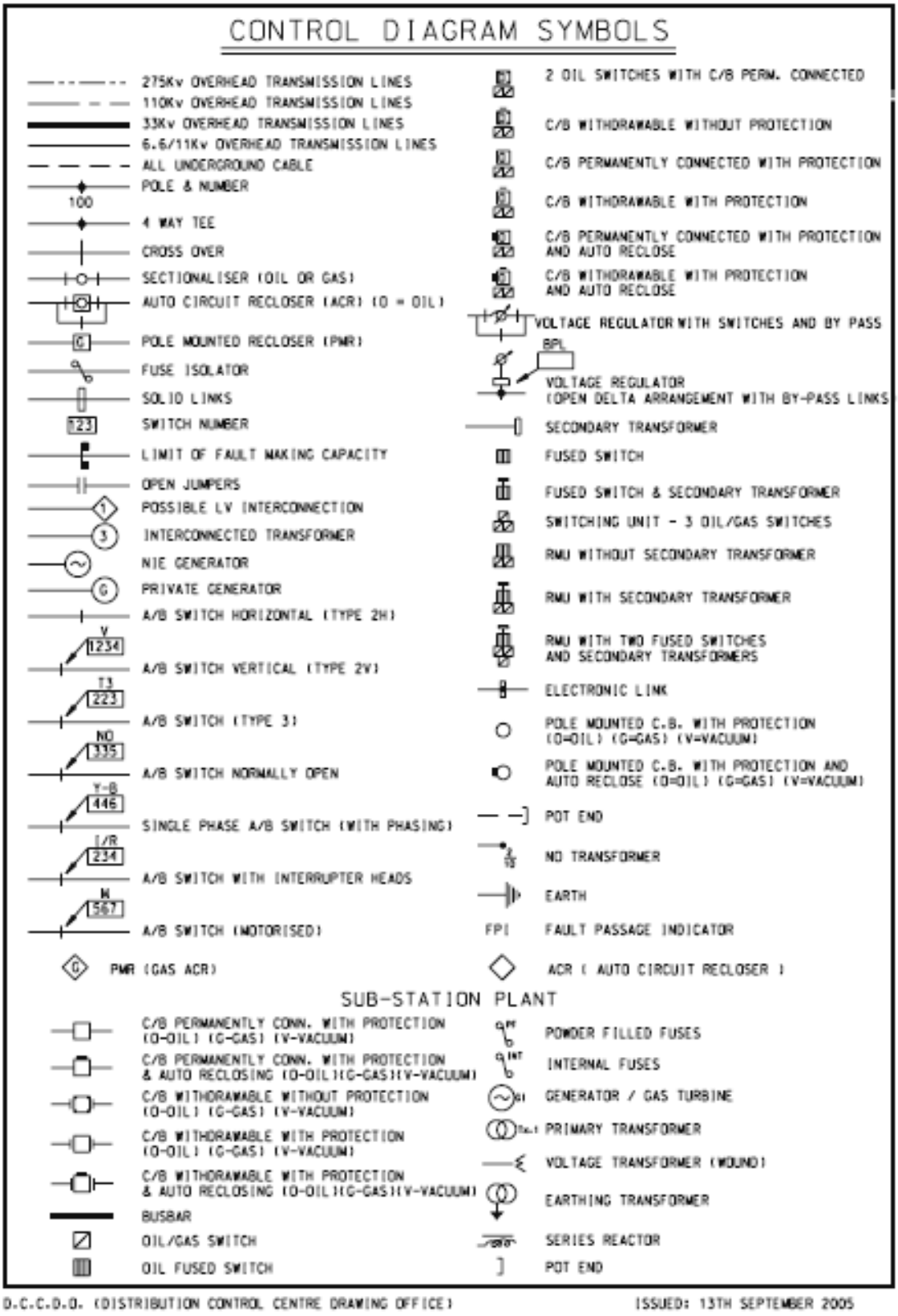
7. ER-P29 - Planning limits for Voltage Unbalance.

8. ER-G5/4- Limits for Harmonics.

9. ER-G12/2 - Application of Protective Multiple Earthing to Low Voltage Networks.

10. EPM-1 - Operational Standards of Security of Supply Issue 2, dated 30 June 1980.

Recommended Graphical Symbols



APPENDIX 4

GUIDANCE ON RISK ASSESSMENT WHEN USING ROCOF LOM PROTECTION

1 This procedure aims to provide guidance on assessing the risks to a **Generator's Plant** and equipment where a **Power Generating Facility** is considering the effect of applying higher interface **Protection** settings. Information provided by the **DNO** in relation to this appendix 4 may be at the expense of the **Generator.**

1.1 The guidance in this appendix 4 relates to a new activity. Early experience may suggest there are more efficient or effective ways of assessing the risk. The **DNO** and **Generators** will be free to adapt this procedure to achieve the **Generators'** ends

1.2 When a **Generator** wishes to carry out a risk assessment the **DNO** will be able to provide an estimate of the net (ie taking into account as appropriate other Generation on that part of the network) potential trapped load. This can be in the form of a yearly profile, and possibly in the form of a load duration curve. It is possible that an island may form at more than one automatic switching point on the **DNO's** network and the **DNO** will be able to provide a profile or estimate of a profile for each. This will enable a quick assessment to be made as to the whether the mismatch between load and generation is so gross as to obviate further study. It is for the **Generator** to determine what a gross mismatch is depending on the **Generating Unit's** response to a change in real or reactive power. The **Generator** should be aware that the trapped load on a network can change over time, due to the connection or disconnection of load and or Generation and network topology changes; hence the trapped load assessment may need to be carried out periodically.

1.3 **DNOs** will also be able to provide indicative fault rates for their network that lead to the tripping of the automatic switching points in paragraph 1.2 above.

1.4 **DNOs** will also be able to provide the automatic switching times employed by any auto-reclose switchgear employed at switching points identified in paragraph 1.2.

1.5 **DNOs** will provide the information above and any other relevant information reasonably required within a reasonable time when requested by the **Generator**.

1.6 A key influence on the stability of any power island will be the short term, ie second by second, variation of the trapped load. The **DNO** will be able to provide either a generic variability of the load with typically 1s resolution data points, or at the **Generator's** expense will be able to measure actual load variability for the network in question for some representative operating conditions.

1.7 Armed with the above information the **Generator** will be able to commission appropriate modelling to simulate the stability of the **Generator's Plant** when subject to an islanding condition and hence assess the risks associated with an out-of-phase reclosure incident. Where the Generator considers these risks to be too high, sensitivity analysis should enable them to identify the effectiveness of various remedial actions.

Operating Code 1 – Generation and Demand Forecasting

1 Introduction

1.1 **Operating Code** No. 1 ("OC1") is concerned with the provision of generation and **Demand** forecasts by **Users** to the **DNO** in order for the **DNO** to ensure the proper, safe and efficient operation of the **Distribution System**.

1.2 The **DNO** has an obligation under the **Grid Code** to provide generation forecasts to the **TSO** in order that the **TSO** can match generation output with **Demand**. The forecasts provided by **Users** under this OC1 will therefore also enable the **DNO** to comply with those **Grid Code** requirements.

1.3 The **DNO** will be receiving data in respect of **Generating Plant** connected to the **Distribution System** from the **TSO** under the **Grid Code**, and will be using that in relation to the operation of the **Distribution System**.

2 Objective

2.1 The objectives of OC1 are to set out the requirements for **Users** to provide estimates to the **DNO** to:-

(a) enable the **DNO** to operate the **Distribution System** in a proper, safe and efficient manner and in accordance with its statutory and licence obligations; and

(b) enable the **DNO** to comply with its obligations under the **Grid Code** to provide generation forecasts to the **TSO**.

3 Scope

3.1 OC1 applies to the **DNO** and to **Users**. **Users** in OC1 means:

(a) **Generators** in respect of their **Independent Generating Plant** connected to the **Distribution System** with a **Registered Capacity** of 1**MW** and above; and

(b) **Demand Customers** in respect of their **Connections Sites** with a **Demand** of 1**MW** and above.

4 Procedure

4.1 Each **User** must provide the following data to the **DNO** at the time and in the manner specified:

4.1.1 **Generator Loading** profiles

Each **Generator** must, at the request of the **DNO**, in respect of each of its **Independent Generating Plants** with a **Registered Capacity** of 1**MW** and above, submit to the **DNO** in writing by 0900 hours on the day following the day on which the request was made an estimate of the **Generator Loading** profiles for such **Independent Generating Plant** for the following **Schedule Day**, save that it will be for the following three **Schedule Days** when submitted on a Friday and the next two **Schedule Days** when submitted on a Saturday (no

notice being required on a Sunday) and shall be for such longer period as the **DNO** may specify, at least one week in advance, to cover holiday periods. Such estimate will be in the form of half hourly output in **MW** for such **Independent Generating Plant**; and

4.1.2 **Demand** profile

Each **Demand Customer** shall at the request of the **DNO**, in respect of each of its **Connection Sites** with a **Demand** of 1**MW** and above, submit to the **DNO** in writing by 0900 hours on the day following the day on which the request was made an estimate of its **Demand** profiles for such **Connection Sites** for the following **Schedule Day**, save that it will be for the next three **Schedule Days** when given on a Friday and the next two **Schedule Days** when given on a Saturday (no notice being required on a Sunday) and shall be for such longer period as the **DNO** may specify, at least one week in advance, to cover holiday periods. Such estimate will be in the form of half hourly **Demand** in **MW** for such **Connection Site**.

Operating Code 2 – Outage Planning

1 Introduction

1.1 **Operating Code** No. 2 ("OC2") is concerned with the co-ordination by the **DNO** of planned **Generating Unit Outages** and **Distribution System Outages** through various timescales to enable the efficient operation of the **Distribution System**.

1.2 OC2 sets out the data required by the **DNO** from **Generators** in order for the **DNO** to carry out co-ordinated **Outage** planning and also sets out the information that will be supplied by the **DNO** to certain **Users**.

1.3 In OC2 "Year 0" means the current calendar year at any time, Year 1 means the next calendar year at any time, Year 2 means the calendar year after Year 1, etc.

2 Objective

2.1 The objectives of OC2 are to:

(a) set out the procedures, timetables and data exchange requirements for the co-ordination of **Generating Unit** and **Distribution System Outages** in order to enable the **DNO** to operate the **Distribution System** in accordance with its statutory and licence obligations;

(b) set out the procedures, timetables and data exchange requirements regarding information to be supplied by the **DNO** to **Users**; and

(c) enable the **DNO** to comply with its **Grid Code** requirements regarding the provision of **Generating Unit** and **Distribution System Outage** information to the **TSO**.

3 Scope

3.1 OC2 applies to the **DNO** and to **Users**. **Users** in OC2 means:

(a) **Generators** in respect of their **Independent Generating Plant** with a **Registered Capacity** of 1**MW** and above, **CDGUs** and **Controllable PPMs**, in each case where connected to the **Distribution System**;

(b) **Demand Customers** in respect of their **Connection Sites** with a **Demand** of 10**MW** and above; and

(c) such other **Demand Customers** as the **DNO** decides should be informed of **Outage** information.

4 Summary

4.1 Under OC2 the interaction between the **DNO**, **Generators** and **Demand Customers** will be as follows:-

(a) each **Generator** and the **DNO** in respect of **Outages** of distribution connected **Independent Generating Plant** with a **Registered Capacity** of 1**MW** and above;

(b) the **DNO** and each **Generator** in respect of **Distribution System Outages** which may operationally affect **Generators** with **Independent Generating Plant** with a **Registered Capacity** of 1**MW** and above, **CDGUs** or **Controllable PPMs** connected to the **Distribution System**; and

(c) the **DNO** and **Demand Customers** in respect of **Distribution System Outages** which may operationally affect **Demand Customers** with a **Demand** of 10**MW** and above and such other **Demand Customers** as the **DNO** may decide.

4.2 Each **User** must, in relation to all matters to be undertaken pursuant to this OC2, act reasonably and in good faith.

4.3 The **DNO** must, in relation to all matters to be undertaken pursuant to this OC2, act reasonably and in good faith in the discharge of its obligations.

5 Outage planning procedures for Generators with Independent Generating Plant with a Registered Capacity of 1MW and above

5.1 Planning for Year 1

5.1.1 By the end of July in each calendar year each **Generator** in respect of its **Independent Generating Plant** with a **Registered Capacity** of 1**MW** and above connected to the **Distribution System** shall provide the **DNO** in writing with its indicative **Outage** programmes for Year 1.

5.1.2 The indicative **Outage** programme shall contain the planned **Start Date**, planned **Finish Date** and the **Output** reduction.

5.2 Planning for Year 0

5.2.1 Each **Generator** in respect of its **Independent Generating Plant** with a **Registered Capacity** of 1**MW** and above connected to the **Distribution System** shall develop and keep up to date its **Outage** programme for Year 0.

5.2.2 On request by the **DNO**, each **Generator** in respect of its **Independent Generating Plant** with a **Registered Capacity** of 1**MW** and above connected to the **Distribution System** shall as soon as reasonably practicable following the request provide the **DNO** in writing with the most up to date version of its **Outage** programme for Year 0.

5.2.3 The **Outage** programme shall contain the planned **Start Date**, **Finish Date** and the **Output** reduction.

6 Outage Planning Procedures for Distribution System Outages

6.1 Planning for Year 1

6.1.1 By the end of May in each calendar year the **DNO** shall have prepared a plan of **Distribution System Outages** scheduled to take place in Year 1 relating to construction, refurbishment and maintenance works.

6.1.2 By the end of June in each calendar year the **DNO** shall notify in writing:

(a) each **Generator** with **Independent Generating Plant** with a **Registered Capacity** of 1**MW** and above connected to the **Distribution System**;

(b) each **Generator** with a **CDGU** or a **Controllable PPM** connected to the **Distribution System**;

(c) each **Demand Customer** with a **Demand** of 10**MW** or above; and

(d) such other **Demand Customers** as the **DNO** may decide,

of those aspects of the plan which may operationally affect such **Users** in Year 1. The notification shall include proposed **Start Dates** and **Finish Dates** of relevant **Distribution System Outages**.

6.1.3 The **DNO** will indicate to each **Generator** where a need may exist to use **Intertripping** or other measures to allow the security of the **Distribution System** to be maintained within the **Licence Standards**.

6.2 Planning in Year 0

6.2.1 The **DNO** shall develop and keep up to date the **Distribution System Outage** plan for Year 0.

6.2.2 By 11.00 hours each Thursday the **DNO** shall notify in writing:

(a) each **Generator** with **Independent Generating Plant** with a **Registered Capacity** of 1**MW** and above connected to the **Distribution System**;

(b) each **Generator** with a **CDGU** or a **Controllable PPM** connected to the **Distribution System**;

(c) Each **Demand Customer** with a **Demand** of 10**MW** or above; and

(d) such other **Demand Customers** as the **DNO** may decide,

of those aspects of the plan which may operationally affect such **Users** in the following one week period beginning on the following Monday. The notification to the **User** shall include proposed **Start Dates** and **Finish Dates** of relevant **Distribution System Outages**.

6.3 The **DNO** will indicate to each **Generator** where a need may exist to use **Intertripping** or other measures to allow the security of the **Distribution System** to be maintained within the **Licence Standards**.

Operating Code 3 – Demand Control

1 Introduction

1.1 **Operating Code** No. 3 ("OC3") sets out the procedures to be followed by the **DNO** to permit a reduction in **Demand**, which in many instances will be initiated by the **TSO** acting in accordance with the **TSO Licence**:

(a) in the event that there are insufficient **Generating Plant**, **Independent Generating Plant**, **Demand Side Units** or transfers across any **Interconnectors** and the **Inter-jurisdictional Tie Lines** between Northern Ireland and the Republic of Ireland available to meet **Demand** in all or any part of the **NI System**; and/or

(b) in the event of problems on any part of the **NI System**, including, without limitation, unacceptable voltage levels and thermal overloads; and/or

(c) where there are insufficient **Generating Plant**, **Independent Generating Plant**, **Demand Side Units** or transfers to meet **Demand** in all or any part of the **Other Transmission System** and/or in the event of problems on the **Other Transmission System** in circumstances where the **TSO** is able to assist the **Other TSO** and where doing so would not have a detrimental effect on the security of the **NI System**.

1.2 It covers both transient shortfalls of generation following a sudden loss of generation and steady state shortfalls of generation.

1.3 The **Demand Control** arrangements provide for the utilisation of controllable **Load** blocks on the **NI System**, for example, by radio teleswitching implemented by the **TSO**.

1.4 OC3 deals with the following:-

(a) **Demand Customer Voltage Reduction** initiated by the **TSO** or the **DNO** and in each case implemented by the **DNO**;

(b) **Planned Manual Disconnection** (including **Rota Load Shedding**) initiated by the **TSO** and implemented by the **DNO**;

(c) **Emergency Manual Disconnection** initiated and implemented by the **TSO**;

(d) protection of supply to any part of the **NI System** where system security is weak; and

(e) **Disconnection** of **Load** blocks by operation of **Automatic Load Shedding Devices** to preserve overall **NI System** security.

Some **Users** will be affected by some or all of the above actions, whether implemented by the **TSO** or the **DNO**.

1.5 The term "**Demand Control**" is used in OC3 to describe any of the methods of controlling **Demand** set out in paragraph 1.4.

1.6 The type of **Demand Control** utilised in any particular case will depend upon the amount of time between the **TSO** or the **DNO** becoming aware of the need to implement **Demand Control** and the time at which it needs to be implemented. In the event of a sudden and unexpected loss of generation and/or **NI System** problems and, subject to the circumstances set out in paragraph 1.1.3, in the event of a sudden and unexpected loss of generation on the **Other Transmission System** and/or **Other Transmission System** problems, the requisite **Demand Control** will normally be achieved by means of **Automatic Load Shedding** but, occasionally, **Emergency Manual Disconnection** may be required. The amount of time available in which to implement **Demand Control** will also determine whether **Demand Control** will be implemented before voltage reduction. In all cases when **Demand Control** is necessary, **Demand Disconnection** will normally be the last option.

1.7 **Demand Control** shall not, so far as possible, be exercised in respect of **Protected Demand Customers**. OC3, therefore, applies subject to this exclusion.

2 Objective

The objective of OC3 is to detail the provisions to be undertaken by the **DNO** required to achieve a reduction in **Demand** to avoid or relieve operating problems on all or any part of the **NI System** and, subject to the circumstances set out in paragraph 1.1.3, on the **Other Transmission System**. Subject to paragraph 1.7, the **DNO** will utilise **Demand Control** in a manner which does not unduly discriminate against, or unduly prefer, any one or any group of **Demand Customers**.

3 Scope

3.1 This section applies to the **DNO** and to **Users**. **Users** in OC4 means:

(a) **Suppliers**;

(b) **Generators**; and

(c) **Demand Customers**.

4 Procedures

4.1 Demand Customer Voltage Reduction

4.1.1 The **DNO** will, insofar as it is able, organise the **Distribution System** and make such other arrangements as are necessary so that a 6 per cent reduction of voltage supplied to all or any group of **Demand Customers** on a particular part of the **Distribution System** can be implemented.

4.1.2 The arrangement will provide for two 3 per cent stages of voltage reduction, which can be applied to all or selected groups of **Demand Customers**.

4.1.3 The **DNO** will, when instructed by the **TSO** and/or when it considers it necessary, implement **Demand Customer Voltage Reduction** of either 3 per cent or 6 per cent.

4.1.4 The **DNO** will, when instructed by the **TSO** and/or when it considers it necessary, remove the voltage reduction implemented pursuant to paragraph 4.1.3.

4.2 **Planned** and **Emergency Manual Disconnection**

Planned Manual Disconnection

4.2.1 **Planned Manual Disconnection** is the procedure adopted by the **DNO** when the **TSO**, in accordance with the **Grid Code**, notifies the **DNO** that insufficient generation will be available to meet **Demand** in all or any part of the **NI System** and that **Demand Control** is required.

4.2.2 Where the **TSO** has notified the **DNO** in accordance with the **Grid Code** that **Demand Control** is required, the **TSO** may then instruct the **DNO** in accordance with the **Grid Code** to implement **Planned Manual Disconnection** and the **DNO** shall implement such **Planned Manual Disconnection** in accordance with this OC3.

4.2.3 The **DNO** will restore the connections removed by **Planned Manual Disconnection** pursuant to paragraph 4.2.2 when instructed by the **TSO** in accordance with the **Grid Code** to do so.

4.2.4 Where **Demand Control** is required to continue for a protracted period rotation of **Disconnection** under a **Rota Load Shedding** procedure may be required to ensure equitable treatment, insofar as practicable, for all **Demand Customers** as further detailed in paragraphs 4.2.5 and 4.2.6.

4.2.5 The **DNO**, in conjunction with the **TSO**, will arrange for the purposes of **Rota Load Shedding**, insofar as it is able, that the **Demand** on the **NI System** is arranged in groups of approximately 5 per cent of total **Demand** (as a percentage at time of winter peak) so that any or all such groups can be **Disconnected** when the **TSO** issues instructions to the **DNO** in accordance with the **Grid Code**.

4.2.6 Where **Disconnection** is to be prolonged, the **DNO** will, where possible, utilise **Disconnection** rotas where approximately 5 per cent groups are interchanged to ensure (so far as possible) equitable treatment of **Demand Customers**.

Emergency Manual Disconnection

4.2.7 **Emergency Manual Disconnection** is utilised by the **TSO** when a loss of generation or a mismatch of generation output and **Demand** is such that there is an operational requirement to shed **Load** in circumstances where it is not possible to give reasonable notice in order to maintain a **Regulating Margin** between generation output and **Demand** and in certain circumstances to deal with operating problems such as unacceptable voltage levels and thermal overloads.

4.2.8 The **TSO** will, when it considers it necessary, implement **Emergency Manual Disconnection**.

4.3 **Demand Control** with weak or reduced **NI System** capabilities

4.3.1 This section covers the situation where the **DNO** or the **TSO** may wish to initiate **Demand Control** to maintain partial supplies to a part of the **NI System** which cannot support the full area **Demand** of that part of the **NI System**.

4.3.2 It applies to circumstances where the **DNO** or the **TSO** wish to allow for fault contingencies more severe than envisaged in the **Licence Standards** because the impact of these contingencies on the **NI System** would be unacceptable.

4.3.3 Where the **DNO** or the **TSO** considers that arrangements should be put in place to enable **Demand Control** to be effected in the circumstances outlined in paragraph 4.3.1, either may effect such arrangements.

4.3.4 **Load** shedding caused by these arrangements will be assimilated into **Load** shedding caused by the **Automatic Load Shedding** scheme detailed in paragraph 4.4 to ensure no **Demand Customer** or group of **Demand Customers** is unfairly discriminated against.

4.4 **Automatic Load Shedding**

4.4.1 Under generation shortfall conditions a **Frequency** graded **Automatic Load Shedding** scheme is utilised by the **TSO** to prevent **Frequency** collapse on the **NI System** and to restore the balance between generation output and **Demand**.

4.4.2 The **Demand** on the **NI System** subject to **Automatic Load Shedding** will be split into discrete blocks. The number, location, size and the associated low **Frequency** settings of these blocks will be as determined by the **TSO** on a rota basis insofar as possible and communicated to the **DNO**.

4.4.3 Where conditions are such that, following **Automatic Load Shedding**, and the subsequent recovery of **Frequency** on the **NI System**, it is not possible to restore a large proportion of the total **Demand** so **Disconnected** within a reasonable period of time, the **DNO** may receive an instruction from the **TSO** to implement additional **Disconnection** manually to restore an equivalent amount of the **Demand** which has been **Disconnected** automatically. It will then effect that instruction.

4.4.4 For the avoidance of doubt, no **Demand** shed by operation of **Automatic Load Shedding Devices** will be restored by the **DNO** without the specific instruction of the **TSO** in accordance with the **Grid Code**.

4.5 General

Suppliers should note that although implementation of **Demand Control** in respect of their **Demand Customers** is not, in general, exercisable by them, their **Demand Customers** may be affected by **Demand Control**. The contractual arrangements of **Suppliers** with their **Demand Customers** may, accordingly, need to reflect this.

5 Fuel Security Code

Each **Supplier** agrees to comply with the **Fuel Security Code** to the extent it is expressed to apply to it and with any instructions issued by the **TSO** or the **DNO** pursuant to the **Fuel Security Code**.

Operating Code 4 – Operational Liaison

1 Introduction

1.1 **Operating Code** No. 4 ("OC4") sets out the requirements for the exchange of information between the **DNO** and **Users** in relation to **Operations** and **Events** on the **Total System** which will have (or may have) or have had (or may have had) an **Operational Effect**:-

(a) on a **User System** in the case of an **Operation** and/or **Event** occurring on the **Distribution System** or the **Transmission System**; and

(b) on the **Distribution System** in the case of an **Operation** and/or **Event** occurring on a **User System**;

where there is no other requirement for exchange of information or liaison specified in any other part of the **Distribution Code**.

1.2 Where there is an obligation on the **DNO** under the **Grid Code** to report an **Operation** and/or **Event** on the **Distribution System** to the **TSO**, the **DNO** may include in that report information which it has been given by a **User** relating to an **Operation** and/or **Event** on the **User System** which caused or contributed to the **Event** on the **Distribution System** or, in the case of an **Operation** on the **User System**, caused the **DNO** to undertake an **Operation** on the **Distribution System**.

1.3 Where the **Grid Code** contains an equivalent provision allowing the **DNO** to pass on information it has received under the **Grid Code** in relation to **Operations** and/or **Events** on the **Transmission System**, or on the system of users under the **Grid Code**, that will form part of the information communicated to **Users** under this OC4. The provisions of this OC4 allowing the **DNO** to pass information it has received under the **Grid Code** will only have effect to the extent that the **DNO** is allowed to pass that information on to **Users** pursuant to the **Grid Code**.

2 Objective

2.1 The objective of this OC4 is to set out the requirements and procedures for the exchange of information between the **DNO** and **Users** in order that the implications of an **Operation** and/or **Event** can be considered and the possible risks arising from it can be assessed and appropriate action taken by either the **DNO** or the **User** as applicable in order to maintain the integrity of the **Distribution System** and the relevant **User System**. OC4 does not seek to deal with any actions arising from the exchange of information, but merely with that exchange.

3 Scope

3.1 OC4 applies to the **DNO** and to **Users**. **Users** in this OC4 means:

(a) **Generator**s in respect of their **Generating Unit**s connected to the **Distribution System** at 33kV; and

(b) **Demand Customers** in respect of their **Connection Site**s connected to the **Distribution System** at 33kV; and

(c) Regarding notification to the **DNO**, **Users** in respect of their **User System**s connected to the **Distribution System** at 6.6kV or 11kV.

4 Procedure

4.1 Requirement to notify **Operations**

4.1.1 **DNO** notification

In the case of an **Operation** on the **Distribution System** which will have, or may have, an **Operational Effect** on a 33kV **User System**, the **DNO** will (unless the notifying requirement arises under any other part of the **Distribution Code**) notify the **User**, or **Users**, whose **System**(s) will, or may in the opinion of the **DNO**, be so affected in accordance with this OC4. The provisions of this paragraph 4.1.1 shall also apply to circumstances where an **Operation** on the **Transmission System** will have, or may have, an **Operational Effect** on a **User System** where the **DNO** has been notified of such an **Operation** by the **TSO** under the **Grid Code**.

4.1.2 **User** Notification

In the case of an **Operation** on a 33kV **User System** which will have or may have an **Operational Effect** on the **Distribution System** the **User** will (unless the notifying requirement arises under any other part of the **Distribution Code**) notify the **DNO** in accordance with this OC4. Following notification by the relevant **User**, the **DNO** will notify any other **User** or **Users** on whose **System**(s) the **Operation** will (or, in the **DNO's** reasonable opinion, may) have an **Operational Effect**. The **DNO** may also notify the **TSO** if the **Operation** will (or, in the **DNO's** reasonable opinion, may) have an **Operational Effect** on the **Transmission System**, in accordance with its obligations under the **Grid Code**.

4.1.3 Examples

Whilst in no way limiting the general requirement to notify in advance as set out in paragraphs 4.1.1 and 4.1.2, the following are examples of scheduled or planned actions for which notification will be required under this OC4 if they will, or may, have an **Operational Effect**:-

(a) the planned operation (other than, in the case of a **User**, at the instruction of the **DNO**) of any circuit breaker or isolator or any sequence or combination of the two; and

(b) **Voltage Control**.

4.1.4 Nature of notification

(a) A notification under paragraph 4.1.1 or 4.1.2 (save where the notification is to be given to a **Demand Customer**, in which event the provisions of paragraph 4.1.5 shall apply) must be of sufficient detail to describe the **Operation** (although it need not state the cause) and to enable the recipient of the notification reasonably to consider and assess

the implications and risks arising. It must include the name of the individual reporting the **Operation** on behalf of the **DNO** or the **User**, as the case may be. The recipient may ask questions to clarify the notification and the notifying party shall use its reasonable endeavours to provide the necessary information.

(b) A notification which is to be given under paragraph 4.1.1 or 4.1.2 to a **Demand Customer** will not contain the information specified in paragraph 4.1.4 but may indicate that there will be, or is likely to be, an incident on the **Distribution System**, the general nature of the incident (but not the cause of the incident) and, if known, in circumstances where power supplies are thought likely to be affected, the estimated time of cessation and return to service.

4.1.5 Timing

A notification under paragraph 4.1.1 or 4.1.2 must be given as far in advance as practicable and in any event shall be given in sufficient time as will reasonably allow the recipient to consider and assess the implications and risks arising.

4.1.6 Recording

The notification shall be given in writing whenever possible. If there is insufficient time before the **Operation** is scheduled to take place for notification to be given in writing, then notification shall be given orally and, if either party requests, it shall be written down by the sender and dictated to the recipient who shall write it down and repeat each phrase as received and, on completion, shall repeat the notification in full to the sender and check that it has been accurately recorded.

4.1.7 **User** notification in respect of 6.6kV and 11kV connections

The **DNO** may, acting reasonably, require **Users** in respect of their **User System**s connected to the **Distribution System** at 6.6kV or 11kV, to notify the **DNO** of an **Operation** on their **System**s, such notification to be in accordance with the provisions of paragraphs 4.1.2 to 4.1.6 inclusive.

4.2 Requirement to notify **Events**

4.2.1 **DNO** notification

In the case of an **Event** on the **Distribution System** which has had (or may have had) an **Operational Effect** on a **User System**, the **DNO** will (unless the notifying requirement arises under any other part of the **Distribution Code**) notify the **User** or **Users** whose **System**(s) have been (or in the reasonable opinion of the **DNO** may have been) so affected, in accordance with this OC4. The provisions of this paragraph 4.2.1 shall also apply to circumstances where an **Operational Effect** on the **User System** was caused by an **Event** on the **Transmission System**, provided that the **DNO's** duty to notify a **User** shall be solely a duty to pass on the information that the **DNO** has received from the **TSO**.

4.2.2 **User** notification

In the case of an **Event** on a **User System** which has had (or may have had) an **Operational Effect** on the **Distribution System** the **User** will (unless the notifying requirement arises under any other part of the **Distribution Code**) notify the **DNO** in accordance with this OC4. Following notification by the relevant **User**, the **DNO** will notify any other **User** or **Users** on whose **System** the **Event** has had (or, in the **DNO's** reasonable opinion, may have had) an **Operational Effect**. The **DNO** may also notify the **TSO** if the **Event** has had (or, in the **DNO's** reasonable opinion may have had) an effect on the **Transmission System**, in accordance with its obligations under the **Grid Code**.

4.2.3 Examples

Whilst in no way limiting the general requirement to notify set out in paragraphs 4.2.1 and 4.2.2, the following are examples of situations where notification will be required under this OC4 if they have had, or may have had, an **Operational Effect**:-

(a) where **Plant** and/or **Apparatus** is being operated in excess of its capability or may present a hazard to personnel;

(b) the activation of any alarm or indication of any abnormal operating condition;

(c) adverse weather conditions being experienced;

(d) breakdown of, or faults on, or temporary changes in the capabilities of, **Plant** and/or **Apparatus**;

(e) breakdown of, or faults on, control, communications or metering equipment;

(f) increased risks of **Protection** operation.

4.2.4 Nature of notification

(a) A notification under paragraphs 4.2.1 or 4.2.2 (save where the notification is to be given to a **Demand Customer**, in which event the provisions of paragraph 4.2.5 shall apply) will be of sufficient detail to describe the **Event** (although it need not state the cause) and so enable the recipient of the notification reasonably to consider and assess the implications and risks arising. The recipient may ask questions to clarify the notification and the notifying party shall use its reasonable endeavours to provide the necessary information.

(b) A notification which is to be given under paragraph 4.2.1 or 4.2.2 to a **Demand Customer** will not contain the information specified in paragraph 4.2.4 but may indicate that there has been an incident on the **Distribution System**, the general nature of the incident (but not the cause of the incident) and, if known, in circumstances where power supplies have been affected, an estimated time of return to service.

4.2.5 Recording

Notification shall be given orally and, except in the case of emergency, if either party requests, shall be written down by the sender and dictated to the recipient who shall write it down and repeat each phrase as received and, on completion, shall repeat the notification in full to the sender and check that it has been accurately recorded.

4.2.6 Timing

A notification under paragraph 4.2.1 or 4.2.2 shall be given as soon as possible after the occurrence of the **Event**, or the time that the **Event** is known of or anticipated by the giver of the notification under this OC4, and in any event within 15 minutes of such time.

4.2.7 **User** notification in respect of 6.6kV and 11kV connections

The **DNO** may, acting reasonably, require **Users** in respect of their **User System**s connected to the **Distribution System** at 6.6kV or 11kV, to notify the **DNO** of an **Event** on their **System**s, such notification to be in accordance with the provisions of paragraphs 4.2.2 to 4.2.6 inclusive.

4.3 **Significant Incident**s

4.3.1 Where the **DNO** notifies a **User** of an **Event** under paragraph 4.2.1 which the **User** considers has had or may have had a significant effect on that **User's System**, that **User** may require the **DNO** to report that **Event** in writing in accordance with the provisions of OC5 in which event it will, within one **Business Day**, notify the **DNO** accordingly.

4.3.2 Where a **User** notifies the **DNO** under paragraph 4.2.2 of an **Event** which the **DNO** considers has had or may have had a significant effect on the **Distribution System**, the **DNO** may require the **User** to report that **Event** in writing in accordance with the provisions of OC5 in which event it will, within one **Business Day**, notify that **User** accordingly.

4.3.3 **Events** which a **User** requires the **DNO** to report in writing pursuant to paragraph 4.3.1 and **Events** which the **DNO** requires a **User** to report in writing pursuant to paragraph 4.3.2 are known as "**Significant Incident**s".

4.3.4 Without limiting the general description set out in paragraphs 4.3.1 and 4.3.2, a **Significant Incident** will include an **Event** having an **Operational Effect** which results in, or is likely to result in, the following:-

(a) tripping of **Plant** and/or **Apparatus** either manually or automatically;

(b) voltage outside statutory limits;

(c) **System Frequency** outside statutory limits;

(d) **System** instability; or

(e) **System** overloads.

Operating Code 5 – Operational Event Reporting and Information Supply

1 Introduction

1.1 **Operating Code** No. 5 ("OC5") sets out the requirements for reporting in writing and, where appropriate, more fully those **Significant Incidents** which initially were reported to the **DNO** or a **User** orally under OC4 and the requirements for the provision to the **DNO** of information to enable it to prepare analyses and assessments of policies in the **Distribution Code**.

1.2 Where the **Grid Code** contains a provision allowing the **DNO** to pass on information it has received under the **Grid Code** in relation to **Significant Incidents** on the **Transmission System**, or on the system of users under the **Grid Code**, that will form part of the information communicated to **Users** under this OC5. The provisions of this OC5 allowing the **DNO** to pass information it has received under the **Grid Code** will only have effect to the extent that the **DNO** is allowed to pass that information on to **Users** pursuant to the **Grid Code**.

2 Objective

2.1 The objective of OC5 is to facilitate:-

(a) the provision of more detailed information in writing of **Significant Incidents**;

(b) the provision of information aimed at enabling the **Distribution System** to be operated in accordance with the **Distribution Code**; and

(c) the assessment of the effectiveness of policies adopted in accordance with the **Distribution Code**.

3 Scope

4.4 OC5 applies to the **DNO** and to **Users**. **Users** in this OC5 means:

(a) **Generators** in respect of their **Generating Units** connected to the **Distribution System** at **HV**; and

(b) **Demand Customers** in respect of their **Connection Sites** connected to the **Distribution System** at **HV**.

4 Procedure

4.1 Written reports of **Events**

4.1.1 In the case of a **Significant Incident** which has been notified as an **Event** by the **DNO** to a **User** pursuant to OC4, the **DNO** shall provide a written report to the **User** in accordance with this OC5.

4.1.2 In the case of a **Significant Incident** which has been notified as an **Event** by a **User** to the **DNO** pursuant to OC4, the **User** shall provide a written report to the **DNO** in accordance with this OC5.

4.1.3 Form of Report

(a) A report under paragraph 4.1.1 or 4.1.2 shall, in the case of a report by a **User**, be addressed to the **DNO** and marked for the attention of the Distribution Service Centre Manager and, in the case of a report by the **DNO** to a **User**, be addressed to the **User** and marked for the attention of the person notified to the **DNO** by the **User** in writing from time to time for this purpose (or in the absence of notification, to the Company Secretary).

(b) In either case, the report will contain a written confirmation of the oral notification given under OC4 together with such further information which has become known relating to the **Significant Incident** since the oral notification under OC4. The report shall, as a minimum, contain those matters specified in Appendix 1 to this OC5. Appendix 1 is not intended to be exhaustive.

(c) Whilst the report need not state the cause of the **Significant Incident**, it shall contain an indication as to whether the cause has been ascertained and whether it is thought likely by the party issuing the report that the matter which caused the **Significant Incident** will recur. The recipient may raise questions to clarify the report.

4.2 Timing

4.2.1 Where the **DNO** is required to produce a written report under paragraph 4.1.1, it shall do so as soon as possible and in any event within two **Business Days** after notification by the **User** under paragraph 4.3.1 of OC4. In the event that the **DNO** is unable to provide a full report within this timescale, it shall provide to the **User** a preliminary report containing such information as is then known to the **DNO** not later than two **Business Days** after the notification by the **User** under paragraph 4.3.1 of OC4 and shall provide such up-dates thereafter as the **User** may reasonably require. A full report shall then be provided to the **User** as soon as the **DNO** is able.

4.2.2 Where a **User** is required to produce a written report under paragraph 4.1.2, it shall do so as soon as possible and in any event within two **Business Days** after notification by the **DNO** under paragraph 4.3.2 of OC4. In the event that the **User** is unable to provide a full report within this timescale, it shall provide to the **DNO** a preliminary report containing such information as is then known to the **User** not later than two **Business Days** after the notification by the **DNO** under paragraph 4.3.2 of OC4 and shall provide such updates thereafter as the **DNO** may reasonably require. A full report shall then be provided to the **DNO** as soon as the **User** is able.

4.3 Responsible officers

The **DNO** and each **User** shall nominate responsible officers in order to establish communication channels to enable timely and adequate flows of information between the **DNO** and **Users** to be maintained and thus to ensure the effectiveness of this OC5.

4.4 Provision of reports to other **Users** and the **TSO**

Whenever a **User** has provided a written report in respect of a **Significant Incident** to the **DNO** in accordance with paragraph 4.1.2, the **DNO** shall consider whether the **System** of another **User** (or **Users**) or the **Transmission System** has been or is likely to have been materially affected. If the **DNO** considers that another **User System** (or **Systems**) or the **Transmission System** has been or is likely to have been so affected, the **DNO** shall notify the **User** which prepared the report accordingly and the **User** shall supply an extract from its report, containing only the technical information (and no information of commercial value) which was set out in the report, to the other **Users** and/or the **TSO** identified by the **DNO**.

4.5 The provision of information to the **DNO**

4.5.1 The **DNO** may require (to the extent not supplied under any other provision of the **Distribution Code**) information of a technical (but not of a commercial) nature to be supplied by **Users** under this paragraph 4.5 to enable it to undertake the following:-

(a) the preparation of **Distribution System** and/or **User System** appraisal statements;

(b) surveys of **Distribution System** and/or **User System** conditions;

(c) analysis and validation of policies in the **Distribution Code**; and

(d) analyses of the **DNO** equipment performance;

insofar as such information is necessary to enable the **DNO** to fulfil its obligations relating to the operation of the **Distribution System**.

4.5.2 When the **DNO** requires information from a **User** or **Users** for the purposes set out in paragraph 4.5.1 it shall send a written request to the **User** or **Users** setting out the information it reasonably requires, the reasons (in such detail as the **DNO** reasonably considers to be appropriate) why such information is required and the time by which it reasonably requires a response. Normally this will be within two **Business Days**.

4.5.3 The **User** or **Users** will use all reasonable endeavours to respond in writing within the time stated. However, a **User** will not be obliged to supply the information requested by the **DNO** to the extent that it considers that it is not reasonable to comply with the request. In such circumstances, the **User** must, in its written response to the **DNO**, state such reason in sufficient detail to enable the **DNO** to consider whether the **User** is acting reasonably in refusing to supply the information.

4.5.4 Although the request will set out the information required, an indication of the sort of information that may be requested is set out in Appendix 2 to this OC5. The list contained in Appendix 2 shall not limit the information which may be requested, but is merely given by way of example.

4.5.5 The information supplied to the **DNO** pursuant to this paragraph 4.5 will be used by the **DNO** only for the purposes set out in paragraph 4.5.1.

5 Statutory event reporting procedure

Nothing in this OC5 shall be construed as relieving **Users** from their duty to report events in accordance with the Electricity Supply Regulations (N.I.) in so far as they apply to **Users**.

OC5 - Appendix 1

Matters, if applicable to the **Significant Incident**, to be included in a written report given in accordance with paragraph 4.1

1 Time and date of **Significant Incident**.

2 **Location**.

3 **Plant** and/or **Apparatus** involved.

4 Brief description of **Significant Incident**.

5 Estimated time and date of return to service.

6 Supplies/generation interrupted and duration of interruption.

7 **Generating Unit** - **MVAr** performance achieved.

8 Any other information which either the **DNO** or the **User** reasonably considers that the other might reasonably require in relation to the **Significant Incident**.

OC5 - Appendix 2

Indication of the sort of information that may be requested under paragraph 4.5

1 VOLTAGE

Time and date

Location

Target volts

Actual volts

Reason if different

2 **MW**/**MVAr** CAPABILITY

Time and date

Location

Set identification

Generating Unit performance parameters (List to be included)

3 TRANSFERS AT CONNECTION POINT

Time and date

Location

Direction and magnitude of **MW** and **MVAr** flows

4 FAULT LEVELS AT CONNECTION POINT

Time and date

Location

Fault infeed

The necessary data to enable (single phase to earth and three phase symmetrical) fault levels to be calculated

5 PROTECTION PERFORMANCE UNDER FAULT CONDITIONS

Time and date

Location

Differences between anticipated and actual performance.

Operating Code 6 - Safety Co-ordination

1 Introduction

1.1 **Operating Code** No. 6 ("OC6") specifies the standard procedures which are to be followed by the **DNO** and **Users** for the co-ordination, establishment and maintenance of necessary **Safety Precautions** when work and/or testing (other than **System Tests**, which are covered by OC9 and the type of tests covered in OC10) is to be carried out on or near the **Distribution System** or a **User System** and when, for this to be done safely, **Safety Precautions** are required on the **Distribution System** and on the **User's System**.

1.2 Where, by reason of the design of any **HV Apparatus** on which **Safety Precautions** are to be applied, it is not practicable to apply **Safety Precautions** on such **HV Apparatus**, the **Safety Precautions** shall be applied at the most appropriate point(s) on the **User's Plant** and **Apparatus** to achieve **Safety From The System** on the **HV Apparatus** on which **Safety From The System** is to be achieved.

1.3 OC6 does not apply to a situation in which **Safety Precautions** need to be agreed solely between **Users** and other persons connected to the **Distribution System**.

1.4 OC6 does not seek to impose a particular set of **Safety Rules** on the **DNO** or **Users**; the **Safety Rules** to be adopted and used by the **DNO** and each **User** shall be those chosen by each.

1.5 The procedures set out in this OC6 do not refer expressly to a situation in which both the **DNO** and a **User** require the other to implement **Safety Precautions** at the same time. In such circumstances the relevant procedures of this OC6 should be applied twice, once with the **DNO** acting as **Implementing Safety Co-ordinator** and once with the **User** acting in that role.

2 Objective

2.1 The objective of this OC6 is to achieve **Safety From The System** when work and/or testing on or near either a **User's System** or the **Distribution System** necessitates the provision of **Safety Precautions** on the **Distribution System** and a **User's System**..

3 Scope

3.1 OC6 applies to the **DNO** and to **Users**. **Users** in OC6 means

(a) **Generators** in respect of their **Generating Units** connected to the **Distribution System** at **HV**; and

(b) **Demand Customers** in respect of their **Connection Sites** connected to the **Distribution System** at **HV**.

4 Procedure

4.1 The procedures set out in the remainder of this OC6 apply to the **DNO** and to **Users** in respect of **Generating Units** or **Connection Sites** connected to the **Distribution System** at 33kV or above. In the event of any inconsistency between the procedures set out in

this OC6 and the procedures (if any) set out in such **User's Connection Agreement**, the procedures set out in this OC6 shall prevail.

4.2 For **Users** in respect of **Generating Units** or **Connection Sites** connected to the **Distribution System** below 33kV, such **Users** and the **DNO** shall apply the processes and procedures set out in Safety Rules Guidance Document 4 ("SRG 4") of the NIE **Safety Rules**. In the event of any inconsistency between the processes and procedures set out in SRG 4 and the procedures (if any) set out in such **User's Connection Agreement**, the procedures set out in SRG 4 shall prevail save where such **Connection Agreement** makes it explicit that the procedures therein shall prevail.

5 Approval of Local Safety Instructions

5.1 In accordance with the timing requirements of its **Connection Agreement**, each **User** shall supply to the **DNO** a copy of its **Local Safety Instructions**, if any, relating to its side of the **Connection Point** at each **Connection Site**. In accordance with the timing requirements of each **Connection Agreement**, the **DNO** shall supply to each **User** a copy of the **DNO's Local Safety Instructions**, if any, relating to the **DNO** side of the **Connection Point** at each **Connection Site**. Prior to connection and in accordance with the timing requirements of the relevant **Connection Agreement**, the **DNO** and the **User** must have approved each other's **Local Safety Instructions** dealing with **Isolation** and **Earthing**.

5.2 If the party required to give approval requires, for that approval to be given, more stringent provisions relating to **Isolation** and/or **Earthing** (including relating to **Earthing Devices**) (and to the extent that these are not unreasonable), the other party will make such changes as soon as reasonably practicable to the provisions in its **Local Safety Instructions** relating to **Isolation** and/or **Earthing** (including relating to **Earthing Devices**) affecting the **Connection Site** (which may of course need to cover the application of **Isolation** and/or **Earthing** at a place remote from such **Connection Site**, depending upon the **System** layout). There is no right to withhold approval on the grounds that the party required to approve reasonably believes the provisions relating to **Isolation** and/or **Earthing** (including **Earthing Devices**) are too stringent.

5.3 If, following approval, a party wishes to change the provisions in its **Local Safety Instructions** relating to **Isolation** and/or **Earthing** (including **Earthing Devices**), it must inform the other party. If the change is to make the provisions more stringent, then the other party merely has to note the changes. If the change is to make the provisions less stringent, then the other party needs to approve the new provisions and the procedures referred to in paragraph 5.2 will apply.

6 Safety Co-ordinators

6.1 The **DNO** and each **User** will at all times have nominated a person or persons to be responsible for the co-ordination of **Safety Precautions** at each **Connection Point**, when work and/or testing is to be carried out on or near a **System** which necessitates the provision of **Safety Precautions** on (or relating to) **HV Apparatus**, pursuant to this OC6 ("**Safety Co-ordinator(s)**"). A **Safety Co-ordinator** may be responsible for the co-ordination of safety on (or relating to) **HV Apparatus** at more than one **Connection Point**. It should be noted that, for the purposes of this OC6, the **Safety Co-ordinator's** role is limited to the co-ordination of **Safety Precautions**. The **Safety Co-ordinator**

will not necessarily but may undertake the physical implementation of **Safety Precautions**.

6.2 Each **User** shall, prior to its **Plant** and **Apparatus** being connected to the **Distribution System**, in accordance with any timing provisions of the **Connection Agreement** or, in the absence of such provisions, as far in advance as possible, give notice in writing to the **DNO** of the identity of its **Safety Co-ordinator(s)**, along with contact details, and shall update the written notice (i) whenever there is a change to the identity or contact details of its **Safety Co-ordinator(s)**, and (ii) annually on 1 April each year.

6.3 The **DNO** shall at the time of a **User** being connected to the **Distribution System**, in accordance with the timing provisions of the **Connection Agreement** or, in the absence of such provisions, as far as possible in advance, give notice in writing to that **User** of its **Safety Co-ordinator(s)**, along with contact details, and shall update the written notice (i) whenever there is a change to the identity or contact details of the **Safety Co-ordinator(s)**, and (ii) annually on 1 April each year.

6.4 If work and/or testing is to be carried out on or near a **System** which necessitates the provision of **Safety Precautions** on (or relating to) **HV Apparatus** in accordance with the provisions of this OC6, the **Safety Co-ordinator** who is identified on the relevant **Site Responsibility Schedule** as responsible for the **HV Apparatus** on which or in relation to which **Safety From The System** is to be achieved (the "**Requesting Safety Co-ordinator**") shall contact the **Safety Co-ordinator** who is identified on that same **Site Responsibility Schedule** as being responsible for the **HV Apparatus** which is connected at the **Connection Point** to the **HV Apparatus** on which **Safety From The System** is required (the "**Implementing Safety Co-ordinator**"), to co-ordinate the **Safety Precautions**.

7 RISSP

7.1 OC6 sets out the procedures for utilising the **Record of Inter-System Safety Precautions** ("**RISSP**").

7.2 The form set out in Appendix A and designated as "**RISSP-A**", shall be used by the **Requesting Safety Co-ordinator**, and that in Appendix B and designated as "**RISSP-B**", shall be used by the **Implementing Safety Co-ordinator**.

7.3 **RISSP-A** shall have written or printed on it an identifying number, comprising a unique prefix which identifies the location at which it is issued, and a unique (for each **User** or the **DNO**, as the case may be) serial number consisting of four digits and the suffix "R".

7.4 At the time that the **User** first gives notice to the **DNO** of its **Safety Co-ordinators**, each **User** shall apply in writing to the **DNO** for the **DNO's** approval of its proposed prefix. The **DNO** shall consider the proposed prefix to see if it is the same as (or confusingly similar to) a prefix used by the **DNO** or another **User** and shall, as soon as possible (and in any event within ten days), respond in writing to the **User** with its approval or disapproval. If the **DNO** disapproves, it shall explain in its response why it has disapproved and will suggest an alternative prefix and the **User** shall either notify the **DNO** in writing of its acceptance of the suggested alternative prefix or it shall apply

in writing to the **DNO** with revised proposals and the above procedure shall apply to that application.

8 Safety Precautions on or Relating to HV Apparatus

8.1 Safety Precautions

For the purpose of the co-ordination of safety under OC6 relating to **HV Apparatus**, the term "**Safety Precautions**" means **Isolation** and/or **Earthing**.

8.2 Agreement of **Safety Precautions**

8.2.1 When the **DNO** or a **User** wishes to carry out work and/or testing on its **System** and it is of the opinion that, for this to be done safely, **Safety Precautions** are required on the **DNO's HV Apparatus** (in the case of a **User**), or on or relating to the **HV Apparatus** of a **User** (in the case of the **DNO**), the **Requesting Safety Co-ordinator** will contact the **Implementing Safety Co-ordinator** for the part of the **System** on which (or relating to which) the **Safety Precautions** are, in his reasonable opinion, required, in order to agree in accordance with the procedure contained in this paragraph 8, the **Location** at which the **Safety Precautions** will be implemented or applied.

8.2.2 When the **DNO** wishes to carry out work and/or testing on the **Distribution System** and it is of the opinion that, for this to be done safely, **Safety Precautions** are required on (or relating to) the **System** of more than one **User** the provisions of this paragraph 8 shall be followed with regard to each **User** separately.

8.3 Agreement of **Isolation**

8.3.1 The **Requesting Safety Co-ordinator** shall inform the **Implementing Safety Co-ordinator** of the **HV Apparatus** on which **Safety From The System** is to be achieved and they will need to reach agreement on the **Location(s)** at which **Isolation** is to be established on (or relating to) the **Implementing Safety Co-ordinator's System**.

8.3.2 The **Implementing Safety Co-ordinator** shall then promptly inform the **Requesting Safety Co-ordinator** of the following:

(a) for each **Location**, the identity (by means of name and numbering or position, as applicable) of each point of **Isolation**; and

(b) whether **Isolation** is to be achieved by an **Isolating Device** in the isolating position or by an adequate physical separation or sufficient gap or by disablement (by means of switching or dismantling) of **Plant** and/or **Apparatus** so that electrical energy cannot pass from the **Apparatus** (or, in the case of **Plant**, from the associated **Apparatus**) to the **HV Apparatus**, other than by an **Isolating Device**.

8.3.3 The **Implementing Safety Co-ordinator** shall maintain and secure each point of **Isolation** in accordance with the relevant **Local Safety Instructions**.

8.4 Agreement of **Earthing**

8.4.1 If, in addition to the **Isolation** requested under paragraph 8.3, the **Requesting Safety Co-ordinator** requires **Earthing**, he shall notify this requirement to the **Implementing Safety Co-ordinator** and they will need to reach agreement on the **Location(s)** at which **Earthing** is to be established on the **Implementing Safety Co-ordinator's System**.

8.4.2 The **Implementing Safety Co-ordinator** shall then promptly inform the **Requesting Safety Co-ordinator** for each **Location**, the identity (by means of **HV Apparatus** name and numbering or position, as is applicable) of each point of **Earthing**.

8.4.3 The **Implementing Safety Co-ordinator** shall maintain and secure each point of **Earthing** in accordance with the relevant **Local Safety Instructions**.

8.5 In the event of disagreement

8.5.1 In any case where the **Requesting Safety Co-ordinator** and the **Implementing Safety Co-ordinator** are unable to agree the **Location** of the **Isolation** and (if requested) **Earthing**, it shall be at the closest available points on the infeeds to the **HV Apparatus** on which **Safety From The System** is to be achieved as indicated on the **Ownership Diagram** or, in the case where, by reason of the design of any **HV Apparatus** on which **Safety Precautions** are to be applied, it is not practicable to apply **Safety Precautions** on such **HV Apparatus**, it shall be at the most appropriate point(s) on the **User's Plant** and/or **Apparatus** to achieve **Safety From The System** on the **HV Apparatus** on which **Safety From The System** is to be achieved, as determined by the **DNO**.

8.6 Implementation of **Isolation** and **Earthing**

8.6.1 Once the **Location** of **Isolation** and (if requested) **Earthing** are agreed in accordance with paragraphs 8.3 and 8.4 above, the following procedure will apply:

(a) the **Implementing Safety Co-ordinator** will ensure the implementation of the **Isolation**;

(b) the **Implementing Safety Co-ordinator** will confirm to the **Requesting Safety Co-ordinator** that the **Isolation** has been established on his **System**;

(c) when the **Implementing Safety Co-ordinator** has confirmed the establishment of **Isolation** in accordance with (b) above, the **Requesting Safety Co-ordinator** shall confirm to the **Implementing Safety Co-ordinator** the establishment of relevant **Isolation** on his **System** and request, if it has been required, the implementation of the **Earthing**;

(d) the **Implementing Safety Co-ordinator** will ensure the implementation of the **Earthing** on his **System**; and

(e) the **Implementing Safety Co-ordinator** will confirm to the **Requesting Safety Co-ordinator** that **Earthing** has been established on his **System**.

8.7 Recording of **Safety Precautions**

8.7.1 Following confirmation by the **Implementing Safety Co-ordinator** to the **Requesting Safety Co-ordinator** that all of the agreed **Safety Precautions** have been established on or relating to the **System** of the **Implementing Safety Co-ordinator**, the **Implementing Safety Co-ordinator** will record the details of the **HV Apparatus** on which he has been told that **Safety From The System** is required and the **Safety Precautions** established on or relating to the **System** of the **Implementing Safety Co-ordinator** onto parts 1.1 and 1.2 of his **RISSP-B**. Where **Earthing** was not requested (either because **Earthing** was possible but was not required or because **Earthing** was not possible), part 1.2(b) of the **RISSP-B** will be completed with the words "not earthed".

8.7.2 The **Implementing Safety Co-ordinator** shall then contact the **Requesting Safety Co-ordinator** and confirm, by reading out the details entered on parts 1.1 and 1.2 of **RISSP**B, to the **Requesting Safety Co-ordinator**, that the **Safety Precautions** have been established.

8.7.3 The **Requesting Safety Co-ordinator** will then complete parts 1.1 and 1.2 of **RISSP-A** with the precise details received from the **Implementing Safety Co-ordinator** and then read back all those details to the **Implementing Safety Co-ordinator**. If both confirm that the details entered are the same, the **Requesting Safety Co-ordinator** shall issue the **RISSP** identifying number, as stated on the **RISSP-A**, to the **Implementing Safety Co-ordinator** who shall ensure that the number, including its prefix and suffix, is correctly entered on the **RISSP-B**.

8.7.4 The **Requesting Safety Co-ordinator** and the **Implementing Safety Co-ordinator** shall then respectively complete part 1.3 of **RISSP-A** and **RISSP-B** (which relates to the identity and location of the **Implementing Safety Co-ordinator** and the **Requesting Safety Co-ordinator** respectively). Each **Safety Co-ordinator** shall then complete the issue of the **RISSP** by signing part 1.3 of their respective **RISSPs** and then enter the time and date. Once signed, no alteration to the **RISSP** is permitted; the **RISSP** may only be cancelled.

8.7.5 The **Requesting Safety Co-ordinator** is then free to authorise work, but not testing. Where testing is to be carried out, the procedure set out below in paragraph 9 shall be implemented. The procedure to carry out the work is entirely an internal matter for the party which the **Requesting Safety Co-ordinator** is representing.

9 Testing

9.1 Where the **Requesting Safety Co-ordinator** wishes to authorise the carrying out of a test to which the procedures in this paragraph 9 apply he may not do so and the test will not take place unless and until the following procedures have been followed:

(a) confirmation is obtained from the **Implementing Safety Co-ordinator** that no person is working on, or testing, or has been authorised to work on, or test, any

parts of the **Systems** within the points of **Isolation** identified on the **RISSP** form relating to the test which is proposed to be undertaken (the "original **RISSP**"), and the points of **Isolation** on the **Requesting Safety Co-ordinator's System**, and will not be so authorised until the proposed test has been completed (or cancelled) and the **Requesting Safety Co-ordinator** has notified the **Implementing Safety Co-ordinator** of its completion (or cancellation) and thereby the cancellation of the requirements;

(b) all current **RISSPs** (except for the original **RISSP**) between the **Requesting Safety Co-ordinator** and the **Implementing Safety Co-ordinator** which relate to those parts of the **Systems** between the points of **Isolation** identified on the original **RISSP** and the points of **Isolation** on the **Requesting Safety Co-ordinator's System**, have been cancelled in accordance with the procedures set out in paragraph 9; and

(c) the **Implementing Safety Co-ordinator** agrees with the **Requesting Safety Co-ordinator** to permit the testing on those parts of the **Systems** between the points of **Isolation** identified in the original **RISSP** and the points of **Isolation** on the **Requesting Safety Co-ordinator's System**.

9.2 The **Requesting Safety Co-ordinator** will inform the **Implementing Safety Co-ordinator** as soon as the test has been completed or cancelled. Where **Earthing** has been removed during a test and has not been restored at the original position upon completion or cancellation of the test, the original **RISSP** shall be cancelled immediately in accordance with the procedure set out in paragraph 10.

10 Cancellation

10.1 When the **Requesting Safety Co-ordinator** decides (having followed all relevant internal procedures) that **Safety Precautions** are no longer required, he will contact the **Implementing Safety Co-ordinator** and inform him of the **RISSP** identifying number (including the prefix and suffix). The **Requesting Safety Co-ordinator** shall read out to the **Implementing Safety Co-ordinator** the details entered on parts 1.1 and 1.2 of his **RISSP-A**, and the **Implementing Safety Co-ordinator** shall confirm that the details entered on parts 1.1 and 1.2 of the **RISSP-B** are the same. The **Requesting Safety Co-ordinator** shall then confirm to the **Implementing Safety Co-ordinator** that the **Safety Precautions** are no longer required.

10.2 The **Requesting Safety Co-ordinator** and the **Implementing Safety Co-ordinator** shall then respectively complete part 2.1 of **RISSP-A** and **RISSP-B** (which relates to the identity and location of the **Implementing Safety Co-ordinator** and the **Requesting Safety Co-ordinator** respectively). Each **Safety Co-ordinator** shall then complete the cancellation of the **RISSP** procedure by signing part 2.1 of their respective **RISSP**s and then entering the time and date.

10.3 Subject as provided in paragraph 10.4, the **Implementing Safety Co-ordinator** is then free to arrange the removal of the **Safety Precautions**, the procedure to achieve that being entirely an internal matter for the party which the **Implementing Safety Co-ordinator** is representing. The only situation in which any **Safety Precautions** may be removed without first cancelling the **RISSP** in accordance with paragraph 10 is when **Earthing** is removed in the situation envisaged in paragraph 9.2.

10.4 Where **Earthing** has been requested neither **Safety Co-ordinator** shall instruct the removal of any **Isolation** forming part of the **Safety Precautions** until it is confirmed to each by the other that all **Earthing** has been removed.

11 Loss of Integrity of Safety Precautions

In any instance when any **Safety Precautions** may be ineffective for any reason the relevant **Safety Co-ordinator** shall without delay inform the other **Safety Co-ordinator(s)** of that being the case and, if requested, of the reasons why.

12 Safety Log

The **DNO** and each **User** shall maintain a safety log which shall be a chronological record of all messages relating to safety co-ordination under this OC6 sent and received by the **Safety Co-ordinator(s)**. The safety log must be retained for a period of not less than 3 years.

OC6 SAFETY CO-ORDINATION - APPENDIX A

Northern Ireland Electricity

DISTRIBUTION CONTROL CENTRE/USER

RECORD OF INTER-SYSTEM SAFETY PRECAUTIONS (**RISSP-A**)

(**Requesting Safety Co-ordinator's** Record)

RISSP NUMBER

PART 1

1.1 **HV APPARATUS** IDENTIFICATION

Safety Precautions have been established by the **Implementing Safety Co-ordinator** to achieve (in so far as it is possible from that side of the **Connection Point**) **Safety From The System** on the following **HV Apparatus** on the **Requesting Safety Co-ordinator's System**: [State identity - name(s) and, where applicable, identification of the **HV** circuit(s) up to the **Connection Point**]:

1.2 SAFETY PRECAUTIONS ESTABLISHED

(a) ISOLATION

[State the **Location(s)** at which **Isolation** has been established. For each **Location**, identify each point of **Isolation**. For each point of **Isolation**, state the means by which the **Isolation** has been achieved and whether immobilised and Locked, Caution Notice affixed or other safety procedures applied, as appropriate.]

(b) EARTHING

[State the **Location(s)** at which **Earthing** has been established. For each **Location**, identify each point of **Earthing**. For each point of **Earthing**, state the means by which the **Earthing** has been achieved and whether immobilised and Locked or other safety procedures applied, as appropriate].

1.3 ISSUE

I have received confirmation from _____ (name of **Implementing Safety Co-ordinator**) at _____ (location) that the **Safety Precautions** identified in paragraph 1.2 have been established and that instructions will not be issued at his location for their removal until this **RISSP** is cancelled.

Signed ……(**Requesting Safety Co-ordinator**)

at …… (time) on ……(date)

PART 2

2.1 CANCELLATION

I have confirmed to _____ (name of the **Implementing Safety Co-ordinator**) at _____ (location) that the **Safety Precautions** set out in paragraph 1.2 are no longer required and accordingly the **RISSP** is cancelled.

Signed ……(**Requesting Safety Co-ordinator**)

at ……(time) on ……(Date)

OC6 SAFETY CO-ORDINATION - APPENDIX B

Northern Ireland Electricity

DISTRIBUTION CONTROL CENTRE/USER

RECORD OF INTER-SYSTEM SAFETY PRECAUTIONS (**RISSP-B**)

(**Implementing Safety Co-ordinator's** Record)

RISSP NUMBER _____

PART 1

1.1 **HV APPARATUS** IDENTIFICATION

Safety Precautions have been established by the **Implementing Safety Co-ordinator** to achieve (in so far as it is possible from that side of the **Connection Point**) **Safety From The System** on the following **HV Apparatus** on the **Requesting Safety Co-ordinator's System**: [State identity - name(s) and, where applicable, identification of the **HV** circuit(s) up to the **Connection Point**]:

_____

_____

_____

1.2 SAFETY PRECAUTIONS ESTABLISHED

(a) ISOLATION

[State the **Location(s)** at which **Isolation** has been established. For each **Location**, identify each point of **Isolation**. For each point of **Isolation**, state the means by which the **Isolation** has been achieved and whether immobilised and Locked, Caution Notice affixed or other safety procedures applied, as appropriate.]

_____

_____

_____

(b) EARTHING

[State the **Location(s)** at which **Earthing** has been established. For each **Location**, identify each point of **Earthing**. For each point of **Earthing**, state the means by which the **Earthing** has been achieved and whether immobilised and Locked or other safety procedures applied, as appropriate].

_____

_____

_____

1.3 ISSUE

I have confirmed to _____ (name of **Requesting Safety Co-ordinator**) at _____ (location) that the **Safety Precautions** identified in paragraph 1.2 have been established and that instructions will not be issued at my location for their removal until this **RISSP** is cancelled.

Signed ……(**Implementing Safety Co-ordinator**)

at …… (time) on ……(date)

PART 2

2.1 CANCELLATION

I have received confirmation from _____ (name of the **Requesting Safety Co-ordinator**) at _____ (location) that the **Safety Precautions** set out in paragraph 1.2 are no longer required and accordingly the **RISSP** is cancelled.

Signed ……(**Implementing Safety Co-ordinator**)

at ……(time) on ……(Date)

(Note: This form to be a different colour from **RISSP-A**)

Operating Code 7 – Contingency Planning

1 Introduction

1.1 **Operating Code** No. 7 ("OC7") covers the following:-

(a) The **DNO's** role in the implementation of recovery procedures in the event of a **Total Shutdown** or **Partial Shutdown**; and

(b) the procedure to be followed when the **Distribution Service Centre** is incapacitated for any reason.

It recognises that the main role in the event of any of those situations arising will be undertaken by the **TSO**, and that under the **Grid Code** and the related emergency procedures the **DNO** will principally be acting in accordance with the instructions of the **TSO**.

1.2 It should be noted that, under Article 58 of the **Order**, the **Department** may give directions to the **DNO**, the **TSO** and/or any **Generator** and any **Supplier** for the purpose of, "mitigating the effects of any civil emergency which may occur" (i.e. for the purposes of planning for dealing with a civil emergency); a civil emergency is defined in the **Order** as "any natural disaster or other emergency which, in the opinion of the **Department**, is or may be likely to disrupt electricity supplies".

1.3 Additionally, under the Energy Act 1976, the **Secretary of State** has powers to make orders and give directions controlling the production, supply, acquisition or use of electricity, where an Order in Council under Section 3 is in force declaring that there is an actual or imminent emergency affecting electricity supplies. In the event that any such directions are given or orders made under the Energy Act 1976, the provisions of the **Distribution Code** will be suspended insofar as they are inconsistent with them.

2 Objective

The overall objectives of OC7 are:

(a) to outline and enable co-ordination between the **DNO** and **Users** in the situation where the **TSO** under the **Grid Code** is seeking to recover from a **Total** or **Partial Shutdown** to achieve, as far as possible, restoration and **Re-Synchronisation** of the **Total System** and to enable **Demand** once again to be satisfied in the shortest possible time; and

(b) to ensure that the **NI System** can continue to operate in the event that the **Distribution Service Centre** is incapacitated for any reason.

3 Scope

3.1 OC7 applies to the **DNO** and to **Users**. **Users** in this OC7 means:

(a) **Generators**;

(b) **Suppliers**; and

(c) **Demand Customers** in respect of **Connection Sites** with a **Demand** of 1**MW** and above.

4 Black Start Procedure

4.1 Total Shutdown

When a "**Total Shutdown**" occurs, namely where all generation has ceased and there is no electricity supply across any **Interconnectors** and the **Inter-jurisdictional Tie Lines** between Northern Ireland and the Republic of Ireland resulting in the **Total System** having shutdown, it is not possible for the **Total System** to begin to function again without the **TSO's** directions relating to a **Black Start**.

4.2 Partial Shutdown

When a "**Partial Shutdown**" occurs, namely a situation which is the same as a **Total Shutdown** except that all generation has ceased in a separate part of the **Total System** and there is no electricity supply to that part of the **Total System** and, therefore, that part of the **Total System** is shutdown, it is not possible for that part of the **Total System** to begin to function again without the **TSO** directions relating to a **Black Start**.

4.3 Licence Standards

During a **Total Shutdown** or **Partial Shutdown** and during the period leading up to such shutdowns and the subsequent recovery, the **Licence Standards** may not be met and the whole or any part of the **Total System** may be operated outside normal voltage and/or **Frequency**.

4.4 **Black Start** situation

In the event of a **Total Shutdown** or **Partial Shutdown**, the **DNO** will inform **Users** which in the **DNO's** opinion need to be informed that a **Total Shutdown** or, as the case may be, a **Partial Shutdown**, exists and that it has been notified by the **TSO** that the **TSO** intends to implement a **Black Start**.

4.5 Black Start

4.5.1 The procedure necessary for a recovery from a **Total Shutdown** or **Partial Shutdown** is a "**Black Start**". The procedure for a **Partial Shutdown** is the same as that for a **Total Shutdown** except that it applies only to a part of the **Total System**. It should be noted that a **Partial Shutdown** may affect parts of the **Total System** which are not themselves shutdown.

4.5.2 The overall strategy for recovery from a **Total Shutdown** or **Partial Shutdown** will, in general, include the overlapping phases of establishment by the **TSO** of isolated **Power Generating Facilities**, together with complementary local **Demand**, termed "Power Islands", step by step integration of these Power Islands into larger sub-systems and, eventually, complete re-establishment of the **Total System**.

4.5.3 The **TSO** will, in accordance with the **Grid Code**, be instructing the **DNO** to assist in relation to this process and under this OC7 the **DNO** may contact **Users**

to discuss and instruct **Users** in relation to the role they are to play as part of the recovery.

4.5.4 The conclusion of the **Black Start** and the time of the return to normal operation of the **Total System** will be determined by the **TSO** which shall inform the **DNO**, in accordance with the terms of the **Grid Code**. The **DNO** will then inform **Users** which in the **DNO's** opinion need to be informed, that the **Black Start** situation no longer exists and that normal operation of the **Total System** has begun.

5 Loss of the Distribution Service Centre

If the event of the temporary loss of the **Distribution Service Centre** the **DNO** will have arrangements in place whereby the **DNO** may transfer the functions of the **Distribution Service Centre** to an alternative control facility whereupon the **DNO** will inform **Users** of the communications details for the new location.

Operating Code 8 – Numbering and Nomenclature of Plant and Apparatus at Connection Sites

1 Introduction

1.1 **Operating Code** No. 8 ("OC8") sets out the responsibilities and procedures for determining and notifying the **DNO** and **Users** of the numbering and/or nomenclature of the other's **Plant** and/or **Apparatus** at **Connection Sites**. For clarification, nomenclature shall include the selection of **Substation** names.

1.2 The numbering and/or nomenclature of **Plant** and/or **Apparatus** is to be included in an **Ownership Diagram** prepared for each **Connection Site** as provided in the **Connection Conditions**.

2 Objectives

The prime objective embodied in this OC8 is to ensure that at any **Connection Site** items of **Plant** and/or **Apparatus** has numbering and/or nomenclature that, so far as possible, has been mutually agreed and that has been notified between the **DNO** and **Users** to ensure, so far as is reasonably practicable, the safe and effective operation of the **Distribution System** and the **User System** by minimising the risk of error in identifying **Plant** and/or **Apparatus**.

3 Scope

3.1 OC8 applies to the **DNO** and to **Users**. **Users** in this OC8, means:

(a) **Generators** in respect of their **Generating Units** connected to the **Distribution System** at 33kV; and

(b) **Demand Customers** in respect of their 33kV **Connection Sites**; and

(c) those further **Generators** and **Demand Customers** in respect of their **HV Connection Sites** as notified by the **DNO** in writing.

4 Procedure

4.1 General requirement

4.1.1 **Plant** and/or **Apparatus** of a **User** at a **Connection Site** shall have numbering and/or nomenclature which cannot be confused with that of the **DNO's Plant** and **Apparatus** at that **Connection Site**.

4.1.2 In furtherance of the general requirement set out in paragraph 4.1.1 above, no **User** will install, or permit the installation of, any **Plant** and/or **Apparatus** which has numbering and/or nomenclature which could be confused with that of the **DNO** which is either already on that **Connection Site** or which the **DNO** has notified the **User** will be installed on that **Connection Site**. The procedure for determining the applicable numbering and nomenclature for new and existing **Connection Sites** is set out in paragraphs 4.2.1 and 4.2.2 respectively.

4.2 **Plant** and **Apparatus**

4.2.1 New **Connection Sites**

When a **User** intends to install or the **DNO** intends to install **Plant** and/or **Apparatus** as part of the construction and commissioning of a new **Connection Site**, the proposed numbering and/or nomenclature shall be notified as part of the production of the **Ownership Diagram** in accordance with the provisions of the **Connection Conditions**. The principles to apply to determine whether that proposed numbering and/or nomenclature is acceptable will be those set out in this OC8 (including, for the avoidance of doubt, the provisions of paragraph 4.2.2(e)).

4.2.2 Existing **Connection Sites**

(a) When a **User** intends to install or the **DNO** intends to install **Plant** and/or **Apparatus** at an existing **Connection Site** the proposed numbering and/or nomenclature to be adopted for the **Plant** and/or **Apparatus** shall be notified to the other.

(b) The notification shall be made in writing to the other and will consist of a revised **Ownership Diagram** incorporating the proposed new **Plant** and/or **Apparatus** to be installed and its proposed numbering and/or nomenclature.

(c) The notification shall be made at least six months (or such shorter period as the **DNO** or the **User**, as the case may be, may agree) prior to the proposed installation of the **Plant** and/or **Apparatus**.

(d) The recipient of the notification shall respond in writing within one month of the receipt of the notification confirming receipt and confirming whether the proposed numbering and/or nomenclature is acceptable or, if not, what would be acceptable.

(e) In the event that agreement cannot be reached between the **DNO** and the **User**, the **DNO** acting reasonably, shall have the right to determine the numbering and nomenclature to be applied at the **Connection Site**.

4.3 Changes to existing **Plant** and **Apparatus**

Where there needs to be a change of the existing numbering or nomenclature of any of the **DNO's Plant** and/or **Apparatus** at a **Connection Site** or a **User** needs to change the existing numbering or nomenclature of any of its **Plant** and/or **Apparatus** at a **Connection Site**, the provisions of paragraph 4.2.2 shall apply, with any amendments necessary to reflect that only a change is being made.

4.4 Clear labelling

The **DNO** shall be responsible for ensuring the provision, erection and maintenance of clear and unambiguous labelling showing the numbering and nomenclature of the **DNO's Plant** and/or **Apparatus** at **Connection Sites** and each **User** shall be responsible for the provision, erection and maintenance of clear and unambiguous

labelling showing the numbering and nomenclature of the **User's Plant** and/or **Apparatus** at **Connection Sites**.

Operating Code 9 – System Tests

1 Introduction

1.1 **Operating Code** No. 9 ("OC9") relates to the following types of test (all of which are referred to as **"System Tests"**):-

(a) tests to be carried out by a **User** or the **DNO** which involve or may involve simulating conditions or the controlled application of irregular, unusual or extreme conditions on the **User's System** or the **Distribution System** (as the case may be) which may have a material effect on the **Total System**, beyond the **User's System** or the **Distribution System** (as the case may be);

(b) tests to be carried out by the **TSO** or a user under the **Grid Code** which involve or may involve simulating conditions or the controlled application of irregular, unusual or extreme conditions on the **NI System** or that user's system (as the case may be) which may have a material effect on the **Distribution System** and the **System** of a **User** under this **Distribution Code**, and which the **DNO** therefore decides, in its view, should be raised as a connected system test (a "**Connected System Test**") under this OC9 to ensure that **Users** under this **Distribution Code** are included within the consideration of the system test being proposed under the **Grid Code**; and

(c) **Commissioning/Acceptance Tests** of **Plant** and **Apparatus** to be carried out by a **User** or the **DNO** which involve or may involve the application of irregular, unusual or extreme conditions and which may have a material effect on the **Total System**, beyond the **User's System** or the **Distribution System** (as the case may be).

1.2 OC9 only deals with the responsibilities and procedures for arranging and carrying out tests which have (or may have) a material effect on the **Systems** of both the **DNO** and **Users**. Accordingly, where a test proposed by a **User** will not have a material effect on the **Distribution System** or where a test proposed by the **DNO** will not have a material effect on a **User System**, such test will not fall within this OC9 and OC9 shall not apply to it.

1.3 OC9 does not cover **Commissioning/Acceptance Tests** of a **User's Plant** and **Apparatus** which will have no material effect on the **Distribution System** beyond the **User's System**; such tests will be undertaken solely pursuant to paragraph 10 and 11 in the **Connection Conditions**. Neither does it cover the type of tests which are dealt with in OC10, "**Testing, Monitoring and Investigation**".

1.4 The **Grid Code** contains provisions relating to system tests under the **Grid Code**, which will be initiated by the **TSO** or users under the **Grid Code**. The **DNO** is a user under the **Grid Code** and certain **Users** under the **Distribution Code** will also be users under the **Grid Code**. A system test under the **Grid Code** may therefore involve, and affect, the **Distribution System**, and the **TSO** is required under the **Grid Code** to obtain agreement from all affected **Grid Code** users. In that instance if the **DNO** was a user so affected under the **Grid Code**, the **DNO** may decide that it should initiate a **Connected System Test** under this OC9 in order to ensure that **Users** are involved in the **Grid Code** system test.

2 Objective

2.1 The overall objectives of OC9 are:-

(a) to ensure, so far as possible, that tests proposed to be carried out:

(i) by a **User** which may have a material effect on the **Total System** or any part of the **Total System** (in addition to that **User's System**) including the **Distribution System**;

(ii) by the **DNO** which may have a material effect on a **Users' System** (in addition to the **Distribution System**); or

(iii) under the **Grid Code** in certain circumstances;

do not threaten the safety of personnel or threaten to damage **Plant** and/or **Apparatus** and cause minimum detriment to the **DNO** and **Users.** These tests will not affect the **Transmission System** and therefore the reference to **Total System** above excludes the **Transmission System**; and

(b) to set out the procedures to be followed for establishing and where appropriate reporting such tests and to set out guidelines for which tests need to be notified to the **DNO** prior to the test being carried out.

3 Scope

3.1 OC9 applies to the **DNO** and to **Users** which, in this OC9 means:

(a) **Generators**, and

(b) **Demand Customers**.

4 Procedure

4.1 Proposal Notice

4.1.1 The level of **Demand** on the **Distribution System** varies substantially according to the time of day and time of year and, consequently, certain **System Tests** which may have a significant impact on the **Distribution System** (for example, tests of the **Full Load** capability of a **Generating Unit** over a period of several hours) can only be undertaken at certain times of the day and year. Other **System Tests**, for example, those involving substantial **MVAr** generation, may also be subject to timing constraints. It therefore follows that notice of **System Tests** should be given as far in advance of the date on which they are proposed to be carried out as reasonably practicable.

4.1.2 Where a **User** wishes to carry out a **System Test** it shall submit a notice (a "**Proposal Notice**") to the **DNO** as far in advance as is reasonably practicable of the date it would like to undertake the proposed **System Test**. In the event that a **User** submits to the **DNO** a programme for proposed **Commissioning/Acceptance Testing** pursuant to paragraph 10.1.4 in the **Connection Conditions** which the **DNO** considers may involve the application of

irregular, unusual or extreme conditions and which may have a material effect on the **Distribution System**, beyond the **User's System**, such programme shall be treated as a **Proposal Notice** for the purposes of this OC9.

4.1.3 The **Proposal Notice** shall be in writing, or in such other form as the **DNO** and the relevant **User** may otherwise agree (such agreement not to be unreasonably withheld), and shall contain details of the nature and purpose of the proposed **System Test** and shall indicate the identity and situation of the **Plant** and/or **Apparatus** involved. In the case of a **System Test** involving a **CDGU**, the **User** shall state in the **Proposal Notice** the level of Availability and the values for Technical Parameters which will be declared for the **CDGU** for the period of the test in accordance with SDC1 of the **Grid Code** and shall also include details of the planned operation by the **User** as part of the test. In the case of a **Generating Plant**, it will also confirm that the **User** will be arranging with the **TSO** for a relevant Dispatch Instruction to be issued to it for the purposes of the test. For the purposes of this paragraph 4.1, "Dispatch Instructions", "Availability" and "Technical Parameters" shall have the meaning given to such terms in the **Grid Code**.

4.1.4 If the **DNO** is reasonably of the view that the information set out in the **Proposal Notice** is insufficient, it will contact the person who submitted the **Proposal Notice** (the **"Test Proposer"**) as soon as reasonably practicable, with a written request for further information. The **DNO** shall not be required to do anything under this OC9 until it is satisfied with the details supplied in the **Proposal Notice** or pursuant to a request for further information.

4.1.5 If the **DNO** wishes to undertake a **System Test** or a **Connected System Test**, the **DNO** shall be deemed to have received a **Proposal Notice** for that **System Test**.

4.1.6 The **DNO** will use all reasonable endeavours to accommodate requests for **System Tests** but has absolute discretion as to the timing of such tests (which discretion will be exercised reasonably consistently with previous practice) to ensure the proper operation of the **Distribution System** and so as to ensure that the **Licence Standards** are not breached.

4.1.7 Without prejudice to the general description of the types of **System Tests** which have to be dealt with under this OC9, as set out in paragraph 1.1 above, each **Generator** must submit a **Proposal Notice** to the **DNO** if it proposes to carry out any of the following tests, each of which is therefore a **System Test**:-

(a) **VAr** limiter tests; and

(b) **Load** rejection tests.

4.2 Establishment of **Test Panel**

(a) Using the information supplied (or deemed to have been supplied) to it under paragraph 4.1, the **DNO** will determine, in its reasonable estimation, which **Users**, other than the **Test Proposer**, may be materially affected by the proposed **System Test** and will notify such **Users** accordingly.

(b) The **DNO** will then determine, in its reasonable opinion, whether a **Test Panel** is required taking into account the degree of severity of its possible effect on the **Systems** of the **DNO** and **Users**. A **Test Panel** will not generally be needed for a routine test and, since the majority of **System Tests** are routine, the establishment of a **Test Panel** will be the exception rather than the rule. If the **DNO**, in its reasonable discretion, decides that a **Test Panel** is necessary, the provisions set out in the **Appendix** to this OC9 will apply.

4.3 The **DNO** Supervision

(a) If the **DNO** determines that no **Test Panel** is required, it will determine, acting reasonably, whether and, where appropriate, when the proposed **System Test** can take place and it will consider:-

(i) the details of the nature, technical reasons for and timing of the proposed **System Test** and other matters set out in the **Proposal Notice** (together with any further information requested by the **DNO** under OC9.4.1.4);

(ii) the economic, operational and risk implications of the proposed **System Test**; and

(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 **Outage Planning** requirements of the **DNO** and **Users**.

If the **DNO** determines that the proposed **System Test** cannot take place, it will, insofar as it is able to do so without breaching any obligations regarding confidentiality contained either in the **Licence** held by the **DNO** or in any agreement, notify the **Test Proposer** of the reasons for such decision in such degree of detail as the **DNO** considers reasonable in the circumstances.

(b) **Users** identified by the **DNO** under paragraph 4.2.1 (and the **Test Proposer**) shall be obliged to supply the **DNO**, upon written request, with such details as the **DNO** reasonably requires in order to consider the proposed **System Test**.

(c) The **DNO** will consult with each **User** identified by it under paragraph 4.2.1 regarding the proposed **System Test** including, in particular, the effects which such test is likely to have on such **User's System**.

4.4 The **DNO Test Programme**

(a) As soon as practicable the **DNO** shall, if it approves of the proposed **System Test** taking place (of which it will notify the **Test Proposer**), taking into account the factors specified in paragraph 4.3.1, prepare a programme (the "**Test Programme**"), in such detail as the **DNO** considers, in its reasonable opinion, to be appropriate for the test, which will include:-

(a) the procedure to be adopted for carrying out the **System Test**, including the switching sequence and proposed timings of the switching sequence;

(b) the manner in which the **System Test** is to be monitored;

(c) a list of those members of staff to be involved in carrying out the **System Test**, including those who will be responsible for site safety; and

(d) such other matters as the **DNO** considers appropriate including (without limitation) matters suggested by **Users** identified by the **DNO** pursuant to paragraph 4.2.1.

(b) The **DNO**, the **Test Proposer** and each **User** identified by the **DNO** under paragraph 4.2.1 will determine by agreement the basis on which the costs of the **System Test** (including unanticipated costs, for example, costs arising from modifications etc) shall be borne as between the affected parties (the general principle being that the **Test Proposer** will bear such costs). If agreement cannot be reached (each party having acted in good faith), the **System Test** will be cancelled.

(c) Without prejudice to the provisions of paragraph 4.1, the **DNO** shall be entitled to require the proposed **System Test** to be modified, delayed or cancelled if, in its reasonable opinion, it considers that such test would impose unacceptable effects on the **Distribution System** or any **User System**.

(d) If the **DNO** requires the proposed **System Test** to be cancelled or if it requires such test to be delayed or modified but the **Test Proposer** considers that such delay or modification is not possible, the proposed **System Test** shall not take place.

(e) The **Test Programme** will, subject to paragraph 4.4.6, bind the **Test Proposer** to act in accordance with the provisions of the **Test Programme** in relation to the proposed **System Test**.

(f) Any problems with the proposed **System Test** perceived by the **Test Proposer** or any affected **User** or the **DNO** which arise or are anticipated after the issue of the **Test Programme** and prior to the day of the proposed **System Test** must be notified by the **Test Proposer** or affected **User** or the **DNO** (as the case may be) to the others as soon as possible in writing. If, in any such case, the **DNO** decides that these anticipated problems merit an amendment to, or postponement of, the **System Test**, it shall notify the **Test Proposer** and affected **Users** accordingly.

(g) If, on the day of the proposed **System Test**, operating conditions on the **Distribution System** are such that any of the **DNO**, the **Test Proposer** or an affected **User** wishes to delay or cancel the start or continuance of the **System Test**, they shall immediately inform the others of this decision and the reasons for it. The **DNO** shall then postpone or cancel, as the case may be, the **System Test** and another suitable time and date shall be arranged in accordance with this paragraph 4.4.

Appendix

1 Test Panel supervision

1.1 If the **DNO** determines pursuant to paragraph 4.2.2 that a **Test Panel** is required, it will appoint a representative to co-ordinate the **System Test** (the **"Test Co-ordinator"**) as soon as reasonably practicable after it has, or is deemed to have, received a **Proposal Notice** and in any event prior to the distribution of the **Preliminary Notice** referred to below. The **Test Co-ordinator** shall act as Chairman of the **Test Panel** and shall be a full member of the **Test Panel**.

1.2 The **DNO** will notify all **Users** identified by it under paragraph 4.2.1 of the proposed **System Test** by a notice in writing (a "**Preliminary Notice**") and will send a copy of the **Preliminary Notice** to the **Test Proposer**. The **Preliminary Notice** will contain:

(a) the details of the nature and purpose of the proposed **System Test**, the identity and situation of the **Plant** and/or **Apparatus** involved, the identities of the **Users** identified by the **DNO** under paragraph 4.2.1 and the identity of the **Test Proposer**;

(b) an invitation to nominate within one month a suitably qualified representative (or representatives if the **Test Co-ordinator** considers that it is appropriate for a particular **User** to nominate more than one representative) to be a member of the **Test Panel** for the proposed **System Test**; and

(c) the name of the **DNO** representative whom the **DNO** has appointed as the **Test Co-ordinator** and who will be a member of the **Test Panel** for the proposed **System Test** together with the names of any other representatives whom the **DNO** has nominated to be members of the **Test Panel**.

1.3 The **Preliminary Notice** will be sent within one month of the later of either the receipt by the **DNO** of the **Proposal Notice**, or of the receipt of any further information requested by the **DNO** under paragraph 4.1.3. Where the **DNO** is the proposer of the **System Test**, the **Preliminary Notice** will be sent within one month of the proposed **System Test** being fully formulated.

1.4 Replies to the invitation in the **Preliminary Notice** to nominate a representative to be a member of the **Test Panel** must be received by the **DNO** within one month of the date on which the **Preliminary Notice** was sent to the **User** by the **DNO**. Any **User** which has not replied within that period will not be entitled to be represented on the **Test Panel**. If the **Test Proposer** does not reply within that period, the proposed **System Test** will not take place and the **DNO** will notify all **Users** identified by it under paragraph 4.2.1 accordingly.

1.5 The **DNO** will, as soon as possible after the expiry of that one month period, appoint the nominated persons to the **Test Panel** and notify all **Users** identified by it under paragraph 4.2.1 and the **Test Proposer**, of the composition of the **Test Panel**.

2 Test Panel

2.1 A meeting of the **Test Panel** will take place as soon as possible after the **DNO** has

notified all **Users** identified by it under paragraph 4.2.1 and the **Test Proposer** of the composition of the **Test Panel**, and in any event within one month of the appointment of the **Test Panel**.

2.2 The **Test Panel** shall consider:

(a) the details of the nature, technical reasons for and timing of the proposed **System Test** and other matters set out in the **Proposal Notice** (together with any further information requested by the **DNO** under paragraph 4.1.3);

(b) the economic, operational and risk implications of the proposed **System Test**;

(c) the possibility of combining the proposed **System Test** with any other tests and with **Plant** and/or **Apparatus Outages** which arise pursuant to the **Operational Planning** requirements of the **DNO** and **Users**; and

(d) whether, at the conclusion of the **System Test**, the **Test Proposer** should be required to prepare a written report on the **System Test** (a "**Final Report**") in accordance with paragraph 4 in the Appendix and, if so, the period within which the **Final Report** must be prepared.

2.3 **Users** identified by the **DNO** under OC9.4.2.1, the **Test Proposer** (whether or not they are represented on the **Test Panel**) and the **DNO** shall be obliged to supply the **Test Panel**, upon written request, with such details as the **Test Panel** reasonably requires in order to consider the proposed **System Test**.

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

3 Test Panel Test Programme

3.1 As soon as practicable after its first meeting, the **Test Panel** shall, taking into account the factors specified in paragraph A.2.2 in the Appendix, prepare a programme (the "**Test Programme**") which will include:-

(a) the procedure to be adopted for carrying out the **System Test**, including the switching sequence and proposed timings of the switching sequence;

(b) the manner in which the **System Test** is to be monitored;

(c) a list of those members of staff to be involved in carrying out the **System Test**, including those who will be responsible for site safety; and

(d) such other matters as the **Test Panel** considers to be appropriate.

3.2 The **Test Panel** shall also determine the basis on which the costs of the **System Test** (including unanticipated costs) shall be borne as between the affected parties (the general principle being that the **Test Proposer** will bear such costs). If the **Test Panel** cannot agree on this (each party having acted in good faith), the **System Test** will be cancelled.

3.3 The **Test Co-ordinator** shall be entitled to require the proposed **System Test** to be modified, delayed or cancelled if, in his reasonable opinion, he considers that such test

would impose unacceptable effects on the **Distribution System** or on any **User System**.

3.4 If the **Test Co-ordinator** requires the proposed **System Test** to be cancelled or if he requires such test to be delayed or modified but the **Test Proposer** considers that such delay or modification is not possible, the proposed **System Test** shall not take place and the **Test Panel** will disband automatically.

3.5 If the **Test Co-ordinator** requires the proposed **System Test** to be modified or delayed and such modification or delay is possible, the **Test Panel** shall, as soon as practicable, revise the **Test Programme** accordingly.

3.6 The **Test Programme** will, subject to paragraph 3.7 in this Appendix, bind all recipients to act in accordance with the provisions of the **Test Programme** in relation to the proposed **System Test**.

3.7 Any problems with the proposed **System Test** which arise or are anticipated after the issue of the **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 the **Test Proposer** (unless the test was proposed by the **DNO**) and each **User** identified by the **DNO** under paragraph 4.2.1 accordingly.

3.8 If, on the day of the proposed **System Test**, operating conditions on the **Distribution 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 the **Test Proposer** (unless the test was proposed by the **DNO**) and all **Users** identified by the **DNO** under paragraph 4.2.1 another suitable time and date. If he cannot reach such agreement, the **Test Co-ordinator** shall reconvene the **Test Panel** as soon as practicable, which will endeavour to arrange another suitable time and date for the **System Test**, in which case the relevant provisions of this OC9 shall apply.

4 Connected System Tests

4.1 In the case of a **Connected System Test**, the timings and process outlined in this Appendix may be amended by the **DNO** to co-ordinate with the process being undertaken under the **Grid Code**.

5 Test Panel Final Report

5.1 At the conclusion of the **System Test**, the **Test Proposer** shall, if so decided by the **Test Panel** pursuant to paragraph 2.2(d) in the Appendix, prepare a **Final Report** for submission to the **DNO** and the other members of the **Test Panel**. The **Final Report** shall be submitted within the period agreed by the **Test Panel** pursuant to paragraph 2.2(d).

5.2 The **Test Proposer** may omit from the **Final Report** matters which, in its reasonable opinion, are confidential to it and the **Final Report** shall not be submitted to any person who is not a member of the **Test Panel** unless the **Test Panel**, having considered the

confidentiality issues arising, shall have unanimously approved such submission.

5.3 The **Final Report** shall include a description of the **Plant** and/or **Apparatus** tested and a description of the **System Test** carried out, together with the results and, where appropriate, the conclusions and recommendations of the **Test Panel**.

5.4 When the **Final Report** has been prepared and submitted in accordance with paragraph 4.1 in this Appendix, the **Test Panel** will disband automatically. If a **Final Report** is not required by the **Test Panel** then it will disband automatically upon the conclusion of the **System Test**.

Operating Code 10 – Testing, Monitoring and Investigation

1 Introduction

1.1 **Operating Code** No. 10 ("OC10") specifies the procedures to be followed by the **DNO** in carrying out:

(a) **Monitoring** of the compliance of **Generating Units** and **Demand Customers' Plant** and/or **Apparatus** with the **Connection Conditions**;

(b) **Testing**:-

(i) in certain circumstances, (whether by means of a formal test or verification by inspection) to ascertain whether the **Connection Conditions** are being complied with in respect of **Generating Units** and **Demand Customer's Plant** and/or **Apparatus**; and

(ii) at the request of a **User**, in certain circumstances; and

(c) **Investigations** in relation to equipment and operational procedures at **Power Generating Facilities** and other **User Sites**.

1.2 It should be noted that **Testing** and **Monitoring** under this OC10 are two different procedures with, in general terms, **DNO** representatives being present at the **Power Generating Facility** or **User Site** for a **Test**, but not for **Monitoring**.

2 Objectives

2.1 The objectives of OC10 are to establish whether **Generating Units** and **Demand Customers' Plant** and/or **Apparatus** comply with the **Connection Conditions**.

3 Scope

3.1 OC10 applies to the **DNO** and to **Users**. **Users** in this OC10 means:

(a) **Generators**; and

(b) **Demand Customers** in respect of their **Connection Sites** with a **Demand** of 1**MW** and above.

4 Procedure for Monitoring

4.1 **Monitoring** may be carried out at any time by the **DNO** and involves the analysis of the output of **Monitoring** equipment (as required or permitted under the **Connection Conditions** and/or the **Connection Agreement**) to show the output and/or performance of a **User's Equipment** in order to see whether the **User's Equipment** is meeting the requirements of the **Connection Conditions**. The output from such **Monitoring** equipment installed may, amongst other uses, be used to **Monitor** the performance of **User's Equipment** in the event of variations in **NI System Frequency**.

4.2 In determining whether a **User's** equipment is meeting the requirements of the **Connection Conditions** the **DNO** shall in each case give due regard to operating conditions on the **Distribution System**.

4.3 If a **User's Equipment** is not meeting the requirements of the **Connection Conditions**, the **DNO** will, submit a **Monitoring Notice** to the **User** which will identify the **Connection Conditions** requirements which have been **Monitored** and which have not been met.

4.4 Consequences of **Monitoring**

4.4.1 The **User** will provide the **DNO** as soon as possible with an explanation of the reasons for the failure and the actions it is proposing to undertake to enable its equipment to meet the requirements of the **Connection Conditions** which it has not met within a reasonable period.

4.4.2 The **DNO** and the **User** will then discuss the action which the user proposes to take and will seek to reach agreement on any short term operational matters necessary to protect the **Distribution System** and the **Systems** of other **Users** and the time by which the requirements will be met. In the absence of agreement between the **User** and the **DNO** on this, the **DNO** shall refer the **Distribution Code** non-compliance to the **Authority**.

4.4.3 Once the **User** confirms to the **DNO**, in the agreed timescale, that its equipment meets the relevant **Connection Conditions** requirements, the **DNO** may verify that either by further **Monitoring** or by undertaking a **Test** under this OC10.

5 Procedure for Testing

5.1 In circumstances where the **DNO** reasonably considers that, in relation to **User's Equipment**, a **User** might be failing to comply with the **Connection Conditions** (or where it wishes to verify that the equipment now meets the requirements where **Monitoring** or a previous test has demonstrated non-compliance) the **DNO** may, upon giving reasonable notice identifying the requirement concerned, send representatives to the relevant **User Site** in order to verify by **Testing** or inspection (in the case of **Testing**, conducted by the **User**) whether in relation to the item of **User's Equipment**, the **Connection Conditions** requirements are being met.

5.2 Each **User** must allow the **DNO** representatives access to all relevant parts of its **User Site** for the purposes of this OC10.

5.3 The procedure for the **Test**, and the criteria for passing the **Test**, will, if not agreed between the **DNO** and the **User**, be as determined by the **DNO** acting reasonably and as notified to the **User** at the time and the **User** will comply with all reasonable instructions of the **DNO** in carrying out the **Test**.

5.4 In determining whether the item of **User's Equipment**, as the case may be, has passed a **Test**, due regard will be given by the **DNO** to operating conditions on the **NI System**.

5.5 If in relation to the item of **User's Equipment** the **User** fails the **Test** then: it must provide the **DNO** with a written report specifying in reasonable detail the reasons for the failure, such report to be submitted within 5 **Business Days** of the **Test**. The **User** must then within five further **Business Days** submit in writing to the **DNO** for approval the date by which the **User** proposes to have brought the equipment to a condition where it would meet the requirements of the **Connection Conditions**. The **DNO** may

either accept this period, or suggest a shorter period. In the absence of agreement between the **User** and the **DNO** on this, the **DNO** shall refer the **Distribution Code** non-compliance to the **Authority**.

5.6 Once the **User** confirms to the **DNO**, in the agreed timescale, that its equipment meets the relevant **Connection Conditions** requirements, the **DNO** may verify that either by **Monitoring** or by undertaking a further **Test** under this OC10.

6 Investigations

6.1 The **DNO** may, upon giving reasonable notice (in any event not less than 2 **Business Days**), send representatives to a **Power Generating Facility** or **User Site** in order to investigate any equipment or operational procedure.

6.2 An **Investigation** may take place only for the purposes of enabling the **DNO** to fulfil its obligations relating to the operation of the **Distribution System** (and where in the reasonable opinion of the **DNO** in the absence of an **Investigation** it would be unable properly to fulfil such obligations).

6.3 An Investigation shall not take place during or less than 2 days before or after a **Test** in respect of **Plant** or equipment at the relevant **Power Generating Facility** or **User Site**.

6.4 The **DNO's** notice under paragraph 6.1 shall specify:

(a) the nature and purpose of the Investigation and the reasons therefor;

(b) the equipment or operational procedure subject to the **Investigation**; and

(c) the procedure (as reasonably determined by the **DNO**) for the **Investigation**.

6.5 The scope of an **Investigation** and the information and parts of the **Power Generating Facility** or **User Site** to which the **DNO** shall be entitled to access shall be limited to that required for the purposes of the **Investigation** as specified in the **DNO's** notice under paragraph 6.4.

6.6 The **User** shall comply with the reasonable requests of the **DNO** in carrying out the **Investigation**, and allow the **DNO** representative access to all relevant parts of the **Power Generating Facility** or **User Site** to conduct the **Investigation**.

6.7 An **Investigation** shall not of itself result in consequences for the **User** under the **Distribution Code** or **Connection Agreement**.

6.8 These provisions shall be without prejudice to **DNO's** rights of access under any other document or agreement.

7 Testing at the request of a User

7.1 A **User** shall, subject to paragraph 7.2, be entitled, by notice in writing setting out the desired procedure (or, if the **DNO** acting reasonably so agrees, taking into account the nature of the test being requested, by oral request specifying the desired procedure, such oral request to be confirmed in writing as soon as reasonably practicable thereafter), to request the **DNO** to assist it in carrying out a test on any of its **Plant**

and/or **Apparatus** as such **User**, acting reasonably in accordance with **Prudent Operating Practice**, may request.

7.2 The **DNO** shall be entitled to refuse to conduct any test requested under paragraph 7.1 (or refuse to conduct it in accordance with the procedure or at the time requested) if, in the **DNO's** reasonable opinion, it is unsafe for the **Distribution System** to conduct such a test or if it is otherwise not practicable to do so (or to do so in accordance with the procedure or at the time requested) for **Distribution System** or any other reasons, including if all reasonable costs and expenses of the **DNO** are not, in the **DNO's** reasonable view, adequately covered by the **User**. The **DNO** may only continue to refuse to conduct the test (or to conduct it in accordance with the procedure) for so long as these reasons continue.

7.3 If the **DNO** refuses to conduct the test, either at all or in accordance with the procedure or at the time requested, the **DNO** and the **User** may discuss an alternative form of test or procedure for conducting the test or timing of the test to see whether agreement can be reached.

7.4 If the **DNO** agrees to the test taking place, to the procedure for conducting the test and to the time of the test, either in response to the original request or following the discussion referred to in paragraph 7.3, it will notify the **User** accordingly.

7.5 If the **DNO** does not (following the discussion referred to in paragraph 7.3) agree to the test taking place, then it will not take place, provided that as indicated in paragraph 7.2 above, the **DNO** may only continue to refuse to conduct the test for so long as the reasons set out in that paragraph continue to apply.

7.6 If the **DNO** does not (following such discussion) agree to the procedure for conducting the test, then if the test is to go ahead, the **DNO's** requirements relating to the procedure will prevail, unless the reasons set out in paragraph 7.2 above no longer continue.

7.7 If the **DNO** does not (following such discussion) agree to the timing of the test, then if the test is to go ahead, the **DNO's** requirements relating to timing will prevail.

7.8 The **DNO** may then, in accordance with the agreed (or otherwise settled) procedure and timing and if agreed by the **User**, send representatives to the **User Site** in order to witness the test.

7.9 The **User** must, if agreed under paragraph 7.8 above, allow the **DNO** witnesses access to all relevant parts of its **User Site** in order to witness such a test.

7.10 The **DNO** shall take all reasonable steps to ensure that any representatives that it sends to the **User Site** pursuant to paragraph 7.9 above comply at all times with all relevant safety requirements of the User of which they are made aware and with all reasonable directions of the User and (but subject to paragraph 7.8) any reasonable restrictions on access whilst at the **User Site** in question.

8 Commissioning/Acceptance Testing

1.1 The **Connection Conditions** reflect the **Commissioning/Acceptance Testing** which will be required under each **Connection Agreement** for **User's Equipment** prior to

being certified as acceptable to be and remain connected (or to be reconnected) to the **Distribution System** and for modifications to existing **User's Equipment**.

Distribution Metering Code

Table of Contents

1 Introduction

1.1 This **Distribution Metering Code** sets out the requirements for **Metering** and for **Generator Metering Circuits** for **Apparatus** with a rating of 70 kVA and above connected to the **Distribution System**. It covers in relation to such **Apparatus**:

(a) **Metering** for **Active** and **Reactive Energy**; and

(b) **Generator Metering Circuits**.

The **Distribution Metering Code** deals with **Metering** at R**elevant Connection Sites**, as further provided in this **Distribution Metering Code**.

1.2 The **Distribution Metering Code** does not apply in respect of **Imports** below 70kVA at **Power Generating Facilities** and in such circumstances the relevant **Connection Agreement** will specify the **Metering** requirements.

1.3 Prior to the introduction of the **Single Electricity Market** (**SEM**) on the Island of Ireland on 1 November 2007, the requirements for **Metering** for **Users**, whether they were connected to the **Transmission System** or to the **Distribution System**, were contained in the **Grid Code Metering Code**.

1.4 With the full licence separation of the **TSO** from the **DNO** at the introduction of the **SEM** in November 2007, the **DNO** became responsible for a separate **Distribution Code**.

1.5 The **Grid Code Metering Code** continues to specify the metering requirements for:

(a) **Apparatus** connected to the **Transmission System**; and

(b) **Power Generating Facilities** which are subject to **Central Dispatch** and are connected to the **Distribution System**.

1.6 **Users** shall, in respect of **Plant** and **Apparatus** described in paragraph 1.5(b) above, also be required to comply with the requirements of the **Grid Code Metering Code**. Unless otherwise specifically provided in this **Distribution Code**, the provisions of both the **Grid Code** and the **Distribution Code** have been designed so that compliance with the metering requirements in the **Grid Code Metering Code** should ensure that there will be compliance with the relevant parts of this **Distribution Metering Code**.

1.7 In addition to the requirements for **Metering** and **Generator Metering Circuits** set out in this **Distribution Metering Code** there may be provisions in each of the **Trading and Settlement Code**, **Market Registration Code** ("**MRC**"), Schedule 7 of the **Order**, **Connection Agreement**, **Grid Code** and other industry documentation that apply to certain **Users** connected to the **Distribution System** in respect of their **Apparatus**.

1.8 The **Distribution Metering Code** specifies the requirements in respect of:

(a) technical, design and operational criteria;

(b) accuracy and calibration;

(c) approval, certification and testing; and

(d) meter reading and data management.

1.9 The **Distribution Metering Code** is divided into:

- the **Main Code**;
- the **Sub-Codes**; and
- the **Agreed Procedures**.

1.10 In general, the **Main Code** contains the broader principles applying to **Metering** and the **Sub-Codes**, **Agreed Procedures** and, in certain cases, the relevant **Retail Market Procedures** under the **MRC** contain the more detailed technical requirements and/or procedures. The **Sub-Codes**, **Agreed Procedures** and relevant **Retail Market Procedures** cover, amongst other things, the following matters:

(a) **Metering Sub-Codes**:

Sub Code No	***Subject***
1	For the **Metering** of circuits > 100 MVA
2	For the **Metering** of circuits > 10 MVA and ≤ 100 MVA
3	For the **Metering** of Circuits > 1 MVA and ≤ 10 MVA
4	For the **Metering** of Circuits ≥ 70 kVA and ≤ 1 MVA

(b) **Agreed Procedures**

AP No	***Subject***
AP1	Maintenance, testing, inspection and sealing of **Metering** (Generation) and **Generator Metering Circuits**.
AP2	Maintenance, testing, inspection and sealing of **Metering**.
AP3	Meter advance reconciliation (Generation).
AP4	Validation, estimation and substitution rules for half-hourly data

2 Objectives

2.1 The objective of the **Distribution Metering Code** is to ensure that **Metering** requirements are specified for **Users' Apparatus** with a rating of 70 kVA and above connected to the **Distribution System**.

3 Scope

3.1 This **Distribution Metering Code** applies to the **DNO** and to **Users**, which in the **Distribution Metering Code** means:

(a) **Generators** in respect of **Apparatus** with a rating of 70kVA and above connected to the **Distribution System**; and

(b) **Suppliers** in respect of the supply they make to their **Demand Customers** whose **Apparatus** is of a rating of 70 kVA and above connected to the **Distribution System**.

4 Procedure

4.1 **Active** and **Reactive Energy** and **Active** and **Reactive Power Exported** or **Imported** by **Users** shall be metered as required by this **Distribution Metering Code**.

4.2 **Metering** must be designed and installed so as to measure both **Exports** to and **Imports** from the **Distribution System** and, in the case of **Generating Unit(s)** registered under the **Trading and Settlement Code**, output from each **Generating Unit**. Where a number of **Generating Units** have been registered as one unit under the **Trading and Settlement Code** the combined output, rather than the individual outputs, from those **Generating Units** may with the agreement of the **DNO** be measured with a single set of **Metering**.

4.3 Data from **Metering** required under this **Distribution Metering Code** shall be collected:

(a) in the case of **Users** not subject to **Central Dispatch**, by the **DNO**; and

(b) in the case of **Users** subject to **Central Dispatch**, by the **TSO,**

in each case through the relevant **DNO Data Collection System**.

4.4 Description of **Metering**:

(a) **Metering** subject to this **Distribution Metering Code** shall comply with the requirements set out in the relevant **Metering Sub-Code**.

(b) All **Metering** for **Apparatus** connected to the **Distribution System** which is required to comply with the **Grid Code Metering Code** shall be compatible with the **TSO Data Collection System**.

(c) All **Generator Metering Circuits** must be compatible with the relevant **Metering**.

5 Ownership and Meter Responsible Person

5.1 All **Metering** shall be owned by the **DNO**.

5.2 The **DNO** shall ensure that all such **Metering** complies with this **Distribution Metering Code**, other than:

(a) all **Metering** relating to **Demand Customers** which shall, for the purposes of this **Distribution Metering Code**, be the responsibility of the relevant **Supplier**.

(b) all **Generator Metering Circuits** which shall, for the purposes of this **Distribution Metering Code**, be the responsibility of the **Generator** which operates the **Generating Unit** to which they relate; and

(c) all **Metering** relating to **Interconnectors**, responsibility for which shall be governed by the provisions of the relevant **Interconnection Agreement**.

The **DNO** or the **User** responsible for **Metering** shall be known in this **Distribution Metering Code** as the **Meter Responsible Person** in respect of such **Metering**.

5.3 **Metering**

(a) Each of the **DNO** and each **User** acting in its capacity as a **Meter Responsible Person** or as a **Generator** shall, by the date such person becomes bound by this **Distribution Metering Code** (and in respect of that **Metering** or those **Generator Metering Circuits** for which it is responsible), ensure such **Metering** or **Generator Metering Circuits** are properly installed and that they comply with the requirements of this **Distribution Metering Code**.

(b) Details of such **Metering** or **Generator Metering Circuits** shall be provided by the relevant **Meter Responsible Person** or **Generator** to the **DNO** on request for the purposes of maintaining the register pursuant to paragraph 9.5. Maintenance and replacement of **Generator Metering Circuits** in the ordinary course shall be the responsibility of the relevant **Generator**.

5.4 Position

5.4.1 All current and voltage transformers associated with **Metering** must be installed as close as reasonably practicable to the **Connection Point** taking into account physical location and cost.

5.4.2 CTs and VTs which are part of **Generator Metering Circuits** must be installed in positions which will enable the measurement of **Settlement Values**.

5.4.3 **Generator Metering Circuits** and **Metering** shall comply with the applicable sections of **Sub-Codes** Nos. 1 to 4.

6 Data Collection

6.1 **DNO**

The **DNO** shall have the right to collect data relating to **Active Energy** and **Reactive Energy Imported** and **Exported** by remote interrogation (either direct or through the **TSO**) or manual on-site interrogation in accordance with the terms of this **Distribution Metering Code**.

6.2 **Generators**

For the purposes of remote interrogation the **DNO** may use its own data communications network or failing this, shall enter into, manage and monitor contracts to provide for the maintenance of all data links by which data is passed from **System Data Collectors** to the **DNO**. In the event of any fault or failure on such

communication lines or any error or omission in such data the **DNO** shall, if possible, retrieve such data by manual on-site interrogation in accordance with **Agreed Procedure** No.4 or, as the case may be, **Retail Market Procedure** MP NI 105 failing which it shall estimate the same in accordance with **Agreed Procedure** No.4 or **Retail Market Procedure** MP NI 105a as appropriate.

6.3 Each of the **DNO** and all **Users** shall use communications protocols in relation to **Metering** in accordance with the relevant **Sub-Code**.

7 Accuracy

Metering shall be accurate within the prescribed limits set out in the relevant **Sub-Codes**. These prescribed limits shall be applied after adjustments have been made in accordance with the relevant **Sub-Code** to compensate for any errors due to measuring current and voltage transformers and connections thereto and/or due to **Generator Metering Circuits**.

8 Calibration

Each **Meter Responsible Person** shall ensure that all **Metering** for which it is responsible and each **Generator** shall ensure that all **Generator Metering Circuits** for which it is responsible shall be calibrated or compensated in accordance with this **Distribution Metering Code** in order to meet the accuracy requirements in the **Sub-Codes**. The **Meter Responsible Person** in the case of **Metering** or the **DNO** in the case of **Generator Metering Circuits** shall be granted access to such **Metering** or **Generator Metering Circuits** by the relevant **User** upon reasonable notice and at reasonable times, in order to make or inspect any adjustments to them and to attend any tests or inspection of them required pursuant to this **Distribution Metering Code**.

9 Proper Order, Testing, Sealing and Reading

9.1 Proper Order:

(a) Each **Meter Responsible Person** shall at its own cost and expense keep in good working order, repair and condition all **Metering** in respect of which it is the **Meter Responsible Person** to the extent necessary to ensure the correct recording and transmission of the requisite data relating to or in respect of the quantity of **Active** and **Reactive Energy** measured by the relevant **Metering**.

(b) Each **Generator** shall at its own cost and expense keep in good working order, repair and condition all **Generator Metering Circuits** for which it is responsible.

9.2 Testing:

(a) Any new or replacement meters shall be calibrated prior to installation in accordance with the provisions of the relevant **Sub-Code**.

(b) Any new, replacement or modified **Metering** shall be tested by the **Meter Responsible Person** as soon as is reasonably practicable after installation or modification of such **Metering**. **Metering** for consumers will be tested in accordance with the Meters (Certification) Regulations (NI) 1998.

(c) No less frequently than every five years (or more frequently if required by the relevant **Sub-Code**) each **Meter Responsible Person** shall carry out a periodic calibration of all **Metering** in respect of which it is the **Meter Responsible Person**.

(d) The **Meter Responsible Person** in respect of **Metering** at a **Power Generating Facilities** shall give the **DNO** or (in the case of **Metering** of which the **DNO** is the **Metering Responsible Person**), the **Generator** at least one month's prior written notice of a routine test and 5 **Business Days'** prior written notice in the case of every site test of new, replacement or modified **Metering**. The notice must state the date, time, work required and estimated duration of every such test except where such test is carried out as a result of an emergency or equipment failure in respect of **Metering** which is already in service.

(e) The **DNO** or the **Generator**, as the case may be, shall have the right to attend any such test should it so require. Any such test shall comply with the relevant **Sub-Code**.

(f) If the **DNO** or any **User** has reason to believe that **Metering** or **Generator Metering Circuits** are not performing properly or within the prescribed limits of accuracy referred to in the relevant **Sub-Code** then such person (where it is not the **DNO**) shall promptly notify the **DNO** accordingly. An ad-hoc test may then be arranged which will only be chargeable to the requesting party if no fault is found.

(g) The costs and expenses of testing carried out under paragraph 9.2(b) and calibration carried out under paragraph 9.2(c) shall be borne by the **Meter Responsible Person**. The costs and expenses of testing carried out under paragraph 9.2(f) shall to the extent that testing reveals no fault, be borne by the party requesting such test and, to the extent that such test reveals faults, by the **Meter Responsible Person**.

(h) If all or any part of a **Generator Metering Circuit** is replaced, the relevant **Generator Metering Circuit** shall be recalibrated if calibration is possible. If required, the **DNO** and the **Generator** shall agree any change that may be necessary to the existing compensation for that **Generator Metering Circuit**.

(i) Calibration certificates for test equipment shall be made available by the **DNO** for inspection by the relevant **Generator** and the relevant **User**.

9.3 Testing: General

(a) Any testing of any **Metering** or **Generator Metering Circuits** will be carried out by the **Meter Responsible Person** in the case of **Metering**, or by the **Generator** in the case of **Generator Metering Circuits**, on the relevant **Metering** or **Generator Metering Circuits** mounted in their operational position.

(b) Both the **Generator** and the **Meter Responsible Person** and (where the **DNO** is not the **Meter Responsible Person**) the **DNO** shall have the right to attend all such tests. All testing will be carried out in accordance with the relevant **Sub-**

Code. Any breaking of seals and sealing on **Metering** will be carried out in accordance with **Agreed Procedure** No.1 or, as the case may be, **Agreed Procedure** No. 2. The test performance of any **M etering** or **Generator Metering Circuits** shall be compared with calibrated test equipment by one of the following methods:

(i) injecting into the measuring circuits (i.e. excluding the primary current and voltage transformers) and comparing the readings or records over such period as may reasonably be required by the **DNO** or, where a **Generator** has instigated the test, by that **Generator** to ensure a reliable comparison; or

(ii) where practicable, operating the calibrated test equipment from the same primary current and voltage transformers as the meter under operating conditions. The readings or recordings of the meter and the calibrated test equipment shall be compared over such period as may reasonably be required by the **DNO** or, where an **Generator** has instigated the test, by that **Generator** to ensure a reliable comparison; or

(iii) in any other circumstances, such other method as may be reasonably specified by the **DNO** or, where a **Generator** has instigated the test, by that **Generator**.

9.4 Test Failures

(a) Any meter which fails any test whilst in its operational position shall be removed by the **Meter Responsible Person** forthwith and tested by the **DNO** under laboratory conditions in accordance with the relevant **Sub-Code** in the presence of the **Meter Responsible Person** or the **Generator** if either wishes to attend. The **DNO** shall give the **Meter Responsible Person** or the **Generator**, as the case may be, prior notice of such test.

(b) For meters removed in accordance with paragraph 9.4(a) on circuits that are required to remain in service either:

(i) the meter shall be replaced by the **Meter Responsible Person** forthwith with a previously recalibrated meter suitably prepared and compensated for the circuit; or

(ii) where the **Metering** includes both main and check meters for the affected circuit, and the meter (main or check) which is to remain on site is within its calibration period, such other meter may be removed provided it is returned to site or replaced within 10 **Business Days**.

(iii) In such circumstances where the remaining meter is the check meter it shall, for all estimation or retrieval purposes, be regarded as the main meter until replacement or return to site of the main meter.

9.5 Records:

(a) Each **Meter Responsible Person** shall at its own cost and expense maintain a register in relation to **Metering** for which it is the **Meter Responsible Person**.

(b) Each **Generator** shall at its own cost and expense maintain a register in relation to **Generator Metering Circuits** for which it is responsible.

(c) Each such register shall detail any relevant **Compensation Factors**, specification details, e.g. serial number and accuracy class, and all relevant matters as may be required by the relevant **Sub-Code** relating to testing and calibration including the dates, location and results of any tests, readings, adjustments or inspections carried out, any temporary or permanent replacement of meters and the dates on which any seal was applied or broken, the reason for any seal being broken and the persons carrying out and attending any such tests, readings, inspections or sealings. Such records shall also include any other details as may be reasonably required by the **DNO**.

(d) Any such records shall be complete and accurate and retained for a minimum period of 7 years whilst the **Metering** or **Generator Metering Circuit** continues to be in service at the **Relevant Connection Site** and for 12 months or such longer period as may be required under any other relevant industry document following the permanent removal of the relevant **Metering** or **Generator Metering Circuits**.

(e) Any data which forms part of such records shall be made available to the **Generator** in the case of **Metering** and the **DNO** in the case of **Generator Metering Circuits**. Copies of the results of all manual readings, adjustments, tests and inspections shall be provided to the **Meter Responsible Person** or **Generator** in accordance, where appropriate, but without limitation, with the **Agreed Procedures**.

(f) Each **Meter Responsible Person** shall on request pass such records or copies of the same to its successor as **Meter Responsible Person** in relation to any **Metering**.

9.6 Sealing:

(a) All **Metering** as is capable of being made secure shall be sealed by or on behalf of each **Meter Responsible Person** and either the **DNO** or the **Generator** as is appropriate and following any test or inspection thereof in accordance with **Agreed Procedure** No.1 or, as the case may be, **Agreed Procedure** No. 2 except, where sealing is impractical in the reasonable opinion of such **Meter Responsible Person** and either the **DNO** or the **Generator** as is appropriate having regard to the physical and electrical configuration at each **Relevant Connection Site**.

(b) Each **Generator** and the **DNO** shall make arrangements for all **Generator Metering Circuits** as are capable of being made secure to be sealed by or on its behalf in accordance with **Agreed Procedure** No. 1, except where impractical in the reasonable opinion of the relevant **Generator** and the **DNO** having regard to the physical and electrical configuration at each **Relevant Connection Site**.

(c) The extent and nature of the sealing arrangements shall be agreed by the **DNO** and the **Generator** at the design stage of the main connection.

(d) No seal applied pursuant to this **Distribution Metering Code** shall be broken or removed except in the presence of or with the prior consent of the **DNO** or the **User** affixing the seal or on whose behalf the seal has been affixed unless it is necessary to do so in circumstances where both main and check meters are malfunctioning or there occurs a fire or other similar hazard and such removal is essential and such consent cannot be obtained (provided that the person which has affixed the seal and which has not given such consent shall be informed forthwith thereafter). Where verbal consent is given it must be confirmed in writing forthwith.

(e) Neither the **DNO** nor the relevant **User** shall incur any liability under this **Distribution Metering Code** in the event it cannot perform any of its duties hereunder due to any such consent required by paragraph 9.6(d) being withheld save that it shall promptly inform the **DNO** and the relevant **Meter Responsible Person** or **Generator** accordingly.

(f) Each **User** shall control the issue of its own seals and sealing pliers, and shall keep an accurate register of all such pliers and the authorised persons to whom they are issued.

(g) Each seal must be uniquely identified in a format previously agreed with the **DNO**. A seal application and removal record must be maintained and signed off by both parties.

9.7 Inspection and Readings:

(a) The **DNO** shall ensure that all meters forming part of **Metering** which is subject to the terms of this **Distribution Metering Code** are inspected and read by on-site interrogation by it or on its behalf not less than once every 5 years and shall give the **Meter Responsible Person** or the **Generator** at least 5 **Business Days'** prior notice thereof or such shorter period as the **DNO** and the relevant **User** may agree.

(b) A failure to notify in accordance with paragraph 9.7(a) shall invalidate the results of any such inspection or reading. Each reading shall be taken at, or as close as is practicable to, the end of a **Settlement Period** (as that term is defined in the **Trading and Settlement Code**).

(c) The **DNO** shall keep written reports of all such inspections and readings and provide copies to the **Meter Responsible Person** or the **Generator** for the purposes of paragraph 9.5(a). Any resulting discrepancies will be dealt with as provided in the relevant **Agreed Procedure**.

(d) The **Meter Responsible Person** or **Generator**, as the case may be shall have the right to attend any such inspection and reading although the failure to attend shall not prevent such inspection or reading taking place nor invalidate its results. The representative of the **Generator** or **Meter Responsible Person** shall acknowledge the results of any such inspection or reading in the manner required by the **Agreed Procedure**.

10 Access

10.1 Each **User** hereby agrees to grant to each other **User** and to the **DNO**, and the **DNO** hereby agrees to grant to each **User**, its employees, agents and contractors and persons duly authorised by them (each an "**Invitee**") full right to enter upon and through and remain upon any part of such person's property to the extent necessary for the purposes of this **Distribution Metering Code** subject to the other provisions of paragraph 10. Each person so granting access must further ensure that any consents or other forms of approval of third parties required in respect of such access have been correctly obtained and remain valid at the time of such access including, if appropriate, rights of access across third party land.

10.2 Each of the **DNO** and each **User** shall ensure, so far as it is able, that physical access to **Metering** and **Generator Metering Circuits** is, where practicable, restricted to personnel who are required to have such access for the proper performance of their duties and have received permission for such access. A record of any such access shall be maintained by the **DNO** or the **User**, as the case may be, on whose land the **Metering** or **Generator Metering Circuits** are positioned, with copies provided to the **Meter Responsible Person** and the **DNO** pursuant to paragraph 9.5(f). In addition all **Metering** and **Generator Metering Circuits**, where practicable, must be made secure, if necessary by making the lock and keys subject to similar access restrictions.

10.3 Subject to any other arrangements which may be agreed between the relevant **User** and the **DNO** or another **User**, as the case may be, the right of access provided for in paragraph 10.1 includes the right to bring on to such property such vehicles, plant, machinery and maintenance or other materials as shall be necessary for the purposes of this **Distribution Metering Code**.

10.4 Each of the **DNO** and each **User** shall ensure that any particular authorisation or clearance for any **Invitee** which is required to be given to ensure access by such **Invitee** is available on the arrival of such **Invitee** at the **Relevant Connection Site**.

10.5 Each of the **DNO** and each **User** shall ensure that all reasonable arrangements and provisions are made and/or revised from time to time as and when necessary or desirable to facilitate the safe exercise of any right of access granted pursuant to paragraph 10.1 with the minimum of disruption, disturbance and inconvenience. Such arrangements and provisions may, to the extent that the same is reasonable, limit or restrict the exercise of such right of access and/or provide for any of the **DNO** and each **User** to make directions or regulations from time to time in relation to a specified matter.

10.6 Matters to be covered by such arrangements and/or provisions include:

(a) the identification of the relevant **Metering** or **Generator Metering Circuits**;

(b) the particular access routes applicable to the land in question having particular regard for the weight and size limits on these routes;

(c) any limitations on times of exercise of the right of access;

(d) any requirements as to prior notification and as to authorisation or security clearance of individuals exercising such right of access and procedures for obtaining the same;

(e) the means of communication to the **Invitee** of any relevant directions or regulations made by the person granting access; and

(f) the identification of and arrangements applicable to personnel exercising the right of access granted by paragraph 10.1; and

(g) safety procedures.

Each **Invitee** shall observe and comply with any such arrangements and all provisions (or directions or regulations issued pursuant thereto) made from time to time.

10.7 Each **Invitee** shall ensure that all reasonable steps are taken in the exercise of any right of access by such **Invitee** to:

(a) avoid or minimise damage in relation to the property over which it has access; and

(b) cause as little disturbance and inconvenience as possible to any of the **DNO** or any **User** as the case may be, or other occupier of such property,

and shall make good any damage caused to any such property in the course of exercise of such rights as soon as may be practicable. Subject to this, all such rights of access shall be exercisable free of any charge or payment of any kind.

10.8 For the avoidance of doubt, no **User** or the **DNO** shall incur any liability under this **Distribution Metering Code** in the event it cannot perform any of its duties hereunder due to access to **Metering** or **Generator Metering Circuits** being denied to it save that such person (where not the **DNO**) shall promptly inform the **DNO**, the relevant **Meter Responsible Person** and the **Generator** accordingly.

11 Disputes

11.1 Any dispute in relation to the following matters:

(a) siting of **Metering**;

(b) technical specifications for **Metering**, **Generator Metering Circuits** or the **DNO Data Collection System**;

(c) sealing of **Metering**;

(d) compliance of **Metering** or **Generator Metering Circuits** with technical specifications of the **Distribution Metering Code**;

(e) compensation values;

(f) such other matters as the relevant persons in dispute under this **Distribution Metering Code** may agree,

shall be referred to an **Independent Engineer** under paragraph 11.2.

11.2 The parties to a dispute under this paragraph 11 agree and shall procure that the **Independent Engineer** shall act as an expert and not as an arbitrator and shall decide those matters referred or reserved to him under this paragraph 11 by reference to Good Industry Practice using his skill, experience and knowledge and with regard to such other matters as the **Independent Engineer** in his sole discretion considers appropriate. All references to the **Independent Engineer** shall be made in writing by either party with notice to the other being given contemporaneously as soon as reasonably practicable and in any event, within 14 days of the occurrence of the dispute to be referred to the **Independent Engineer**. The parties shall promptly supply the **Independent Engineer** with such documents and information as he may request when considering such question. The **Independent Engineer** shall use his best endeavours to give his decision upon the question before him as soon as possible following its referral to him and in any event within 21 days of such referral. The fees and expenses of the **Independent Engineer** shall be shared equally the parties to the dispute. The parties to the dispute expressly acknowledge that submission of disputes under this paragraph 11 for resolution by the **Independent Engineer** does not preclude subsequent submission of disputes for resolution by arbitration as provided for in the **Distribution Code**. Pending any such submission the parties shall treat the **Independent Engineer's** decision as final and binding. The **Independent Engineer** will be a Member of the Association for Consultancy and Engineering (ACE) and shall be agreed between the parties within 7 days of a dispute being referred or such other period as may be agreed between the parties to the dispute. Failing agreement it shall be referred to the President of the Institution of Electrical Engineers who shall nominate the **Independent Engineer**.

11.3 Any other dispute under this **Distribution Metering Code** shall be dealt with in accordance with the disputes procedure in the relevant **Connection Agreement**.

11.4 Any testing of **Metering** or **Generator Metering Circuits** required to settle a dispute will be carried out in accordance with paragraphs 9.3 and 9.4.

11.5 Notwithstanding paragraphs 11.1 to 11.4, any dispute under this **Distribution Metering Code** in relation to a matter that is also subject to the dispute resolution procedures contained within the **Trading and Settlement Code** and the **MRC** will be dealt with in accordance with the relevant dispute resolution procedure contained within the **MRC**.

11.6 If at any time any **Metering** equipment is destroyed or damaged or otherwise ceases to function, or is found to be outside the prescribed limits of accuracy referred to in the **Sub-Codes**, the **DNO** will promptly adjust, renew or repair the same. If at any time any **Metering** circuit not under the ownership of the **DNO** is destroyed or damaged or otherwise ceases to function, or is found to be outside the prescribed limits of accuracy referred to in the **Sub-Codes**, the **Generator** will promptly adjust, renew or repair the same. In the event that a **Generator** cannot or does not comply with its obligations to repair, adjust or replace or renew any defective component, the **DNO** shall have the right to carry this out and to recover its own costs and expenses from the **Generator**.

12 Information

12.1 Where a relevant **User** has an agreement with the **DNO** to receive electronic data from **Metering**, such **User** shall install such computer equipment as may be necessary for such purpose and which shall be compatible with such **Metering** and shall comply with any relevant requirement of the **Agreed Procedures**. Each such **User** shall be responsible for its own computer equipment and communication lines.

12.2 Each **Generator** shall have the right to receive electronic data from **Metering** in respect of which it is the **Generator**. The **DNO** shall not, without good cause, interrupt or otherwise disturb such electronic data. The **Generator** shall be responsible for the maintenance of any communication lines from the **Generator** Data Collector to the relevant **Generator**.

12.3 **Demand Customers** shall not have the right to receive electronic data files for **Metering** from the **DNO** in respect of which it is the **Demand Customer**.

12.4 All **Users** shall give to the **DNO** all such information in their possession regarding **Metering** as the **DNO** shall reasonably require for the proper functioning of the Data Collection System including information regarding the dates and time periods for installation of new **Metering**, wiring diagrams, and the dates and periods when **Metering** is out of service.

13 Ownership of Metering Data

13.1 The **Meter Responsible Person** of any **Metering** shall own the data acquired therefrom. Any of the **DNO** and each **User** to whom such data relates shall at all times have the right to and is hereby authorised to have access to such data and to use such data in each case as may be permitted pursuant to this **Distribution Metering Code**.

13.2 The **Meter Responsible Person** may make a charge for the provision of such data of an amount reflecting its reasonable costs of providing such data and, if confidential, may only release such data to others to the extent required pursuant to this **Distribution Code** or as permitted by the **Connection Agreement**.

13.3 Any person subject to this **Distribution Metering Code** shall, at all times, comply with its respective obligations under all applicable Data Protection Legislation in relation to all **Personal Data** that is Processed by it in the course of performing its obligations under this **Distribution Metering Code**, including maintaining any required notification under the Data Protection Legislation. To the extent that any **Personal Data** is data that is **Processed** for a purpose set out in the data protection provisions contained within the **MRC**, any person **Processing** such data will be subject to those provisions.

14 New Connection Registration and Change of Supplier

14.1 The procedures for registration of a new connection in Northern Ireland and for a change of **Supplier** are set out in **Retail Market Procedures** MP NI 101 and MP NI 102 respectively. Additional guidance relating to these procedures is set out in the market guide(s) associated with **Retail Market Procedures** MP NI 101 and MP NI 102.

15 Notices

15.1 Any notice of a new **Meter Responsible Person** or of a change in **Meter Responsible Person** or any other communication required under this **Distribution Metering Code** to be given to the **DNO** shall if required be sent by facsimile to number: 02890 954 329, at NIE Market Services, Fortwilliam House, attention: Metering Systems Manager (with hard copy to follow by first class post) or such other facsimile number and address as may from time to time be nominated in writing by the **DNO** and, if required to be given to any other **User**, shall be sent by facsimile to such number at such address and to such person as such **User** shall nominate in writing to the **DNO** (with hard copy to follow by first class post). In the absence of nomination such communication as is required shall be sent to the registered office of such other **User**.

15.2 Any notice or other communication sent by facsimile pursuant to paragraph 15.1 shall be deemed to have been received when despatched.

15.3 A new **Meter Responsible Person** must be notified to the **DNO** at least 20 **Business Days** prior to either:

(a) the date of the intended commencement of obligations of the **Meter Responsible Person**; or

(b) the date of simultaneous termination of obligations by the existing **Meter Responsible Person** and the assumption of those obligations by the new **Meter Responsible Person**,

(as the case may be) in connection with the relevant **Metering**.

SUB-CODES

Summary of Technical Requirements for Distribution Connected Metering Systems

The **Metering System** technical requirements for Distribution connections are similar to those at Transmission level. The fundamental **Metering** attribute which must be specified for different circuit loads or generator outputs is that of meter accuracy.

A summary of these accuracy requirements is given in the table below and the **Sub-Codes** that follow provide more detailed information;

a) Technical Standards Matrix

> 100MVA		
	CTs	0.2S
	VTs	0.2
	Meters	0.2S
	Main/Check Meters	Y
	Main/Check CTs & VTs	Y
	3 Phase 4 Wire Required	Y

10-100MVA		
	CTs	0.2
	VTs	0.5
	Meters	0.5S
	Main/Check Meters	Y
	Main/Check CTs & VTs	Y
	*3 Phase 4 Wire Required	N

1-10MVA		
	CTs	0.5S
	VTs	1.0
	Meters	0.5
	Main/Check Meters	Y
	Main/Check CTs & VTs	N
	*3 Phase 4 Wire Required	N

< 1MVA		
	CTs	0.5S
	VTs	1
	Meters	2
	Main/Check Meters	N
	Main/Check CTs & VTs	N
	*3 Phase 4 Wire Required	N

b) Technical Design Considerations

Specific design details may on occasions require consideration by the **DNO** and the **User** on a case by case basis depending on the nature of the installed electrical connection and its associated plant.

If any of the above accuracy levels cannot be individually achieved e.g. due to size constraints within switchgear, it may be possible with the permission of the **DNO** to increase the accuracy of other elements such that the overall **Metering System** accuracy remains within the prescribed limits.

The burden of **Metering** CTs and VTs must be determined on a per site basis to ensure that it is adequate for the purpose. CTs must operate at between 25% and 95% of their rated burden and VTs must not exceed 95% of their rating.

* Three phase four wire **Metering** installations are required for generation or loads of greater than 100MVA. However if it is anticipated that phase energy will be imbalanced, this system of **Metering** should be used at other levels. MV metered connections are usually used for lower than 1 MW capacity, are considered unbalanced and therefore must be measured using three phase four wire methods of **Metering**.

The star point of **Metering** VTs must be earthed irrespective of the **Metering System** deployed.

All **Metering** CTs must be individually wired out to **Metering** equipment panels i.e. the use of common return conductors is prohibited.

SUB-CODE D1

Demand Customer Connected Load or Generation > 100MVA

Contents

1 Scope

1.1 This **Sub-Code** D1 specifies the **Metering** facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with:

(a) **Suppliers** in relation to their **Demand Customers**; and

(b) **Generating Units**.

1.2 This **Sub-Code** supplements the **Main Code** of the **Distribution Metering Code** to which reference should be made. In the event of an inconsistency between the provisions of this **Sub-Code** and the **Main Code**, the provisions of the **Main Code** shall prevail.

1.3 This **Sub-Code** should also be read in conjunction with any relevant **Agreed Procedures** and Schedule 7 of the **Order**.

1.4 This **Sub-Code** applies to circuits with a rated capacity which exceeds 100 MVA.

2 Standards

All references to industry standards given in the text of this **Sub-Code** are to versions which are current as at 1 November 2007. However, **Metering** is required to comply with the version of any such standard, equivalent or replacement which is in force at the date of installation.

3 Facilities to be Provided at Metering Points

3.1 General

Although for clarity the specification identifies separate items of equipment, nothing in this **Sub-Code** prevents the items being combined to perform the same task provided the requirements of this **Sub-Code** are met.

3.2 Meters

3.2.1 For each circuit the following energy measurements are required at or in relation to the **Connection Point**:

(a) **Active Energy** for **Import** (kWh);

(b) **Active Energy** for **Export** (kWh) (applicable to **Generators** only);

(c) **Reactive Energy** for **Import** and **Export** (kVArh).

3.2.2 The **Meter Responsible Person** shall ensure that **Metering** for the above measurements shall normally be provided on the **User's** side of the **Connection Point** in order to measure required **Settlement Values**.

3.2.3 **Active Energy Meters** (kWh)

Active Energy meters shall comply with the relevant part of BS EN 62053 (or the standard current at the date of design of such equipment) for class 0.2S meters.

3.2.4 **Reactive Energy** Meters (kVArh)

Reactive Energy meters shall comply with the relevant requirements of IEC Standard 1268 for class 2 meters.

3.2.5 The measurements will be produced using the outputs from current transformers and voltage transformers.

3.2.6 Each circuit will be provided with:

(a) main kWh meter;

(b) check kWh meter;

(c) two main kVArh meters or one bi-directional kVArh meter for lagging and leading power factors; and

(d) two check kVArh meters or one bi-directional kVArh meter for lagging and leading power factors.

Paragraph 3.2.9 deals with the situation where **Import** and/or **Export** of **Active Energy** is required at the same point where a single meter can be used.

3.2.7 If direct measurement of the required values cannot be achieved, then the required values may be calculated using values measured at other points subject to prior agreement with the **DNO** and providing the **Overall Accuracy** meets the requirements of paragraph 4.1. Where compensation is applied the values shall be recorded and supporting evidence shall be available to justify the compensation criteria.

3.2.8 Where the **Import** and/or **Export** of **Active Energy** and **Reactive Energy** is required to be measured at the same point, these functions may be combined in a single meter in which each energy flow is measured separately.

3.2.9 Meters shall be labelled in accordance with the Appendix of this Sub-Code.

3.3 Instrument Transformers

3.3.1 The terms "current transformer" (CT) and "voltage transformer" (VT) used in this **Sub-Code** do not preclude the use of other measuring techniques providing the accuracy, and also the longer term accuracy in accordance with this **Sub-Code** can be verified to the **DNO's** satisfaction.

3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the **User's** side of the **Connection Point** except where otherwise agreed with the **DNO**.

3.3.3 Where CTs and/or VTs are used, they shall meet the requirements set out in paragraphs 3.3.5 and 3.3.6 below.

3.3.4 Where CTs and/or VTs are used then a test terminal block or equivalent facility shall be provided close to the meter(s). This facility will be fitted with the **DNO** seals.

3.3.5 Current Transformers

(a) Two sets of CTs to IEC 60044-1 (or the standard current at the date of design of such equipment) with a minimum standard of accuracy class 0.2S shall be provided per circuit and shall also meet (to the extent applicable) any meter certification regulations in force at the time.

(b) Each CT secondary winding supplying a main meter shall be dedicated to **Metering** purposes only. Each CT secondary winding only supplying a check meter may be used for other purposes so long as such other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (f) below, and the **DNO** is notified of such other uses in accordance with sub-paragraph (g) below.

(c) Where a CT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way without obtaining the approval of the **DNO** in accordance with sub-paragraph (g) below.

(d) Common return leads for two or more CT secondary circuits are not permitted.

(e) Main and check meters must be connected to different CTs.

(f) The total burden on CTs shall not exceed their rating at the rated secondary current.

(g) Where any of the foregoing provisions of this paragraph 3.3.5 permit a modification to CT secondary circuits, provided that the approval of the **DNO** is sought for the modification, any such request must be made in writing to the **DNO** a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.5 and also to ensure there is no degradation of the accuracy required by paragraph 4.1.1.

3.3.6 Voltage Transformers

(a) Two VTs, or one VT with two or more secondary winding sets, to IEC 60044-2 (or the standard current at the date of design of such equipment) with a minimum standard of accuracy class 0.2 shall be provided for the **Metering** of each circuit and shall also (to the extent applicable) meet any meter certification regulations in force at the time.

(b) Capacitor VTs shall have a working burden which provides for monitoring of the integrity of each fuse and which does not exceed the maximum rating or fall below the minimum rating stipulated by the relevant manufacturer.

(c) Each VT secondary winding supplying a main meter shall be dedicated to **Metering** purposes only. Each VT secondary winding only supplying a check meter may be used for other purposes so long as other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (g) below and the **DNO** is notified of such other uses in accordance with subparagraph (h) below.

(d) Where a VT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way unless the approval of the **DNO** is obtained in accordance with subparagraph (h) below.

(e) Each meter circuit shall be fed by a separate, fused supply from the VT.

(f) Main and check meters must be connected to different VTs. If the VT supplies other equipment, separate fusing must be provided for the **Metering**.

(g) The total burden on VTs shall not exceed their rating at the rated secondary voltages.

(h) Where any of the foregoing provisions of this paragraph 3.3.6 permit a modification to VT secondary circuits, provided that the approval of the **DNO** is sought for the modification, any such request must be made in writing to the **DNO** a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.6 and also to ensure there is no degradation of accuracy as required by paragraph 4.1.1.

3.3.7 Existing Installations

For installations connected to the **Distribution System** prior to 1 January 2010 the installed instrument transformers may be used irrespective of their accuracy class providing the **Overall Accuracy** requirements as defined in paragraph 4.1 are met and also the following:

(i) in the event of a significant alteration to the primary plant (e.g. a switchgear change), new instrument transformers which comply with paragraphs 3.3.5 and 3.3.6 shall be provided;

(ii) separately fused VT supplies shall be provided for each of the following:-

(a) the main meters;

(b) the check meters; and

(c) any additional electrical burden.

3.4 Data Collectors

3.4.1 Data collectors may be either an integral part of individual circuit meters or stand alone units which collect pulses from one or more individual meters. Duplicate data collectors may also be an integral part of check meters or stand alone units. These will be provided by the **Meter Responsible Person** and used to collect, store and transmit energy values for each **Settlement Period** to a **DNO Data Collection System**.

3.4.2 The following is required:

(a) the data collectors must have sufficient data channels to store all half-hour value types necessary for settlement (e.g. kWh and kVArhA **Import** and **Export** per connection) and be capable of storing these values during failure of the AC power supply;

(b) on demand from the **DNO Data Collection System** the data collector will transfer the recorded **Settlement Values** without loss or error. The **Settlement Values** must also be transferable manually using a portable collection device (personal computer/hand held unit/removable memory module etc) of a type compatible with the system used by the **DNO**; and

(c) in the event of failure of communications with the central collection station the data collector will be capable of storing a minimum of five channels of data per connection for a minimum period of 20 days with an integrating period of 30 minutes. This 20 day period may reduce pro rata dependent on the notified demand period selected as described in paragraph 3.4.3 below. Access to the manual transfer facility will be secured from unauthorised interference.

3.4.3 The settlement period shall be selectable over the following range: 30, 15, and 1 minutes and will be notified by the **DNO**. For any selectable value in this range one **Settlement Period** shall commence on the hour and half-hour.

3.4.4 Monitoring facilities shall be provided for data collector fault conditions and to record any instances of local interrogation which changes data.

3.5 Data Collection System

3.5.1 Communications

The means of communication between the data collector and the central **DNO Data Collection System** must be secure at the remote end. Communication can be via PSTN, PTN, GPRS, GSM networks or by any other technically suitable means which has previously been agreed with the **DNO**.

3.5.2 Central Collection Station

The **DNO Data Collection System** will interrogate each remote meter or data collector. All the **DNO** operations carried out either manually or automatically

shall be protected by password protection. The **DNO Data Collection System** will synchronise the outstations during interrogation to a standard reference time. Following receipt of all data channels from the outstation the meter data will be transferred to the **DNO'**s billing and settlement systems.

3.5.3 Supply Voltage

Assured Supplies must be used where ever possible. However, where a measurement VT source is used and the outstation is storing data for more than one circuit, a voltage selector relay scheme using each circuit involved shall be provided. Local and remote phase failure indications shall be provided.

3.6 Facilities

The **Metering** equipment shall be capable of providing voltage free (clean contacts) relay outputs which accurately represent the recorded channel values for:

(a) kWh (**Import** and **Export**) and kVArh (lagging and leading).

(b) A 30 minute reset pulse.

4 Measurement Criteria

4.1 Accuracy

4.1.1 **Overall Accuracy** of Equipment

Meters shall be calibrated so as to achieve **Overall Accuracy** of **Metering** within the limits set out below. Calibration of meters shall be adjusted due to current and voltage transformer errors and/or errors due to lead electrical burdens but not for primary transformer losses. Paragraph 4.2.2 deals further with this issue.

(a) **Active Energy** Measurement

Conditions of Test	***Limits of Error at Power Factor***	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
120% to 10% inclusive	1.0	± 0.5%
Below 10% to 5% inclusive	1.0	± 0.7%
Below 5% to 1% inclusive*	1.0	± 1.5%
120% to 10% inclusive	0.5 lag and 0.8 lead	± 1.0%

* This requirement shall only apply where the energy transfers to be measured by the **Import** meter and/or the **Export** meter during normal operating conditions are such that the Rated Measuring Current will be below 5% (excluding zero) for periods equivalent to 10% or greater per annum.

(b) **Reactive Energy** Measurement

Conditions of Test	***Limits of Error at Power Factor***	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error

120% - 10% inclusive 120% - 20% inclusive	0 0.866 lag and lead	± 4.0% ± 5.0%

4.1.2 Accuracy of Time Keeping

(a) The time keeping accuracy of **Metering** equipment shall be maintained in accordance with Standard Time.

(b) The commencement of each **Settlement Period** shall be within 10 seconds of Standard Time.

(c) The duration of each **Settlement Period** shall be within ± 0.1% of the required duration, except where synchronisation has occurred in a **Settlement Period**.

4.2 Compensation for Errors

4.2.1 Compensation for Instrument Transformer Errors

Compensation shall be made for errors of current and voltage transformers and/or lead electrical burdens, if possible, in the meter calibration.

4.2.2 Compensation for **Power** Transformer and Line Losses

Where the installed **Metering** location and the **Connection Point** do not coincide then, where necessary, compensation for power transformer and/or line losses shall be provided to meet the **Overall Accuracy** at the boundary point defined in paragraph 3.2.2. Compensation shall be made in the relevant data collector and the formula for calculation shall be agreed between the **DNO** and the relevant **User**.

4.2.3 Where existing calibration records do not exist, a recalibration test shall be carried out where practicable. Values of compensation shall be recorded and evidence to justify the compensation criteria shall be made available for inspection, including all test certificates.

5 Calibration and Testing of Metering

5.1 Meters

Metering Systems shall be calibrated and tested in accordance with the relevant part of BS EN 62053 and the manufacturer's recommendations.

5.2 Current and Voltage Transformers

Measuring transformers shall be supplied with known characteristics within the requirements of paragraph 3.3 of this **Sub-Code**.

5.3 Test Access to **Metering** Equipment

Metering equipment shall be provided with sealable test terminal blocks both at the meter and if practicable at the switchgear to facilitate meter testing and current / voltage

transformer checks in situ. Test terminal block design shall be agreed in advance with the **DNO**.

5.4 Data Collectors

5.4.1 Maintenance

Data collectors must be maintained in accordance with the manufacturer's recommendations or as otherwise necessary to meet the obligations of this **Sub-Code**.

5.4.2 Testing

There is no requirement for routine tests of data collectors other than as a part of an overall **Metering System** test.

5.5 Records

The results of all tests and periodic checks shall be held as a permanent record by the **DNO** and a copy held by the **Generator**.

APPENDIX

LABELLING OF METERS FOR IMPORT AND EXPORT

1 ACTIVE ENERGY

Active Energy is considered to be **Imported** when it flows to the **User System** from the **Distribution System**. The meter(s) registering this **Active Energy** should be labelled "**Import**".

Active Energy is considered to be **Exported** when it flows from the **User System** to the **Distribution System**. The meter(s) registering this **Active Energy** should be labelled "**Export**".

Meters shall be labelled to distinguish between main and check meters.

2 REACTIVE ENERGY

Reactive Energy is considered to be **Imported** or **Exported** as follows:

Flow of Active Energy	***Power Factor***	***Flow of Reactive Energy***
Import	Lagging	**Import***
Import	Leading	Export*
Import	Unity	Zero
Export	Lagging	Export
Export	Leading	**Import**
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where **Import** for **Active Energy** is defined as in 1 above.

SUB-CODE D2

Demand Customer Connected Load or Generation greater than 10MVA to 100MVA

Contents

1 Scope

1.1 This **Sub-Code** D2 specifies the **Metering** facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with:

(a) **Suppliers** in relation to their **Demand Customers**; and

(b) **Generating Units**.

1.2 This **Sub-Code** supplements the **Main Code** of the **Distribution Metering Code** to which reference should be made. In the event of an inconsistency between the provisions of this **Sub-Code** and the **Main Code**, the provisions of the **Main Code** shall prevail.

1.3 This **Sub-Code** should also be read in conjunction with any relevant **Agreed Procedures** and Schedule 7 of the **Order**.

1.4 This **Sub-Code** applies to circuits with a rated capacity which exceeds 10 MVA and up to and including 100 MVA.

1.5 For the purposes of this **Sub-Code**, the criteria for a **Demand Customer** supply (**Import Active Energy**) to be over 10 MVA is that monthly maximum demand in each of the three months of the highest maximum demand on the **Distribution System** in each period of 12 consecutive months exceeds 10 MVA. For a new supply, a maximum demand is formally agreed between the **Demand Customer** and the **DNO** and this is periodically reviewed thereafter.

2 Standards

All references to industry standards given in the text of this **Sub-Code** are to versions which are current as at 1 November 2007. However, **Metering** is required to comply with the version of any such standard, equivalent or replacement which is in force at 1 November 2007.

3 Facilities to be Provided at Metering Points

3.1 General

Although for clarity the specification identifies separate items of equipment, nothing in this **Sub-Code** prevents the items being combined to perform the same task provided the requirements of this **Sub-Code** are met.

3.2 Meters

3.2.1 For each circuit the following energy measurements are required at or in relation to the **Connection Point**:

(a) **Active Energy** for **Import** (kWh);

(b) **Active Energy** for **Export** (kWh) (applicable to **Generators** only);

(c) **Reactive Energy** for **Import** and **Export** (kVArh).

3.2.2 The **Meter Responsible Person** shall ensure that **Metering** for the above measurements shall normally be provided on the **User's** side of the **Connection Point** in order to measure required **Settlement Values**.

3.2.3 **Active Energy Meters** (kWh)

Active Energy meters shall comply with the relevant part of BSEN 62053 (or the standard current at the date of design of such equipment) for class 0.5S meters.

3.2.4 **Reactive Energy** Meters (kVArh)

Reactive Energy meters shall comply with the relevant requirements of IEC Standard 1268 or BS EN 62053 (or the standard current at the date of design of such equipment) Part 4 for class 2 meters.

3.2.5 The measurements will be produced using the outputs from current transformers and voltage transformers.

3.2.6 Each circuit will be provided with:

(a) main kWh meter;

(b) check kWh meter;

(c) two main kVArh meters or one bi-directional kVArh meter for lagging and leading power factors; and

(d) two check kVArh meters or one bi-directional kVArh meter for lagging and leading power factors.

Paragraph 3.2.9 deals with the situation where **Import** and/or **Export** of **Active Energy** is required at the same point where a single meter can be used.

3.2.7 If direct measurement of the required values cannot be achieved, then the required values may be calculated using values measured at other points subject to prior agreement with the **DNO** and providing the **Overall Accuracy** meets the requirements of paragraph 4.1. Where compensation is applied the values shall be recorded and supporting evidence shall be available to justify the compensation criteria.

3.2.8 Where the **Import** and/or **Export** of **Active Energy** and **Reactive Energy** is required to be measured at the same point, these functions may be combined in a single meter in which each energy flow is measured separately.

3.2.9 Meters shall be labelled in accordance with the Appendix of this Sub-Code.

3.3 Instrument Transformers

3.3.1 The terms "current transformer" (CT) and "voltage transformer" (VT) used in this **Sub-Code** do not preclude the use of other measuring techniques providing

the accuracy, and also the longer term accuracy, in accordance with this **Sub-Code** can be verified to the **DNO's** satisfaction.

3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the **User's** side of the **Connection Point** except where otherwise agreed with the **DNO**.

3.3.3 Where CTs and/or VTs are used, they shall meet the requirements set out in paragraphs 3.3.5 and 3.3.6 below.

3.3.4 Where CTs and/or VTs are used then a test terminal block or equivalent facility shall be provided close to the meter(s). This facility will be fitted with the **DNO** seals.

3.3.5 Current Transformers

(a) Two sets of CTs to IEC 60044-1 (or the standard current at the date of design of such equipment) with a minimum standard of accuracy class 0.2 shall be provided per circuit and shall also meet (to the extent applicable) any meter certification regulations in force at the time.

(b) Each CT secondary winding supplying a main meter shall be dedicated to **Metering** purposes only. Each CT secondary winding only supplying a check meter may be used for other purposes so long as such other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (f) below, and the **DNO** is notified of such other uses in accordance with sub-paragraph (g) below.

(c) Where a CT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way without obtaining the approval of the **DNO** in accordance with sub-paragraph (g) below.

(d) Common return leads for two or more CT secondary circuits are not permitted.

(e) Main and check meters must be connected to different CTs.

(f) The total burden on CTs shall not exceed their rating at the rated secondary current.

(g) Where any of the foregoing provisions of this paragraph 3.3.5 permit a modification to CT secondary circuits, provided that the approval of the **DNO** is sought for the modification, any such request must be made in writing to the **DNO** a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.5 and also to ensure there is no degradation of the accuracy required by paragraph 4.1.1.

3.3.6 Voltage Transformers

(a) Two VTs, or one VT with two or more secondary winding sets, to IEC 60044-2 (or the standard current at the date of design of such equipment) with a minimum standard of accuracy class 0.5 shall be provided for the **Metering** of each circuit and shall also (to the extent applicable) meet any meter certification regulations in force at the time.

(b) Capacitor VTs shall have a working burden which provides for monitoring of the integrity of each fuse and which does not exceed the maximum rating or fall below the minimum rating stipulated by the relevant manufacturer.

(c) Each VT secondary winding supplying a main meter shall be dedicated to **Metering** purposes only. Each VT secondary winding only supplying a check meter may be used for other purposes so long as other uses do not degrade the accuracy of the check meter outside the limits required by paragraph 4.1.1 and sub-paragraph (g) below and the **DNO** is notified of such other uses in accordance with subparagraph (h) below.

(d) Where a VT circuit has an additional burden not associated with meters, this additional burden shall not be modified in any way unless the approval of the **DNO** is obtained in accordance with subparagraph (h) below.

(e) Each meter circuit shall be fed by a separate, fused supply from the VT.

(f) Main and check meters must be connected to different VTs. If the VT supplies other equipment, separate fusing must be provided for the **Metering**.

(g) The total burden on VTs shall not exceed their rating at the rated secondary voltages.

(h) Where any of the foregoing provisions of this paragraph 3.3.6 permit a modification to VT secondary circuits, provided that the approval of the **DNO** is sought for the modification, any such request must be made in writing to the **DNO** a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.6 and also to ensure there is no degradation of accuracy as required by paragraph 4.1.1.

3.3.7 Existing Installations

For installations connected to the **Distribution System** prior to 1 January 2010, the installed instrument transformers may be used irrespective of their accuracy class providing the **Overall Accuracy** requirements as defined in paragraph 4.1 are met and also the following:

(i) in the event of a significant alteration to the primary plant (e.g. a switchgear change), new instrument transformers which comply with paragraphs 3.3.5 and 3.3.6 shall be provided;

(ii) separately fused VT supplies shall be provided for each of the following:

(a) the main meters;

(b) the check meters; and

(c) any additional electrical burden.

3.4 Data Collectors

3.4.1 Data collectors may be either an integral part of individual circuit meters or stand alone units which collect pulses from one or more individual meters. Duplicate data collectors may also be an integral part of check meters or stand alone units. These will be provided by the **Meter Responsible Person** and used to collect, store and transmit energy values for each **Settlement Period** to a **DNO Data Collection System**.

3.4.2 The following is required:

(a) the data collectors must have sufficient data channels to store all half-hour value types necessary for settlement (e.g. kWh and kVArh **Import** and **Export** per connection) and be capable of storing these values during failure of the AC power supply;

(b) on demand from the **DNO Data Collection System** the data collector will transfer the recorded **Settlement Values** without loss or error. The **Settlement Values** must also be transferable manually using a portable collection device (personal computer/hand held unit/removable memory module etc) of a type compatible with the system used by the **DNO**; and

(c) in the event of failure of communications with the central collection station the data collector will be capable of storing a minimum of five channels of data per connection for a minimum period of 20 days with an integrating period of 30 minutes. This 20 day period may reduce pro rata dependent on the notified demand period selected as described in paragraph 3.4.3 below. Access to the manual transfer facility will be secured from unauthorised interference.

3.4.3 The settlement period shall be selectable over the following range: 30, 15, and 1 minutes and will be notified by the **DNO**. For any selectable value in this range one **Settlement Period** shall commence on the hour and half-hour.

3.4.4 Monitoring facilities shall be provided for data collector fault conditions and to record any instances of local interrogation which changes data.

3.5 Data Collection System

3.5.1 Communications

The means of communication between the data collector and the central **DNO Data Collection System** must be secure at the remote end. Communication can

be via PSTN, PTN, GPRS, GSM networks or by any other technically suitable means which has previously been agreed with the **DNO**.

3.5.2 Central Collection Station

The **DNO Data Collection System** will interrogate each remote meter or data collector. All the **DNO** operations carried out either manually or automatically shall be protected by password protection. The **DNO Data Collection System** will synchronise the outstations during interrogation to a standard reference time. Following receipt of all data channels from the outstation the meter data will be transferred to the **DNO'**s billing and settlement systems.

3.5.3 Supply Voltage

Assured Supplies must be used where ever possible. However, where a measurement VT source is used and the outstation is storing data for more than one circuit, a voltage selector relay scheme using each circuit involved shall be provided. Local and remote phase failure indications shall be provided.

3.6 Facilities

The **Metering** equipment shall be capable of providing voltage free (clean contacts) relay outputs which accurately represent the recorded channel values for:

(a) kWh (**Import** and **Export**) and kVArh (lagging and leading).

(b) A 30 minute reset pulse.

4 Measurement Criteria

4.1 Accuracy

4.1.1 **Overall Accuracy** of Equipment

Meters shall be calibrated so as to achieve **Overall Accuracy** of **Metering** within the limits set out below. Calibration of meters shall be adjusted due to current and voltage transformer errors and/or errors due to lead electrical burdens but not for primary transformer losses. Paragraph 4.2.2 deals further with this issue.

(a) **Active Energy** Measurement

Conditions of Test	***Limits of Error at Power Factor***	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
120% to 10% inclusive	1.0	± 1.0%
Below 10% to 5% inclusive	1.0	± 1.5%
120% to 10% inclusive	0.5 lag and 0.8 lead	± 2.0%

(b) **Reactive Energy** Measurement

Conditions of Test	Limits of Error at Power Factor	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error

120% - 10% inclusive 120% - 20% inclusive	0 0.866 lag and lead	± 4.0% ± 5.0%

4.1.2 Accuracy of Time Keeping

(a) The time keeping accuracy of **Metering** equipment shall be maintained in accordance with Standard Time.

(b) The commencement of each **Settlement Period** shall be within 10 seconds of Standard Time.

(c) The duration of each **Settlement Period** shall be within ± 0.1% of the required duration, except where synchronisation has occurred in a **Settlement Period**.

4.2 Compensation for Errors

4.2.1 Compensation for Instrument Transformer Errors

Compensation shall be made for errors of current and voltage transformers and/or lead electrical burdens, if possible, in the meter calibration.

4.2.2 Compensation for **Power** Transformer and Line Losses

Where the installed **Metering** location and the **Connection Point** do not coincide then, where necessary, compensation for power transformer and/or line losses shall be provided to meet the **Overall Accuracy** at the boundary point defined in paragraph 3.2.2. Compensation shall be made in the relevant data collector and the formula for calculation shall be agreed between the **DNO** and the relevant **User**.

4.2.3 Where existing calibration records do not exist, a recalibration test shall be carried out where practicable. Values of compensation shall be recorded and evidence to justify the compensation criteria shall be made available for inspection, including all test certificates.

5 Calibration and Testing of Metering

5.1 Meters

Metering Systems shall be calibrated and tested in accordance with the relevant part of BS EN 62053 and the manufacturer's recommendations.

5.2 Current and Voltage Transformers

Measuring transformers shall be supplied with known characteristics within the requirements of paragraph 3.3 of this **Sub-Code**.

5.3 Test Access to **Metering** Equipment

Metering equipment shall be provided with sealable test terminal blocks both at the meter and if practicable at the switchgear to facilitate meter testing and current / voltage

transformer checks in situ. Test terminal block design shall be agreed in advance with the **DNO**.

5.4 Data Collectors

5.4.1 Maintenance

Data collectors must be maintained in accordance with the manufacturer's recommendations or as otherwise necessary to meet the obligations of this **Sub-Code**.

5.4.2 Testing

There is no requirement for routine tests of data collectors other than as a part of an overall **Metering System** test.

5.5 Records

The results of all tests and periodic checks shall be held as a permanent record by the **DNO** and a copy held by the **Generator**.

APPENDIX

LABELLING OF METERS FOR IMPORT AND EXPORT

1 **ACTIVE** ENERGY

Active Energy is considered to be **Imported** when it flows to the **User System** from the **Distribution System**. The meter(s) registering this **Active Energy** should be labelled "**Import**".

Active Energy is considered to be **Exported** when it flows from the **User System** to the **Distribution System**. The meter(s) registering this **Active Energy** should be labelled "**Export**".

Meters shall be labelled to distinguish between main and check meters.

2 REACTIVE ENERGY

Reactive Energy is considered to be **Imported** or **Exported** as follows:

Flow of Active Energy	***Power Factor***	***Flow of Reactive Energy***
Import	Lagging	**Import***
Import	Leading	**Export***
Import	Unity	Zero
Export	Lagging	**Export**
Export	Leading	**Import**
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where **Import** for **Active Energy** is defined as in 1 above.

SUB-CODE D3

Demand Customer Connected Load or Generation 1MVA to 10MVA

Contents

1 Scope

1.1 This **Sub-Code** D3 specifies the **Metering** facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with:

(a) **Suppliers** in relation to their **Demand Customers**; and

(b) **Generating Units**.

1.2 This **Sub-Code** supplements the **Main Code** of the **Distribution Metering Code** to which reference should be made. In the event of an inconsistency between the provisions of this **Sub-Code** and the **Main Code**, the provisions of the **Main Code** shall prevail.

1.3 This **Sub-Code** should also be read in conjunction with any relevant **Agreed Procedures** and Schedule 7 of the **Order**.

1.4 This **Sub-Code** applies to circuits with a rated capacity which exceeds 1 MVA and up to and including 10 MVA.

1.5 For the purposes of this **Sub-Code**, the criteria for a **Demand Customer** supply (**Import Active Energy**) to be over 1 MVA is that monthly maximum demand in each of the three months of the highest maximum demand on the **Distribution System** in each period of 12 consecutive months exceeds 1 MVA. For a new supply, a maximum demand is formally agreed between the **Demand Customer** and the **DNO** and this is periodically reviewed thereafter.

2 Standards

All references to industry standards given in the text of this **Sub-Code** are to versions which are current as at 1 November 2007. However, **Metering** is required to comply with the version of any such standard, equivalent or replacement which is in force at the date of installation.

3 Facilities to be Provided at Metering Points

3.1 General

Although for clarity the specification identifies separate items of equipment, nothing in this **Sub-Code** prevents the items being combined to perform the same task provided the requirements of this **Sub-Code** are met.

3.2 Meters

3.2.1 For each circuit the following energy measurements are required at or in relation to the **Connection Point**:-

(a) **Active Energy** for **Import** (kWh);

(b) **Active Energy** for **Export** (kWh) (applicable to **Generators** only);

(c) **Reactive Energy** for **Import** and **Export** (kVArh).

3.2.2 The **Meter Responsible Person** shall ensure that **Metering** for the above measurements shall normally be provided on the **User's** side of the **Connection Point** in order to measure required **Settlement Values**.

3.2.3 **Active Energy Meters** (kWh)

Active Energy meters shall comply with the relevant part of BSEN 60653 (or the standard current at the date of design of such equipment) for class 0.5 meters.

3.2.4 **Reactive Energy** Meters (kVArh)

Reactive Energy meters shall comply with the relevant requirements of IEC Standard 1268 or BS EN 62053 (or the standard current at the date of design of such equipment) Part 4 for class 2 meters.

3.2.5 The measurements will be produced using the outputs from current transformers and voltage transformers.

3.2.6 Each circuit will be provided with:-

(a) main kWh meter;

(b) check kWh meter;

(c) two main kVArh meters or one bi-directional kVArh meter for lagging and leading power factors; and

(d) two check kVArh meters or one bi-directional kVArh meter for lagging and leading power factors.

Paragraph 3.2.9 deals with the situation where **Import** and/or **Export** of **Active Energy** is required at the same point where a single meter can be used.

3.2.7 If direct measurement of the required values cannot be achieved, then the required values may be calculated using values measured at other points subject to prior agreement with the **DNO** and providing the **Overall Accuracy** meets the requirements of paragraph 4.1. Where compensation is applied the values shall be recorded and supporting evidence shall be available to justify the compensation criteria.

3.2.8 Where the **Import** and/or **Export** of **Active Energy** and **Reactive Energy** is required to be measured at the same point, these functions may be combined in a single meter in which each energy flow is measured separately.

3.2.9 Meters shall be labelled in accordance with the Appendix of this Sub-Code.

3.3 Instrument Transformers

3.3.1 The terms "current transformer" (CT) and "voltage transformer" (VT) used in this **Sub-Code** do not preclude the use of other measuring techniques providing

the accuracy, and also the longer term accuracy, in accordance with this **Sub-Code** can be verified to the **DNO's** satisfaction.

3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the **User's** side of the **Connection Point** except where otherwise agreed with the **DNO**.

3.3.3 Where CTs and/or VTs are used, they shall meet the requirements set out in paragraphs 3.3.5 and 3.3.6 below.

3.3.4 Where CTs and/or VTs are used then a test terminal block or equivalent facility shall be provided close to the meter(s). This facility will be fitted with the **DNO** seals.

3.3.5 Current Transformers

(a) One set of CTs to IEC 60044-1 (or the standard current at the date of design of such equipment) with a minimum standard of accuracy class 0.5S5S shall be provided per circuit and shall also meet (to the extent applicable) any meter certification regulations in force at the time.

(b) Each CT secondary winding circuit supplying the meters shall be dedicated to **Metering** purposes only. CT secondary winding may supply both main and check meters as long as this does not put the overall **Metering** system accuracy value outside the limits defined in paragraph 4.1.1 and sub-paragraph (e) below.

(c) Where a CT circuit has an additional burden not associated with meters, e.g. to improve system accuracy, this additional burden shall not be modified in any way without obtaining the approval of the **DNO** in accordance with sub-paragraph (f) below.

(d) Common return leads for two or more CT secondary circuits are not permitted.

(e) The total burden on CTs shall not exceed their rating at the rated secondary current.

(f) Where any of the foregoing provisions of this paragraph 3.3.5 permit a modification to CT secondary circuits, provided that the approval of the **DNO** is sought for the modification, any such request must be made in writing to the **DNO** a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.5 and also to ensure there is no degradation of the accuracy required by paragraph 4.1.1.

3.3.6 Voltage Transformers

(a) One VT to IEC 60044-2 (or the standard current at the date of design of such equipment) with a minimum standard of accuracy class 1.00 shall

be provided for the **Metering** of each circuit and shall also (to the extent applicable) meet any meter certification regulations in force at the time.

(b) Capacitor VTs shall have a working burden which provides for monitoring of the integrity of each fuse and which does not exceed the maximum rating or fall below the minimum rating stipulated by the relevant manufacturer.

(c) Each VT secondary winding supplying the meters shall be dedicated to **Metering** purposes only. VT secondary winding may supply both main and check meters as long as this does not put the overall **Metering System** accuracy value outside the limits defined in paragraph 4.1.1 and subparagraph (f) below.

(d) Where a VT circuit has an additional burden not associated with meters e.g. to improve system accuracy, this additional burden shall not be modified in any way unless the approval of the **DNO** is obtained in accordance with sub paragraph (g) below.

(e) Each meter circuit shall be fed by a separate, fused supply from the VT.

(f) The total burden on VTs shall not exceed their rating at the rated secondary voltages.

(g) Where any of the foregoing provisions of this paragraph 3.3.6 permit a modification to VT secondary circuits, provided that the approval of the **DNO** is sought for the modification, any such request must be made in writing to the **DNO** a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.6 and also to ensure there is no degradation of accuracy as required by paragraph 4.1.1.

3.3.7 Existing Installations

For installations connected to the **Distribution System** prior to 1 January 2010, the installed instrument transformers may be used irrespective of their accuracy class providing the **Overall Accuracy** requirements as defined in paragraph 4.1 are met and also the following:

(i) in the event of a significant alteration to the primary plant (e.g. a switchgear change), new instrument transformers which comply with paragraphs 3.3.5 and 3.3.6 shall be provided; and

(ii) separately fused VT supplies shall be provided for the main and the check meters.

3.4 Data Collectors

3.4.1 Data collectors may be either an integral part of individual circuit meters or stand alone units which collect pulses from one or more individual meters. Duplicate data collectors may also be an integral part of check meters or stand

alone units. These will be provided by the **Meter Responsible Person** and used to collect, store and transmit energy values for each **Settlement Period** to a **DNO Data Collection System**.

3.4.2 The following is required:

(a) the data collectors must have sufficient data channels to store all half-hour value types necessary for settlement (e.g. kWh and kVArh **Import** and **Export** per connection) and be capable of storing these values during failure of the AC power supply;

(b) on demand from the **DNO Data Collection System** the data collector will transfer the recorded **Settlement Values** without loss or error. The **Settlement Values** must also be transferable manually using a portable collection device (personal computer/hand held unit/removable memory module etc) of a type compatible with the system used by the **DNO**; and

(c) in the event of failure of communications with the central collection station the data collector will be capable of storing a minimum of five channels of data per connection for a minimum period of 20 days with an integrating period of 30 minutes. This 20 day period may reduce pro rata dependent on the notified demand period selected as described in paragraph 3.4.3 below. Access to the manual transfer facility will be secured from unauthorised interference.

3.4.3 The settlement period shall be selectable over the following range: 30, 15, and 1 minutes and will be notified by the **DNO**. For any selectable value in this range one **Settlement Period** shall commence on the hour and half-hour.

3.4.4 Monitoring facilities shall be provided for data collector fault conditions and to record any instances of local interrogation which changes data.

3.5 Data Collection System

3.5.1 Communications

The means of communication between the data collector and the central **DNO Data Collection System** must be secure at the remote end. Communication can be via PSTN, PTN, GPRS, GSM networks or by any other technically suitable means which has previously been agreed with the **DNO**.

3.5.2 Central Collection Station

The **DNO Data Collection System** will interrogate each remote meter or data collector. All the **DNO** operations carried out either manually or automatically shall be protected by password protection. The **DNO Data Collection System** will synchronise the outstations during interrogation to a standard reference time. Following receipt of all data channels from the outstation the meter data will be transferred to the **DNO's** billing and settlement systems.

3.5.3 Supply Voltage

Assured Supplies must be used where ever possible. However, where a measurement VT source is used and the outstation is storing data for more than one circuit, a voltage selector relay scheme using each circuit involved shall be provided. Local and remote phase failure indications shall be provided.

3.6 Facilities

The **Metering** equipment shall be capable of providing voltage free (clean contacts) relay outputs which accurately represent the recorded channel values for:

(a) kWh (**Import** and **Export**) and kVArh (lagging and leading).

(b) A 30 minute reset pulse.

4 Measurement Criteria

4.1 Accuracy

4.1.1 **Overall Accuracy** of Equipment

Meters shall be calibrated so as to achieve **Overall Accuracy** of **Metering** within the limits set out below. Calibration of meters shall be adjusted due to current and voltage transformer errors and/or errors due to lead electrical burdens but not for primary transformer losses. Paragraph 4.2.2 deals further with this issue.

(a) **Active Energy** Measurement

Conditions of Test	***Limits of Error at Power Factor***	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
100% to 20% inclusive	1.0	± 1.5%
Below 20% to 5% inclusive	1.0	± 2.5%
100% to 20% inclusive	0.5 lag and 0.8 lead	± 2.5%

(b) **Reactive Energy** Measurement

Conditions of Test	***Limits of Error at Power Factor***	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
100% - 20% inclusive	0	± 4.0%
100% - 20% inclusive	0.866 lag and lead	± 5.0%

4.1.2 Accuracy of Time Keeping

(a) The time keeping accuracy of **Metering** equipment shall be maintained in accordance with Standard Time.

(b) The commencement of each **Settlement Period** shall be within 10 seconds of Standard Time.

(c) The duration of each **Settlement Period** shall be within ± 0.1% of the required duration, except where synchronisation has occurred in a **Settlement Period**.

4.2 Compensation for Errors

4.2.1 Compensation for Instrument Transformer Errors

Compensation shall be made for errors of current and voltage transformers and/or lead electrical burdens, if possible, in the meter calibration.

4.2.2 Compensation for **Power** Transformer and Line Losses

Where the installed **Metering** location and the **Connection Point** do not coincide then, where necessary, compensation for power transformer and/or line losses shall be provided to meet the **Overall Accuracy** at the boundary point defined in paragraph 3.2.2. Compensation shall be made in the relevant data collector and the formula for calculation shall be agreed between the **DNO** and the relevant **User**.

4.2.3 Where existing calibration records do not exist, a recalibration test shall be carried out where practicable. Values of compensation shall be recorded and evidence to justify the compensation criteria shall be made available for inspection, including all test certificates.

5 Calibration and Testing of Metering

5.1 Meters

Metering Systems shall be calibrated and tested in accordance with the relevant part of BS EN 62053 and the manufacturer's recommendations.

5.2 Current and Voltage Transformers

Measuring transformers shall be supplied with known characteristics within the requirements of paragraph 3.3 of this **Sub-Code**.

5.3 Test Access to **Metering** Equipment

Metering equipment shall be provided with sealable test terminal blocks both at the meter and if practicable at the switchgear to facilitate meter testing and current / voltage transformer checks in situ. Test terminal block design shall be agreed in advance with the **DNO**.

5.4 Data Collectors

5.4.1 Maintenance

Data collectors must be maintained in accordance with the manufacturer's recommendations or as otherwise necessary to meet the obligations of this **Sub-Code**.

5.4.2 Testing

There is no requirement for routine tests of data collectors other than as a part of an overall **Metering System** test.

5.5 Records

The results of all tests and periodic checks shall be held as a permanent record by the **DNO** and a copy held by the **Generator**.

APPENDIX

LABELLING OF METERS FOR IMPORT AND EXPORT

1 ACTIVE ENERGY

Active Energy is considered to be **Imported** when it flows to the **User System** from the **Distribution System**. The meter(s) registering this **Active Energy** should be labelled "**Import**".

Active Energy is considered to be **Exported** when it flows from the **User System** to the **Distribution System**. The meter(s) registering this **Active Energy** should be labelled "**Export**".

Meters shall be labelled to distinguish between main and check meters.

2 REACTIVE ENERGY

Reactive Energy is considered to be **Imported** or **Exported** as follows:

Flow of active Energy	***Power Factor***	***Flow of Reactive Energy***
Import	Lagging	**Import***
Import	Leading	**Export***
Import	Unity	Zero
Export	Lagging	**Export**
Export	Leading	**Import**
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where **Import** for **Active Energy** is defined as in 1 above.

SUB-CODE D4

Demand Customer Connected Load or Generation 70 kVA to 1MVA

Contents

1 Scope

1.1 This **Sub-Code** D4 specifies the **Metering** facilities which must be provided and certain practices that must be employed for the measurement of electrical energy flows associated with:

(a) **Suppliers** in relation to their **Demand Customers**; and

(b) **Generating Units**.

1.2 This **Sub-Code** supplements the **Main Code** of the **Distribution Metering Code** to which reference should be made. In the event of an inconsistency between the provisions of this **Sub-Code** and the **Main Code**, the provisions of the **Main Code** shall prevail.

1.3 This **Sub-Code** should also be read in conjunction with any relevant **Agreed Procedures** and Schedule 7 of the **Order**.

1.4 This **Sub-Code** applies to circuits with a rated capacity which exceeds 70 kVA and up to and including 1 MVA.

1.5 For the purposes of this **Sub-Code**, the criteria for a **Demand Customer** supply (**Import Active Energy**) to be over 70 kVA is that monthly maximum demand in each of the three months of the highest maximum demand on the **Distribution System** in each period of 12 consecutive months exceeds 70 kVA. For a new supply, a maximum demand is formally agreed between the **Demand Customer** and the **DNO** and this is periodically reviewed thereafter.

2 Standards

All references to industry standards given in the text of this **Sub-Code** are to versions which are current as at1 November 2007. However, **Metering** is required to comply with the version of any such standard, equivalent or replacement which is in force at the date of installation.

3 Facilities to be Provided at Metering Points

3.1 General

Although for clarity the specification identifies separate items of equipment, nothing in this **Sub-Code** prevents the items being combined to perform the same task provided the requirements of this **Sub-Code** are met.

3.2 Meters

3.2.1 For each circuit the following energy measurements are required at or in relation to the **Connection Point**:-

(a) **Active Energy** for **Import** (kWh);

(b) **Active Energy** for **Export** (kWh) (applicable to **Generators** only);

(c) **Reactive Energy** for **Import** and **Export** (kVArh).

3.2.2 The **Meter Responsible Person** shall ensure that **Metering** for the above measurements shall normally be provided on the **User's** side of the **Connection Point** in order to measure required **Settlement Values**.

3.2.3 **Active Energy Meters** (kWh)

Active Energy meters shall comply with the relevant part of BS EN 62053 (or the standard current at the date of design of such equipment) for class 2 meters.

3.2.4 **Reactive Energy** Meters (kVArh)

Reactive Energy meters shall comply with the relevant requirements of IEC Standard 1268 or BS EN 62053 (or the standard current at the date of design of such equipment) Part 4 for class 3 meters.

3.2.5 The measurements will be produced using the outputs from current transformers and voltage transformers.

3.2.6 Each circuit will be provided with:-

(a) main kWh meter; and

(b) two main kVArh meters or one bi-directional kVArh meter for lagging and leading power factors;

Paragraph 3.2.9 deals with the situation where **Import** and/or **Export** of **Active Energy** is required at the same point where a single meter can be used.

3.2.7 If direct measurement of the required values cannot be achieved, then the required values may be calculated using values measured at other points subject to prior agreement with the **DNO** and providing the **Overall Accuracy** meets the requirements of paragraph 4.1. Where compensation is applied the values shall be recorded and supporting evidence shall be available to justify the compensation criteria.

3.2.8 Where the **Import** and/or **Export** of **Active Energy** and **Reactive Energy** is required to be measured at the same point, these functions may be combined in a single meter in which each energy flow is measured separately.

3.2.9 Meters shall be labelled in accordance with the Appendix of this Sub-Code.

3.3 Instrument Transformers

3.3.1 The terms "current transformer" (CT) and "voltage transformer" (VT) used in this **Sub-Code** do not preclude the use of other measuring techniques providing the accuracy, and also the longer term accuracy, in accordance with this **Sub-Code** can be verified to the **DNO's** satisfaction.

3.3.2 In accordance with the principles in paragraph 3.2.2, all CTs and VTs will be fitted on the **User's** side of the **Connection Point** except where otherwise agreed with the **DNO**.

3.3.3 Where CTs and/or VTs are used, they shall meet the requirements set out in paragraphs 3.3.5 and 3.3.6 below.

3.3.4 Where CTs and/or VTs are used then a test terminal block or equivalent facility shall be provided close to the meter(s). This facility will be fitted with the **DNO** seals.

3.3.5 Current Transformers

(a) One set of CTs to IEC 60044-1 (or the standard current at the date of design of such equipment) with a minimum standard of accuracy class 0.5S shall be provided per circuit and shall also meet (to the extent applicable) any meter certification regulations in force at the time.

(b) Each CT secondary winding circuit supplying the meters shall be dedicated to **Metering** purposes only. CT secondary winding may supply both main and check meters as long as this does not put the overall **Metering** system accuracy value outside the limits defined in paragraph 4.1.1 and sub-paragraph (e) below.

(c) Where a CT circuit has an additional burden not associated with meters, e.g. to improve system accuracy, this additional burden shall not be modified in any way without obtaining the approval of the **DNO** in accordance with sub-paragraph (f) below.

(d) Common return leads for two or more CT secondary circuits are not permitted.

(e) The total burden on CTs shall not exceed their rating at the rated secondary current.

(f) Where any of the foregoing provisions of this paragraph 3.3.5 permit a modification to CT secondary circuits, provided that the approval of the **DNO** is sought for the modification, any such request must be made in writing to the **DNO** a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.5 and also to ensure there is no degradation of the accuracy required by paragraph 4.1.1.

3.3.6 Voltage Transformers

(a) One VT to IEC 60044-2 (or the standard current at the date of design of such equipment) with a minimum standard of accuracy class 11 shall be provided for the **Metering** of each circuit and shall also (to the extent applicable) meet any meter certification regulations in force at the time.

(b) Capacitor VTs shall have a working burden which provides for monitoring of the integrity of each fuse and which does not exceed the maximum rating or fall below the minimum rating stipulated by the relevant manufacturer.

(c) Each VT secondary winding supplying the meters shall be dedicated to **Metering** purposes only. VT secondary winding may supply both main and check meters as long as this does not put the overall **Metering System** accuracy value outside the limits defined in paragraph 4.1.1 and subparagraph (f) below.

(d) Where a VT circuit has an additional burden not associated with meters e.g. to improve system accuracy, this additional burden shall not be modified in any way unless the approval of the **DNO** is obtained in accordance with sub paragraph (g) below.

(e) Each meter circuit shall be fed by a separate, fused supply from the VT.

(f) The total burden on VTs shall not exceed their rating at the rated secondary voltages.

(g) Where any of the foregoing provisions of this paragraph 3.3.6 permit a modification to VT secondary circuits, provided that the approval of the **DNO** is sought for the modification, any such request must be made in writing to the **DNO** a reasonable time in advance of the modification and evidence of the value of any additional electrical burden must be made available for inspection to verify compliance with this paragraph 3.3.6 and also to ensure there is no degradation of accuracy as required by paragraph 4.1.1.

3.3.7 Existing Installations

For installations connected to the **Distribution System** prior to 1 January 2010, the installed instrument transformers may be used irrespective of their accuracy class providing the **Overall Accuracy** requirements as defined in paragraph 4.1 are met and also the following:

(i) in the event of a significant alteration to the primary plant (e.g. a switchgear change), new instrument transformers which comply with paragraphs 3.3.5 and 3.3.6 shall be provided; and

(ii) separately fused VT supplies shall be provided for the main and the check meters.

3.4 Data Collectors

3.4.1 Data collectors may be either an integral part of individual circuit meters or stand alone units which collect pulses from one or more individual meters. Duplicate data collectors may also be an integral part of check meters or stand alone units. These will be provided by the **Meter Responsible Person** and used to collect, store and transmit energy values for each **Settlement Period** to a **DNO Data Collection System**.

3.4.2 The following is required:

(a) the data collectors must have sufficient data channels to store all half-hour value types necessary for settlement (e.g. kWh and kVArh **Import**

and **Export** per connection) and be capable of storing these values during failure of the AC power supply;

(b) on demand from the **DNO Data Collection System** the data collector will transfer the recorded **Settlement Values** without loss or error. The **Settlement Values** must also be transferable manually using a portable collection device (personal computer/hand held unit/removable memory module etc) of a type compatible with the system used by the **DNO**; and

(c) in the event of failure of communications with the central collection station the data collector will be capable of storing a minimum of five channels of data per connection for a minimum period of 20 days with an integrating period of 30 minutes. This 20 day period may reduce pro rata dependent on the notified demand period selected as described in paragraph 3.4.3 below. Access to the manual transfer facility will be secured from unauthorised interference.

3.4.3 The settlement period shall be selectable over the following range: 30, 15, and 1 minutes and will be notified by the **DNO**. For any selectable value in this range one **Settlement Period** shall commence on the hour and half-hour.

3.4.4 Monitoring facilities shall be provided for data collector fault conditions and to record any instances of local interrogation which changes data.

3.5 Data Collection System

3.5.1 Communications

The means of communication between the data collector and the central **DNO Data Collection System** must be secure at the remote end. Communication can be via PSTN, PTN, GPRS, GSM networks or by any other technically suitable means which has previously been agreed with the **DNO**.

3.5.2 Central Collection Station

The **DNO Data Collection System** will interrogate each remote meter or data collector. All the **DNO** operations carried out either manually or automatically shall be protected by password protection. The **DNO** Data Collection System will synchronise the outstations during interrogation to a standard reference time. Following receipt of all data channels from the outstation the meter data will be transferred to the **DNO'**s billing and settlement systems.

3.5.3 Supply Voltage

Assured Supplies must be used where ever possible. However, where a measurement VT source is used and the outstation is storing data for more than one circuit, a voltage selector relay scheme using each circuit involved shall be provided. Local and remote phase failure indications shall be provided.

3.6 Facilities

The **Metering** equipment shall be capable of providing voltage free (clean contacts) relay outputs which accurately represent the recorded channel values for:-

(a) kWh (**Import** and **Export**) and kVArh (lagging and leading).

(b) A 30 minute reset pulse

4 Measurement Criteria

4.1 Accuracy

4.1.1 Overall Accuracy of Equipment

Meters shall be calibrated so as to achieve Overall Accuracy of **Metering** within the limits set out below. Calibration of meters shall be adjusted due to current and voltage transformer errors and/or errors due to lead electrical burdens but not for primary transformer losses. Paragraph 4.2.2 deals further with this issue.

(a) **Active Energy** Measurement

Conditions of Test	***Limits of Error at Power Factor***	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
100% to 20% inclusive	1.0	± 1.5%
Below 20% to 5% inclusive	1.0	± 2.5%
100% to 20% inclusive	0.5 lag and 0.8 lead	± 2.5%

(b) **Reactive Energy** Measurement

Conditions of Test	***Limits of Error at Power Factor***	
Current expressed as a percentage of rated measuring current	Power Factor	Limits of Error
100% - 20% inclusive	0	± 4.0%
100% - 20% inclusive	0.866 lag and lead	± 5.0%

4.1.2 Accuracy of Time Keeping

(a) The time keeping accuracy of **Metering** equipment shall be maintained in accordance with Standard Time.

(b) The commencement of each **Settlement Period** shall be within 10 seconds of Standard Time.

(c) The duration of each **Settlement Period** shall be within ± 0.1% of the required duration, except where synchronisation has occurred in a **Settlement Period**.

4.2 Compensation for Errors

4.2.1 Compensation for Instrument Transformer Errors

Compensation shall be made for errors of current and voltage transformers and/or lead electrical burdens, if possible, in the meter calibration.

4.2.2 Compensation for **Power** Transformer and Line Losses

Where the installed **Metering** location and the **Connection Point** do not coincide then, where necessary, compensation for power transformer and/or line losses shall be provided to meet the **Overall Accuracy** at the boundary point defined in paragraph 3.2.2. Compensation shall be made in the relevant data collector and the formula for calculation shall be agreed between the **DNO** and the relevant **User**.

4.2.3 Where existing calibration records do not exist, a recalibration test shall be carried out where practicable. Values of compensation shall be recorded and evidence to justify the compensation criteria shall be made available for inspection, including all test certificates.

5 Calibration and Testing of Metering

5.1 Meters

M**etering Systems** shall be calibrated and tested in accordance with the relevant part of BS EN 62053 and the manufacturer's recommendations.

5.2 Current and Voltage Transformers

Measuring transformers shall be supplied with known characteristics within the requirements of paragraph 3.3 of this **Sub-Code**.

5.3 Test Access to **Metering** Equipment

Metering equipment shall be provided with sealable test terminal blocks both at the meter and if practicable at the switchgear to facilitate meter testing and current / voltage transformer checks in situ. Test terminal block design shall be agreed in advance with the **DNO**.

5.4 Data Collectors

5.4.1 Maintenance

Data collectors must be maintained in accordance with the manufacturer's recommendations or as otherwise necessary to meet the obligations of this **Sub-Code**.

5.4.2 Testing

There is no requirement for routine tests of data collectors other than as a part of an overall **Metering System** test.

5.5 Records

The results of all tests and periodic checks shall be held as a permanent record by the **DNO** and a copy held by the **Generator**.

APPENDIX

LABELLING OF METERS FOR IMPORT AND EXPORT

1 ACTIVE ENERGY

Active Energy is considered to be **Imported** when it flows to the **User System** from the **Distribution System**. The meter(s) registering this **Active Energy** should be labelled "**Import**".

Active Energy is considered to be **Exported** when it flows from the **User System** to the **Distribution System**. The meter(s) registering this **Active Energy** should be labelled "**Export**".

Meters shall be labelled to distinguish between main and check meters.

2 REACTIVE ENERGY

Reactive Energy is considered to be **Imported** or **Exported** as follows:

Flow of active Energy	*Power Factor*	*Flow of Reactive Energy*
Import	Lagging	**Import***
Import	Leading	**Export***
Import	Unity	Zero
Export	Lagging	**Export**
Export	Leading	**Import**
Export	Unity	Zero

For the purposes of labelling of meters the conditions asterisked above will determine labelling where **Import** for **Active Energy** is defined as in 1 above.

Agreed Procedure No. 1

MAINTENANCE, TESTING, INSPECTION AND SEALING OF METERING AND GENERATOR METERING CIRCUITS

for the electricity industry in Northern Ireland

AGREED PROCEDURE No. 1

MAINTENANCE, TESTING , INSPECTION AND SEALING OF METERING AND GENERATOR METERING CIRCUITS

Contents

1 SCOPE OF PROCEDURE

1.1 This Agreed Procedure (the "Procedure") outlines the responsibilities of the DNO and the Generator with regard to notification, authorisation and witnessing of the breaking and replacement of seals on generation Metering and Generator Metering Circuits and the carrying out of routine and emergency maintenance, testing and calibration. The procedure assumes the initial placement of seals by the appropriate Parties in accordance with the Main Code.

1.2 The Procedure supplements the Main Code and the Sub-Codes of the Distribution **Metering Code** to which reference should be made. In the event of an inconsistency between the provisions of the Procedure and the Main Code or a Sub-Code the provisions of the Main Code or such Sub-Code shall prevail. The provisions of the Main Code shall prevail over the provisions of any Sub-Code.

1.3 The Procedure is part of the Distribution Code and terms and expressions defined in the Distribution Code have the same meaning in the Procedure.

2 USE OF THE PROCEDURE

2.1 The Procedure is to be used by the DNO and Generator staff to ensure that the breaking and replacement of seals and the carrying out of routine and emergency maintenance, testing and calibration on generation Metering and Generator Metering Circuits is correctly authorised and witnessed and that documentary evidence is available to that effect.

2.2 Where it is not possible to gain prior authorisation for the breaking of a seal necessitated by malfunctioning of both main and check meters on a circuit, fire or similar hazard or non-compliance by a party with its obligations under the Main Code authorisation should be sought as soon as possible after the event.

3 AMENDMENTS TO FORMS

3.1 Forms set out in the Appendices to this Procedure may be amended from time to time by the DNO upon reasonable notice to all Generators. The DNO shall also take into account reasonable comments of Generators.

4. INTERFACE AND TIMETABLE INFORMATION

Section: MAINTENANCE, TESTING AND INSPECTION OF METERING AND GENERATOR METERING CIRCUITS

Subject: Interface and Timetable Information – Maintenance, Testing, Inspection, Calibration and Sealing of Metering

REF	WHEN	ACTION	FROM/BY	TO	METHOD
EITHER:					
1a	<u>Routine Inspection, Maintenance, Testing & Calibration</u>				
	At least 5 days prior to carrying work out	Notify date, time, work required, estimated duration and request breaking of seals (as necessary)	DNO or Generator	Generator or DNO	Fax on standard form (Appendix A)
OR:					
1b	<u>Inspection, Maintenance, Testing and Calibration in an Emergency</u>				
	At the earliest opportunity	Notify, date, time, place, work required, estimated duration and request breaking of seals (as necessary)	DNO or Generator	Generator or DNO	Fax on standard form (Appendix A) or verbally
2	Prior to work being carried out (Note 1)	Grant permission to break seals (as appropriate) and notify as to attendance	Generator or DNO	DNO or Generator	Fax on standard form (Appendix A) or verbally
3	Day work carried out	Record meter readings prior to seals being broken and commencing work	DNO or Nominated Party		Manual record (Appendix B)

4. INTERFACE AND TIMETABLE INFORMATION

Section: MAINTENANCE, TESTING AND INSPECTION OF METERING AND GENERATOR METERING CIRCUITS

Subject: Interface and Timetable Information – Maintenance, Testing, Inspection, Calibration and Sealing of Metering

REF	WHEN	ACTION	FROM/BY	TO	METHOD
4a	Day work carried out	Carry out required work. Record details of work done	DNO or Generator		Manual record (Appendix A)
4b	Where possible	Witness work being carried out	Generator or DNO		
5	After work completed	Apply own seals and read meters	DNO and Generator		
6	After work completed	Check accuracy of manual record and sign to confirm work completed and seal applied	DNO and Generator		Manual record (Appendix A)
7	After work completed	Record meter readings	DNO or Generator		Manual record (Appendix B)

4. INTERFACE AND TIMETABLE INFORMATION

Section: MAINTENANCE, TESTING AND INSPECTION OF METERING AND GENERATOR METERING CIRCUITS

Subject: Interface and Timetable Information – Maintenance, Testing, Inspection, Calibration and Sealing of Metering

REF	WHEN	ACTION	FROM/BY	TO	METHOD
8	After work completed	Copy meter record sheet and work sheet and issue to other party	DNO or Generator	Generator or DNO	By hand

Note 1 In an emergency situation when it is impossible to contact the DNO or the Generator, it may be necessary to break seals prior to the granting of permission. An emergency situation is defined by the Main Code as when "both main and check meters are malfunctioning or there occurs a fire or other similar hazard and such removal (of seals) is essential". In such circumstances fax or other communication of the intent to break seals will be supplied to the DNO or Generator prior to the commencement of emergency work. The authorisation procedure to break seals must be followed retrospectively. In an emergency situation when it is impossible to await the required paperwork, verbal consent may be given. In such circumstances written consent must follow forthwith.

APPENDIX A

REQUEST TO BREAK SEALS

TO: [DNO/Generator] Date: [ ]
Tel: [ ]
Fax: [ ]

GENERATOR: SERIAL NO:

DETAILS OF WORK TO BE CARRIED OUT:

We request permission to carry out the work described below and to break such seals as are necessary. We estimate the duration of the work to be from [ ] to [ ]. The work is to be carried out at [Site] by [ ].

The description of the work is as follows:

The circuits and meters to be affected are as follows:-

CIRCUIT/METER ID	COMMENTS

FROM:

Name _____ Signature_____

Position _____ Date_____

Continued .....

COMMENTS OF RECIPIENTS:

We acknowledge receipt of your request dated [ ]. We hereby [give/withhold]* consent. Our reasons for withholding consent are [ ].

Our representative dealing with sealing is [ ]. He will/will not be attending when the work is carried out.

BY:

Name _____ Signature_____

Position _____ Date_____

CONFIRM COMPLETION OF WORK AND SEALS APPLIED:

DESCRIPTION OF COMPLETED WORK: _____

_____

_____

CONFIRMATION OF SEALING: _____

(DNO)

Name _____ Signature

Position _____ Date

(GENERATOR)

Name _____ Signature

Position _____ Date

[* Delete as appropriate]

SHEET: ____ OF
SERIAL NO: _____

APPENDIX B

METER RECORD SHEET

GENERATOR :

SITE NAME :

METER ID : _____

READING DATE :

READING TIMES : START :
FINISH :

FUNCTION	MAIN METER		CHECK METER	
	BEFORE	AFTER	BEFORE	AFTER
MWh EXPORT				
MWh IMPORT				
MVAr EXPORT				
MVAr IMPORT				

	RECORDER	GENERATOR WITNESS
NAME		
SIGNATURE		
DATE		
COMPANY		
ACTING FOR		

Agreed Procedure No. 2

MAINTENANCE, TESTING, INSPECTION AND SEALING OF METERING (DEMAND CUSTOMER)

for the electricity industry in Northern Ireland

AGREED PROCEDURE No. 2

MAINTENANCE, TESTING, INSPECTION AND SEALING OF METERING (DEMAND CUSTOMER)

Contents

SCOPE OF PROCEDURE

1.1 This Agreed Procedure (the "Procedure") outlines the responsibilities of the DNO and the Meter Responsible Person with regard to notification, authorisation and witnessing of the breaking and replacement of seals on **Demand Customer Metering** and the carrying out of routine and emergency maintenance, testing and calibration. The Procedure assumes the initial placement of seals by the appropriate Parties in accordance with paragraph 9.6 in the **Main Code**.

1.2 The Procedure supplements the Main Code and the Sub-Codes of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of the Procedure and the Main Code or a Sub-Code the provisions of the Main Code or such Sub-Code shall prevail. The provisions of the Main Code shall prevail over the provisions of any Sub-Code.

1.3 The Procedure is part of the Distribution Code and terms and expressions defined in the Distribution Code have the same meaning in the Procedure.

2 USE OF THE PROCEDURE

2.1 The Procedure is to be used by the DNO and the Meter Responsible Person to ensure that the breaking and replacement of seals and the carrying out of routine and emergency maintenance, testing and calibration on **Demand Customer Metering** is correctly authorised and witnessed and that documentary evidence is available to that effect.

2.2 Where it is not possible to gain prior authorisation for the breaking of a seal in the event of an emergency as described in paragraph 9.6(d)d of the **Main Code** or non-compliance by a party with its obligations under the Main Code, authorisation should be sought as soon as possible after the event.

2.3 A record of work and inspections carried out must be maintained in accordance with paragraph 9.5 of the **Main Code**.

2.4 Throughout this Procedure, timetables reflect the number of Business Days (BD) before or after which (as the case may be) an activity should be completed.

3 AMENDMENTS TO FORMS

3.1 Forms set out in the Appendices to this Procedure may be amended from time to time by the DNO upon reasonable notice to all relevant Parties. The DNO shall also take into account reasonable comments of relevant Parties.

4. INTERFACE AND TIMETABLE INFORMATION

Section: MAINTENANCE, TESTING, INSPECTION AND SEALING OF METERING (DEMAND CUSTOMER)

Subject: Interface and Timetable Information – Maintenance, Testing, Inspection, Calibration and Sealing of Metering.

REF	WHEN	ACTION	FROM/BY	TO	METHOD
EITHER:					
1a	Routine Inspection, Maintenance, Testing & Calibration				
	At least 15 BD prior to carrying work out	Notify date, time, work required, estimated duration and request breaking of seals (as necessary)	DNO or Meter Responsible Person	Meter Responsible Person or DNO	Fax / Post on standard form MT1/1
OR:					
1b.	Inspection, Maintenance, Testing and Calibration in an Emergency				
	At the earliest opportunity	Notify, date, time, place, work required, estimated duration and request breaking of seals (as necessary)	DNO or Meter Responsible Person	Meter Responsible Person or DNO	Fax / Post on standard form MT1/1 or verbally
	Prior to work being carried out	Acknowledge receipt of request to break seals and confirm attendance of party representative	Meter Responsible Person or DNO	DNO or Meter Responsible Person	Fax / Post on standard form MT1/2
3a.	Day work carried out	Record meter readings prior to seals being broken and commencing work	DNO or Meter Responsible Person		Manual record on standard form MT2
3b.	Where possible	Witness recording of meter readings	DNO or Meter Responsible Person		

4. INTERFACE AND TIMETABLE INFORMATION

Section: MAINTENANCE, TESTING, INSPECTION AND SEALING OF METERING (DEMAND CUSTOMER)
Subject: Interface and Timetable Information – Maintenance, Testing, Inspection, Calibration and Sealing of Metering.

REF	WHEN	ACTION	FROM/BY	TO	METHOD
4a.	Day work carried out	Carry out required work. Record details of work done.	DNO or Meter Responsible Person		Manual record on standard form MT1/2
4b.	Where possible	Witness work being carried out	Meter Responsible Person or DNO		
5a.	After work completed	Apply seals and then record meter readings.	DNO or Meter Responsible Person		Manual record on standard form MT2
5b.	Where possible	Witness recording of meter readings and application of seals	DNO or Meter Responsible Person		
	After work completed	Check accuracy of manual record and sign to confirm work completed and seal applied	DNO and Meter Responsible Person		Standard form MT1/2
	After work completed	Copy meter record sheet and work sheet and issue to other party	DNO or Meter Responsible Person	Meter Responsible Person or DNO	By hand

APPENDIX A

GUIDE TO USE OF AP2 FORMS

AP2	Description	Use Form
4.1a/b	DNO or Meter Responsible Person give notification of work to be carried out /completed on Metering.	MT1 / 1
	DNO or Meter Responsible Person acknowledge receipt of form MT1/1 and confirm attendance of representative during work.	MT1 / 2
4.3a, 4.5a	Record of meter readings before and after doing work	MT2
4.4a, 4.6	Record of work done in relation to metering	MT1 / 2

For forms completed by the Meter Responsible Person, please post to the following address:

NIE Limited (Attn: Manager, Market Operations)
Heron Avenue
Belfast BT3 9LF

or such other address and /or recipient as the DNO may notify from time to time.

Serial No.....
Page 1 of 2

MT1/1

NOTIFICATION OF WORK TO BE CARRIED OUT/COMPLETED

TO: (DNO/METER RESPONSIBLE PERSON)* _____
SITE NAME: _____
DNO CRN: _____
METERING ID: _____

DETAILS OF WORK TO BE CARRIED OUT:

Notification is hereby given to carry out work described below and to break such seals as are necessary on:-

Date: _____
We estimate the duration of work to be:- Start Time: _____
Stop Time: _____

The work is to be carried out at site by: _____
The description of the work is as follows: _____

_____

_____

The circuits and meters to be affected are as follows:-

CIRCUIT/METER SER NO.	COMMENTS

FROM: (DNO/METER RESPONSIBLE PERSON)*
Name: _____ Signature: _____
Position _____ Date: _____

(* Delete as appropriate)

Continued....

Serial No.....

MT1/2
COMMENTS OF RECIPIENTS:

We acknowledge receipt of your notification dated:

Our representative is:

and (will/will not)* be attending when the work is carried out.

FROM: (DNO/METER RESPONSIBLE PERSON)*
Name: _____ Signature: _____
Position _____ Date: _____

CONFIRM COMPLETION OF WORK AND SEALS APPLIED:

Description of completed work:

Confirmation of sealing: _____
Date of work: _____
Time work commenced: _____
Time work completed: _____

FOR DNO:

Name: _____ Signature: _____
Position _____ Date: _____

FOR METER RESPONSIBLE PERSON:

Name: _____ Signature: _____
Position _____ Date: _____

(* Delete as appropriate)

Serial No .....

Page of

MT2

METER READINGS RECORD SHEET

For multiple feeder sites use additional sheets.

METER RESPONSIBLE PERSON: _____ READING DATE: _____

SITE NAME: _____ READING TIMES: START: _____

FINISH: _____

METERING ID: _____ METER SERIAL NO(S): _____

FUNCTION	MAIN METER READING		CHECK METER READING	
	BEFORE	AFTER	BEFORE	AFTER
kWh EXPORT				
2kWh IMPORT				
kVArh EXPORT				
kVArh IMPORT				

	PARTY RECORDING	PARTY WITNESSING
NAME		
SIGNATURE		
DATE		
POSITION		
COMPANY		

Agreed Procedure No. 3

METER ADVANCE RECONCILIATION (HALF HOUR METERED GENERATION)

for the electricity industry in Northern Ireland

AGREED PROCEDURE No. 3

METER ADVANCE RECONCILIATION (GENERATION)

Contents

1 SCOPE OF THE AGREED PROCEDURE

1.1 This Agreed Procedure (the "Procedure") covers the collection and processing of tariff meter readings which are taken quarterly pursuant to paragraph 9.7 of the **Main Code** and the reconciliation of such meter readings with **Settlement Values** collected electronically and stored on the DNO Data Collection System. This reconciliation is achieved by comparing the manually read meter register readings with the accumulations recorded in the DNO Data Collection System. Any discrepancies discovered will be processed in accordance with the Trading & Settlement Code.

1.2 The Procedure seeks to ensure that any discrepancy between tariff meter register readings and Settlement Values collected electronically from such meters is identified on a regular basis such that appropriate adjustments to payments can be made.

1.3 The Procedure supplements the Main Code and the Sub-Codes of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of the Procedure and the Main Code or a Sub-Code the provisions of the Main Code or such Sub-Code shall prevail. The provisions of the Main Code shall prevail over the provisions of any Sub-Code.

1.4 The Procedure is part of the Distribution Code and terms and expressions defined in the Distribution Code have the same meaning in the Procedure.

1.5 This Procedure applies to half hour metered Generators only. The meter advance reconciliation procedures for **Demand Customers** are covered by **Retail Market Procedure** MP NI 105.

2 USE OF THE PROCEDURE

2.1 The Procedure shall be used by the DNO and staff of those Generators who are metered on a half-hourly basis who are responsible for meter advance reconciliation readings and processing.

3 AMENDMENTS TO PROFORMAS AND EXAMPLES

3.1 Proformas and examples set out in the Appendices to this Procedure may be amended from time to time by the DNO upon reasonable notice to all Generators. The DNO shall also take into account reasonable comments of Generators.

4 INTERFACE AND TIMETABLE INFORMATION

Section: METER ADVANCE RECONCILIATION (GENERATION)

Subject: Interface and Timetable Information – Reconciliation of Meter Readings with Accumulated Settlement Values

REF	WHEN	ACTION	FROM/BY	TO	METHOD
1	Annually	For each calendar month draw up a plan of the meter readings which are to take place and issue to the Generator. Such readings to be scheduled at intervals not exceeding 3 months.	DNO	Generator	Fax
2	At least 5 days before reading date	Advise the Generator of date and time for reading to take place	DNO	Generator	Fax on standard form (Appendix A)
3	Within 3 months of last reading	Read meter registers (in the presence of the Generator representative if attending) as close as is practicable to the end of a Settlement Period. Record time and date of reading and meter register values. The DNO and Generator representative sign record sheet. (Note 1)	DNO and Generator		Manual record (Appendix B)
4	Before leaving site	Sign off and hand copy of actual meter values with time and date of reading to the Generator.	DNO	Generator	Manual record (Appendix B)

Section: METER ADVANCE RECONCILIATION (GENERATION)

Subject: Interface and Timetable Information – Reconciliation of Meter Readings with Accumulated Settlement Values

REF	WHEN	ACTION	FROM/BY	TO	METHOD
5	Within 3 Business Days of meter reading	(i) Input meter register values, time and date of reading to the meter register comparison process of the DNO Data Collection System (ii) Run meter register comparison process which compares the difference between the latest actual and the previous actual reading with the electronically recorded total delivered energy for the known time interval (iii) Print out meter register comparison report (Appendix C)	DNO	Generator	On line entry to the DNO Data Collection System
EITHER:					
6a	Within 5 Business Days of meter reading	Where the relevant meter register comparison report shows a difference of less than 0.02%: - issue copy of report to the Generator (Note 2)	DNO	Generator	Fax
OR:					
6b	Within 5 Business Days of meter reading	Where meter register comparison report shows a difference of 0.02% or greater: - prepare a Meter Reconciliation Statement and issue to the Generator , together with copies of the relevant meter register comparison reports (Note 2)	Generator	DNO	

Section: METER ADVANCE RECONCILIATION (GENERATION)

Subject: Interface and Timetable Information – Reconciliation of Meter Readings with Accumulated Settlement Values

REF	WHEN	ACTION	FROM/BY	TO	METHOD
7a	Within 14 Business Days of receipt of Meter Reconciliation Statement	Review Meter Reconciliation Statement and either: (i) advise the DNO that the Meter Reconciliation Statement is agreed OR (ii) discuss areas of concern with the DNO, providing supporting evidence as necessary	Generator	DNO	
7b		Where revisions to the initial Meter Reconciliation Statement are agreed, prepare a replacement Meter Reconciliation Statement and issue to Generator	DNO	Generator	Fax
8a	On or before 15th Business Day after receipt of Meter Reconciliation Statement	Where the Meter Reconciliation Statement is agreed, indicate agreement on form and sign and return to the DNO	Generator	DNO	Fax
8b		Where the Meter Reconciliation Statement is disputed, indicate non-agreement on form and sign and return to the DNO. Immediately thereafter raise a formal dispute as per the Disputes Procedure of the PPA	Generator	DNO	Fax

Section: METER ADVANCE RECONCILIATION (GENERATION)

Subject: Interface and Timetable Information – Reconciliation of Meter Readings with Accumulated Settlement Values

Ref	WHEN	ACTION	FROM/BY	TO	METHOD
9	Within 14 days of receipt of agreed Meter Reconciliation Statement	Issue invoice for agreed payment adjustment	Generator	DNO	As per PPA
10	Within 14 days of receipt of invoice	Make payment	Generator or DNO	DNO or Generator	BACS

Note 1: time of reading shall be taken from the radio clock or data collector associated with the meter being read

Note 2: 0.02% is the maximum error due to 1 Settlement Period in 3 months (i.e. this tolerance allows for the fact that meter readings will not be taken precisely at the end of a Settlement Period).
This tolerance is in itself tighter than the relevant accuracy of the metering system (0.5%)

APPENDIX A

To: [Generator] SERIAL NO:

METER ADVANCE RECONCILIATION – NOTICE OF METER READING

Northern Ireland Electricity Limited hereby notifies the undermentioned Generator that all Generation tariff meters at the undermentioned site will be read for the purposes of meter advance reconciliation pursuant to paragraph 8.8 of the Main Code of the Northern Ireland Distribution Code on the date and at the approximate time stated below. The person(s) attending on behalf of Northern Ireland Electricity Limited is/are indicated below.

Generator:	
Site:	
DNO Representative(s):	
Date/Time	

For DNO:

Signature: _____ Name:
(in block capitals)

Position:

Date of Issue:

APPENDIX B

METER ADVANCE RECONCILIATION RECORD

SHEET: _____ OF:

GENERATOR : _____ READING DATE : _____ (DD.MM.YY)

SITE NAME : _____ READING TIME : _____ (HH.MM)

METER ID : _____ SERIAL NO :

FUNCTION	MAIN METER REGISTER READING	CHECK METER REGISTER READING
MWh EXPORT		
MWh IMPORT		
MVAr EXPORT		
MVAr IMPORT		

	DNO REPRESENTATIVE	GENERATOR WITNESS
PRINT NAME		
SIGNATURE		

APPENDIX C

Example printout for Meter Register Comparison

21/04/89 14.20 Page 1

Meter Register Comparison for file EXAMPLE

Meter Name	RTU Name	MV Nr	Reading	Factor	Identification	
	Meter Reg. Reading A/B	Value	read	Energy acquired	Difference Abs %	
METER_1	RTU_A	01	1	Meter 1		
	20/04/89	21/04/89				
	03:30	0:00				
	1551.78	2409.45	857.67	858.43	-0.76	0.088
METER_2	RTU_A	04	1	Meter 2		
	19/04/89	22/04/89				
	08:30	17:45				
	554.25	1245.76				
	3589.65	3809.02				
	1651.79	2569.45				
	857.67	857.67	1828.54	1829.01	0.47	0.025

APPENDIX D

METER ADVANCE RECONCILIATION STATEMENT

SITE NAME: _____ READING DATE:

GENERATOR: _____ SERIAL NO:

SETTLEMENT VALUE AFFECTED:

Metering Point (as appropriate)	Difference Recorded in Meter Register Comparison Report MWh
Generator Gross Meter Generator Transformer Meter Unit Transformer Meter Station Transformer Meter	
Net Settlement Value Adjustment MWh	

Associated primary transformer losses are ignored in establishing the Net Settlement Value Adjustment

For DNO:

Signed: _____ Name:
(in block capitals)

Position:

Date:

For Generator:

Signed: _____ Name:
(in block capitals)

Position:

Date: _____ AGREED/DISAGREED
(Delete as appropriate)

Agreed Procedure No. 4

VALIDATION, ESTIMATION AND SUBSTITUTION RULES FOR HALF-HOURLY DATA

for the electricity industry in Northern Ireland

AGREED PROCEDURE No. 4

VALIDATION, ESTIMATION AND SUBSTITUTION RULES FOR HALF-HOURLY DATA

Contents

1 INTRODUCTION

1.1 This Agreed Procedure (the "Procedure") describes the rules to be followed for both data validation and data estimation for Generators with remotely read half-hourly Metering.

1.2 The Procedure supplements the Main Code and the Sub-Codes of the Metering Code to which reference should be made. In the event of an inconsistency between the provisions of the Procedure and the Main Code or a Sub-Code the provisions of the Main Code or such Sub-Code shall prevail. The provisions of the Main Code shall prevail over the provisions of any Sub-Code.

1.3 The Procedure is part of the Grid Code and terms and expressions defined in the Grid Code have the same meaning in the Procedure.

1.4 This Procedure applies to half hour metered Generators only. The meter advance reconciliation procedures for **Demand Customers** are covered by **Retail Market Procedure** MP NI 105.

2 USE OF THE PROCEDURE

2.1 The Procedure shall be used by the DNO and staff of those Generators who are metered on a half-hourly basis who are responsible for meter advance reconciliation readings and processing.

3 VALIDATION OF METER DETAILS

3.1 Prior to half-hourly data being accepted and approved for settlement purposes the Meter details are validated. This occurs for new meter installations, meter changes, meters that have been re-programmed or for existing meters moving to half-hourly profiling.

4 METER ID/SERIAL NUMBER

4.1 The Meter serial number registered to the Metering installation is verified against the Meter id retrieved during Polling to ensure the correct meter has been polled.

5 METER REGISTER AND PULSE MULTIPLIERS

5.1 The meter Register Reading multiplier and the Pulse Multiplier are verified to ensure data accuracy.

6 METER DATA DATE AND TIME

6.1 The date and time held by the meter and stamped on the data collected is checked to ensure its accuracy.

7 VALIDATION OF HALF HOURLY METERING DATA

7.1 After polling each meter the half-hourly data retrieved from the meter is validated by the data collection level and the following checks are performed.

8 METER ID

8.1 Each Time a meter is polled the Electronic Serial Number of that meter is compared to the Device ID stored within the data collection level. If they do not match then no data is retrieved and the Failure is reported by the data collection level for investigation.

9 METER CHANNEL DETAILS

9.1 Each time a meter is polled the number of channels of data expected is compared against the number actually received. If they do not agree then no data is retrieved and the failure is reported by the DNO Data Collection System for investigation.

10 METER TIME

10.1 Each time a meter is polled it's time is checked to ensure it falls within two minutes of the actual time. If the time is out by more than two minutes then the data is retrieved and the time difference is investigated. The meter will be programmed with the correct time.

11 PULSE OVERFLOW

11.1 Each channel status for each interval is checked for pulse Overflows. If a Pulse Overflow is reported the data is marked for estimation and the cause is investigated and resolved.

12 EXCLUDED INTERVALS

12.1 Each Channel status for each interval is checked for any interval data that may be excluded. If Excluded intervals are reported then those intervals are marked for estimation and the cause is investigated.

13 NUMBER OF INTERVALS

13.1 Each time a meter is polled the number of expected half-hour time intervals between the start and stop times of the Load profile data is calculated and compared with the actual number of time intervals found in the Load profile data file. Any difference in the number of time intervals is investigated and resolved.

14 CUMULATIVE/TOTAL CONSUMPTION COMPARISON

14.1 When a meter is polled and it provides an electronic cumulative reading of the prime register equivalent to the total consumption of the meter, then the difference between successive cumulative readings is compared to the total of the meter period data for the same period of time.

14.2 Specifically:

14.2.1 The sum of pulses * pulse multiplier for all the recording intervals collected is compared to the meter advance * meter multiplier for the time interval.

14.2.2 If the difference between these values is greater than the meter register multiplier then a secondary check is performed.

14.2.3 If the difference between actual reading and the calculated reading is more than 2 % then the problem is investigated and resolved.

15 ALARMS

15.1 When a meter is polled and significant meter alarms are flagged in the data file e.g. long/short intervals etc. Each alarm is investigated.

16 ZERO INTERVAL TOLERANCE

16.1 If a Customer's half hour data profile does not normally register any zero generation on the KW **Export** channel then the total number of zero half hour data intervals retrieved for the KW channel will be counted. If it exceeds 20 intervals then the data is flagged for investigation.

17 DATA ESTIMATION AND SUBSTITUTION

17.1 Data estimation is required in situations where meter data is incomplete, has been irretrievably lost or cannot be obtained within the timeframes required. Data substitution is required where the data obtained is erroneous. Data will be estimated/substituted when required using one of the following methods in the order specified below:

18 CHECK METER

18.1 Where a check meter is installed and functional, data requiring estimation/substitution will be taken directly from the check meter.

19 UP TO TWO HOUR GAP IN DATA

19.1 If the gap in data is 2 hours or less point –to-point linear interpolation will be used to estimate/substitute the data. Intervals containing a power Outage are not used as end points for interpolation:

19.1.1 If the data gap occurs in the middle of the data, the first point is the last valid interval before the gap and the second point is the first valid interval after the gap.

19.1.2 If the gap occurs at the beginning of the span the last interval from the historical data is used as the first point if the historical data is available and valid. Otherwise the second point (the first valid interval after the section) is used as the first point – this will cause the Load to be estimated as a flat Load.

19.1.3 If the gap occurs at the end of the span the first point (the last valid interval before the section) is used as the second point – this will cause the Load to be estimated as a flat Load.

20 OVER TWO HOUR GAP IN DATA

20.1 If the gap in data is greater than 2 hours then the interval data is constructed using the average Load shape based on the three most recent "similar" periods with valid data (i.e. data that has not been estimated). A "similar" period means the same time period of week and can be chosen from the previous 90 days. If the period needing estimation is a holiday, then the "similar days" should be holidays rather than the same day of week.

20.2 If adequate data is not available to perform this then one of the methods outlined below will be employed in the order given.

20.2.1 Where actual meter readings are available an adjustment factor shall be calculated and applied to the data to ensure that the total estimated consumption is equal to the total actual consumption.

20.2.2 If only two "similar" periods are available within 90 days, the average is calculated of these two. Similarly, if only one "similar" period is available the data for this period is used for estimation.

20.2.3 If no "similar" periods are available in the previous 90 days, the three "like" periods that are closest chronologically prior to the period requiring estimation are used. A "like" period means a weekday or weekend/holiday.

20.2.4 If no "similar" periods are available and three "like" periods are not available then the average of the two "like" periods that are closest chronologically prior to the period requiring estimation is used.

20.2.5 If no "similar" periods are available and two "like" periods are not available then the data for the "like" period that is closest chronologically prior to the period requiring estimation is used.

20.2.6 If there is no historical data that can be used, the data should be estimated manually and all assumptions documented fully.

Glossary and Definitions

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

Active Energy	the electrical energy produced, flowing or supplied by an electrical circuit during a time interval, being the integral with respect to time of **Active Power**, measured in units of watt-hours or standard multiples thereof, that is: 1000 Wh = 1 kWh; 1000 kWh = 1 MWh; 1000 MWh = 1 GWh.
Active Power or MW	The product of the components of alternating current and voltage that equate to true power which is measured in units of watts and standard multiples thereof, for example: 1000 Watts = 1kW; 1000kW = 1**MW**; 1000**MW** = 1GW.
Aggregated Demand Site	A group of Individual **Demand Site**s represented by a **Dispatchable Demand Customer**, which together are capable of a **Demand Reduction Capability** equal to or above 4**MW** (and which is therefore subject to **Central Dispatch** from the **TSO**). Each Individual **Demand Site** comprising an **Aggregated Demand Site** shall be in one currency zone. Unless otherwise specified, information submitted in respect of an **Aggregated Demand Site** shall always be at an aggregated level.
Aggregated Generating Unit	A group of **Generating Unit**s represented by a **Generator Aggregator**, each of which must not have a **Registered Capacity** greater than 10**MW**. An **Aggregated Generating Unit** with a total **Registered Capacity** of 4**MW** or more shall be subject to **Central Dispatch**, but one with a total **Registered Capacity** of less than 4**MW** may only be subject to **Central Dispatch** subject to agreement with the **TSO**.

Aggregator	Either a **Generator Aggregator** or a **Dispatchable Demand Customer** in respect of an **Aggregated Demand Site**.
Agreed Procedure	Each of the agreed procedures which are specified in paragraph 1.10 of the **Main Code** and set out in the **Distribution Metering Code**.
Annex 1 Standard	An electricity industry national standard that implements **Distribution Code** requirements, that is included in the **Distribution Code Review Panel**'s governance procedures, and which is listed in Annex 1 of the **Distribution Code**, and forms part of the **Distribution Code**.
Apparatus	All equipment in which electrical conductors are used, supported or of which they may form a part.
Authority	The Northern Ireland Authority for Utility Regulation.
Automatic Load Shedding	A **Load** shedding scheme utilised by the **TSO** to prevent **Frequency** collapse or other problems and to restore the balance between generation output and **Demand** on the **Distribution System**.
Automatic Load Shedding Device	A device for initiating **Load** shedding automatically, such as a **Low Frequency Relay**.
Black Start	The procedure necessary for a recovery from a **Total Shutdown** or **Partial Shutdown**.
Business Day	Any day (other than a Saturday or a Sunday) on which banks are open for business in Belfast but excluding those days which the **DNO** may from time to time notify **Users** as being days on which normal business will not be conducted at the **DNO's** premises.

Central Dispatch	The process of issuing an instruction in relation to **CDGU**s, **Aggregated Generating Unit**s and/or **Interconnectors** by the **TSO** pursuant to the **Grid Code**. In particular: • All **Dispatchable PPMs** shall be subject to **Central Dispatch**; • All other **Power Generating Facilities** with a **Registered Capacity** of above 10**MW** shall be subject to **Central Dispatch**; • All other **Power Generating Facilities** with a **Registered Capacity** of 10**MW** or less can agree with the **TSO** to be subject to **Central Dispatch**.
Centrally Dispatched Generating Unit (CDGU)	A **Generating Unit** within a **Power Generating Facility** subject to **Central Dispatch**.
Combined Cycle Gas Turbine Module or CCGT Module	A collection of **Generating Unit**s comprising one or more Gas Turbine Units (or other gas based engine units) and one or more Steam Units where, in normal operation, the waste heat from the Gas Turbines is passed to the water/steam system of the associated Steam Unit or Steam Units and where the component units within the **CCGT Module** are directly connected by steam or hot gas lines which enable those units to contribute to the efficiency of the combined cycle operation of the **CCGT Module**.
Commissioning/Acceptance Test	Testing of an item of **User's Equipment** required pursuant to the **Connection Conditions** prior to connection or re-connection in order to determine whether or not it is suitable for connection to the **System** and the term "**Commissioning/Acceptance Testing**" shall be construed accordingly.
Committed Project Planning Data	Has the meaning set out in paragraph 8.3 of the **Planning Code**.
Compensation Factors	Loss adjustment factors.
Connected System Test	Has the meaning set out in paragraph 1.1(b) of OC9.
Connection Agreement	The bilateral agreement between the **DNO** and the **User**, which contains the detail specific to the **User's** connection to the **Distribution System**.
Connection Conditions or CC	The part of the **Distribution Code** which is identified as the **Connection Conditions**.

Connection Point	A point at which a **User's Plant** and/or **Apparatus** connects to the **Distribution System**.
Connection Site	A site containing a **Connection Point**.
Control Person	The term used as an alternative to "**Safety Co-ordinator**" on the **Site Responsibility Schedule** only.
Controllable PPM	A **PPM** first connected to the **Distribution System** on or after 1 April 2005 with a **Registered Capacity** of 5**MW** or more.
Data Protection Legislation	The Data Protection Act 1998 implementing Directive 95/46/EC on the protection of individuals with regard to the **Processing of Personal Data** and including all regulations and codes of practice applicable to those persons subject to the **Distribution Metering Code** in relation to matters the subject of the **Distribution Metering Code**.
Demand Customer Voltage Reduction	A 3 or 6 per cent reduction of voltage supplied to all or any group of **Demand Customers** on a particular part of the **Distribution System**.
Demand	The amount of electrical power consumed comprising of **Active** and **Reactive Power** unless otherwise stated.
Demand Control	As defined in paragraph 1.5 in OC3.
Demand Customer	A person to whom electrical **Energy** is provided by means of a direct connection to the **Distribution System**.
Demand Facility	An installation under the control of a **Demand Customer** where electrical energy is consumed and is connected at one or more **Connection Point**s to the **DNO's Distribution System**.
Demand Reduction Capability	The reduction capability in **MW Demand** that can be achieved by the **Demand Side Unit**.
Demand Side Unit	A **Demand Site** or **Aggregated Demand Site** with a **Demand Reduction Capability** of at least 4**MW**. The **Demand Side Unit** shall be subject to **Central Dispatch**.

Demand Services Provider	A party who contracts with the **DNO** to provide a demand side service. The party might be a **Demand Customer** contracting bilaterally with the **DNO** for the provision of services, or may be a third party providing an aggregated service from many individual **Demand Customer**s. In the latter case there will be a specific contract for the provision of the services to the **DNO** and will include compliance by that third party with the requirements of **CC** 13 in relation to each **Demand Unit** included in the aggregated service.
Demand Unit	An appliance or a device whose **Active Power Demand** or **Reactive Power** production or consumption is being actively controlled by the **Demand Customer** in whose **Demand Facility** it is installed and which has been commissioned on or after 07 September 2019 in pursuance of a contract to this end with the **DNO**. Such an appliance or device commissioned before this date, but which has been materially altered will also be included in this definition. **Demand Units** of **Demand Customers** where the **Demand Customer** has concluded a final and binding contract for the purchase of a **Demand Unit** before 07 September 2018 are not included the scope of **CC** 13. The **Demand Customer** must have notified the **DNO** of the conclusion of this final and binding contract by 07 March 2019. Any **Demand Unit** including storage, with the exception of a pumped storage **Power Generating Module**, as a component part is also excluded from the requirements of **CC** 13.
Department	The Department of Enterprise, Trade and Industry.
Detailed Planning Data	Data specified in Part 2 of the Appendix to the **Planning Code**.
Development	A modification relating to a **User's Plant** and/or **Apparatus** already connected to the **Distribution System**.
Disconnect	The act of physically separating **Users** (and **Demand Customer**s) equipment from the **Distribution System**, and the terms "**Disconnection**" and "**Disconnecting**" shall be construed accordingly.

Dispatchable Demand Customer	A person who operates a **Demand Side Unit**, with a **Demand Reduction Capability** not less than 4**MW**.
Dispatchable PPM	A **Controllable PPM** which is dispatched via an **Electronic Interface** by the **TSO**.
Distribution Code	The document named as such, prepared pursuant to condition 27 of the **Licence** held by the **DNO**.
Distribution Code Review Panel (Panel)	The panel whose functions are set out in paragraph 6 of the **General Conditions**.
Distribution Metering Code	That part of the **Distribution Code** identified as the **Distribution Metering Code** comprising the **Main Code**, each **Sub-Code** and each **Agreed Procedure**.
Distribution Service Centre	A location used for the control and operation of the **Distribution System**.
Distribution System	The electric lines within the Authorised Area, as defined in the **Licence** held by the **DNO**, owned by the Distribution Licensee (but not, for the avoidance of doubt, any lines forming part of the transmission system or any **Interconnector**), and any other electric lines which the **Authority** may specify as forming part of the distribution system, together with (in each case) any **Plant** and **Apparatus** and/or meters owned or operated by the **DNO** used in connection with the distribution of electricity.
DNO or Distribution Network Owner	Northern Ireland Electricity Networks Limited acting in its capacity as the owner of the **Distribution System**.

DNO Data Collection System	The data collection system (sometimes referred to as an "instation") operated by the **DNO** to supply **Settlement Values** to the Market Operator (as such term is defined in the **Trading and Settlement Code**) for use in calculating payments due, inter alia, to **Generators** and from **Suppliers** (currently comprising a central computer together with datalinks to and from it connecting to **System Data Collectors**), or such other data collection system as the **DNO** may reasonably specify to be used for such purpose with the prior agreement of the **Authority** and after consultation with all **Generators** and those other **Users** which are, in the reasonable opinion of the **DNO**, interested in any such system. For the avoidance of doubt, the **System Data Collectors**, the **Generator** data collectors and the accounting software known as the contract management system are not part of the **Data Collection System**.
DNO Site	A site owned (or occupied pursuant to a lease, licence or other agreement) by the **DNO** in which there is a **Connection Point**. For the avoidance of doubt a site owned by a **User** but occupied by the **DNO** as aforesaid, is a **DNO Site**.
Earthing	A way of providing a connection between conductors and earth by an **Earthing Device**.
Earthing Device	A means of providing a connection between a conductor and earth being of adequate strength and capability.
Electronic Interface	A system, in accordance with the requirements of the **TSO's** data system providing an electronic interface between the **TSO** and a **User**, for issuing and receiving instructions, including **Dispatch Instructions**, as provided for in the **Grid Code** and established pursuant to an agreement between the **TSO** and the **User**.
Emergency Manual Disconnection	Load shedding carried out at short notice or no notice when a Regulating Margin cannot otherwise be achieved.

Energy	The electrical energy produced, flowing or supplied by an electrical circuit during a time interval and being the integral with respect to time of the instantaneous power, measured in units of Watt-hours or standard multiples thereof, for example:- 1000Wh = 1kWh; 1000kWh = 1**MW**h; 1000**MW**h = 1GWh.
Event	An unscheduled or unplanned (although it may have been anticipated) occurrence on a **System** or on the **Transmission System** including, without limiting that general description, faults, incidents and breakdowns.
Export	In respect of any **User**, a flow of electricity from the **Apparatus** of such **User** to the **Apparatus** of another **User** and the verb "export" and its respective tenses shall be construed accordingly.
Fast Acting	As specified in the relevant **Setting Schedule**
Final Connection Report	Has the meaning set out in paragraph 11.5.1 of the **Connection Conditions**.
Final Report	Has the meaning set out in paragraph 2.2(d) in OC9.
Finish Date	The date on which an **Outage** is to finish.
Frequency	The number of alternating current cycles per second (expressed in Hertz) at which a **System** is running.
Fuel Security Code	The Northern Ireland **Fuel Security Code** designated by the **Department** as a condition of **Licences** granted under Article 10 of the **Order**.
General Conditions	The part of the **Distribution Code** which is identified as the **General Conditions**.
Generating Plant	A **Power Generating Facility** subject to **Central Dispatch**
Generating Unit	Any apparatus which produces electricity. This includes Micro-generators and electricity storage devices. [Note that although storage is in the scope of EREC G99/NI, some aspects do not apply. The exclusions are noted where they apply in the text]

Generator	A person who generates electricity under a **Licence** or exemption under the **Order** and who is subject to the **Distribution Code** either by virtue of a **Licence** or exemption or pursuant to any agreement with the **DNO** or otherwise. Also for the avoidance of doubt any customer with generation connected to that customer's installation is a **Generator**.
Generator Aggregator	A person who represents several **Generating Units**, each of which does not have a **Registered Capacity** greater than 10**MW** and the combined **Registered Capacity** of which is equal to or greater than 4**MW** in relation to those **Generating Unit**s and receiving **Dispatch Instructions** in relation to those **Generating Unit**s from the **TSO** under the **Grid Code.** For the avoidance of doubt, a **Generator Aggregator** cannot aggregate a **Generating Unit** with an output equal to or above 10**MW**.
Generator data collector	A data collector available to transmit data directly to the relevant **Generator**.
Generator Metering Circuits	Current and voltage transformers in a **Power Generating Facility** and their associated secondary circuits which feed **Metering** and which may be owned by either the **Generator** or the **DNO**.
Generator Performance Chart	A diagram showing the **Active Power** (MW) and **Reactive Power** (MVAr) capability limits within which a **Power Generating Module** at the **Generator Terminals** or the **Connection Point** as appropriate for the **Power Generating Facility** will be expected to operate under steady state conditions.
Generator Terminal	The terminals of a **Generating Unit**.
Generator Transformer	The main transformer for a **Generating Unit** through which that power passes from the **Generator Terminals** to the **Distribution System**.
Grid Code	The **Grid Code** prepared pursuant to the **TSO's Licence**, as from time to time revised in accordance with the **TSO's Licence**.
Grid Code Metering Code	That part of the **Grid Code** identified as the **Grid Code Metering Code**.
High Voltage or HV	A voltage exceeding 650 volts.

HV Apparatus	**High Voltage** electrical circuits forming part of a **System**.
Implementing Safety Co-ordinator	Has the meaning set out in paragraph 6.4 in OC6.
Import	In respect of any **User**, a flow of electricity to the **Apparatus** of such **User** from the **Apparatus** of another **User** and the verb "import" and its respective tenses shall be construed accordingly.
Independent Engineer	The person appointed pursuant to paragraph 11.2 of the **Main Code** in the **Distribution Metering Code**.
Independent Generating Plant	A **Power Generating Facility** which is not subject to **Central Dispatch** and is not a **Controllable PPM**.
Induction Generating Unit	A **Generating Unit** in which some or all of the excitation is derived from the **Distribution System** rather than being separately supplied as magnetic or electrical energy.
Interconnector	Electric lines and electric **Plant** used for conveying electricity from outside both of Northern Ireland and the Republic of Ireland directly to or from a substation or converter station in either Northern Ireland or the Republic of Ireland.
Interested User	As defined in the **Metering Code**.
Inter-jurisdictional Tie Line	The lines, facilities and equipment that connect the transmission system of the Republic of Ireland to the transmission system of Northern Ireland.
Intertripping	A method of tripping a circuit breaker on receipt of a signal initiated from protection at another location.
Investigation	An investigation carried out by the **DNO** pursuant to OC10 in relation to **User Site**s.
Invitee	As defined in paragraph 10.1 of the **Main Code**.
Isolating Device	A device for the purpose of rendering **Plant** and **HV Apparatus** either **Isolated** or disabled so that electrical energy cannot pass from the **Apparatus** (or, in the case of **Plant**, from the associated **Apparatus**) to the **HV Apparatus**.

Isolation	The disconnection of **HV Apparatus** from the remainder of the **System** in which that **HV Apparatus** is situated by means either of an **Isolating Device**(s) in the isolating position or adequate physical separation or sufficient gap or the disablement (by means of switching or dismantling) of **Plant** and/or **Apparatus** so that electrical energy cannot pass from the **Apparatus** (or, in the case of **Plant**, from the associated **Apparatus**) to the **HV Apparatus**, other than by an **Isolating Device** and "**Isolated**" shall be construed accordingly.
Licence	A licence granted under the **Order**.
Licence Standards	The document designated as such by the **Authority** on or before SEM Go-Live, as modified from time to time in accordance with Condition 19 of the **Licence** held by the **DNO**.
Load	The **Active Power** or **Reactive Power**, as the context requires, generated, transmitted or distributed and all like terms shall be construed accordingly.
Local Safety Instructions	Instructions relating to each **DNO Site** and each **User Site** approved by the relevant **DNO** or **User** in accordance with OC6.4.1, setting down the methods of achieving the objectives of the **DNO's** or the **User's** (as the case may be) **Safety Rules** to ensure the safety of personnel carrying out work or testing on **Plant** and/or **Apparatus** to which his **Safety Rules** apply and in the case of a **User**, any other document(s) on a **User Site** which contains rules with regard to maintaining or securing the isolating position of an **Isolating Device**, or maintaining a physical separation or sufficient gap, or the disablement (by means of switching or dismantling) of **Plant** and/or **Apparatus** so that electrical energy cannot pass from the **Apparatus** (or, in the case of **Plant**, from the associated **Apparatus**) to the **HV Apparatus**, other than by an **Isolating Device** or maintaining or securing the position of an **Earthing Device**.
Location	The electrical location on a **System**.
Low Frequency Relay	An electrical measuring relay intended to operate when its characteristic quantity (**Frequency**) reaches the relay settings by decrease in **Frequency**.

Low Voltage or LV	A voltage not exceeding 250 volts.
Main Code	The part of the **Distribution Metering Code** entitled the "Main Code".
Manufacturers' Information	Information in suitable form provided by a manufacturer in order to demonstrate compliance with one or more of the requirements of the **Distribution Code**. Where equipment certificate(s) as defined in EU 2016/631, or 2016/1388 cover all or part of the relevant compliance points, the equipment certificate(s) demonstrate compliance without need for further evidence for those aspects within the scope of the equipment certificate
Market Operator	Shall have the meaning set out in the **TSC**.
Market Registration Code or MRC	The code of that name drawn up by the DNO as amended or restated from time to time.
Medium Voltage or MV	A voltage exceeding 250 volts but not exceeding 650 volts.
Meter Advance Reconciliation	The process for reconciliation of meter readings with record produced in accordance with **Agreed Procedure** 3 of the **Distribution Metering Code** and/or the statement produced in accordance with **Agreed Procedure** 3.
Meter Advance Reconciliation Record	The record produced in accordance with **Agreed Procedure** 3 of the **Distribution Metering Code** in the form set out in Appendix B to **Agreed Procedure** 3.
Meter Reconciliation Statement	A statement prepared by the **DNO** and submitted to each **Generator**.
Meter Responsible Person	As defined in paragraph 5 of the **Distribution Metering Code**.
Metering	Means **Tariff Metering**.
Metering System	Means a meter and any associated voltage transformers, current transformers and secondary circuits.
Minimum Generation	The minimum **MW Output** which a **Generating Unit** can generate continuously, registered with the **DNO**.

Minister	The Minister for Enterprise, Trade and Investment.
Monitoring	Monitoring carried out by the **DNO** pursuant to OC10.
Monitoring Notice	A notice issued by the **DNO** to a **User** pursuant to paragraph 4.3 in OC10, informing the **User** that the **DNO** is **Monitoring** its **User Equipment**.
NI Demand	The **Demand** on the **NI System** less the output of **Independent Generating Plant**.
NI System	Together, the **Transmission System** and the **Distribution System**.
Operating Code or OC	That part of the **Distribution Code** which is identified as the **Operating Code**.
Operation	A scheduled or planned action relating to the operation of a **System** and the **Transmission System** but, for the avoidance of doubt, does not include fault locating operations undertaken by the **DNO**.
Operational Effect	Any effect on the operation of the relevant **System** or on the **Transmission System** which will or may cause the **System**s of the **DNO** or a **User**, as the case may be, to operate differently from the way in which they would or may have operated in the absence of that effect.
Operational Procedures	Management instructions and procedures, both in support of the **Safety Rules** and for the local and remote operation of **Plant** and/or **Apparatus** at or from a **Connection Site**.
Order	The Electricity (Northern Ireland) Order 1992.
Other Authority	The Commission for Energy Regulation in the Republic of Ireland.
Other Transmission System	The transmission system operated by the **Other TSO** in the Republic of Ireland.
Other Transmission System Operator (Other TSO)	The holder of a licence granted pursuant to Section 14 of the Electricity Regulation Act 1999 in the Republic of Ireland to operate a **Transmission System**.

Outage	In relation to a **Generating Unit**, a total or partial reduction in **Output** in connection with the repair or maintenance of the **Generating Unit** or any associated **Power Generating Facility Equipment**, or resulting from a breakdown or failure of the **Generating Unit** or any associated **Power Generating Facility Equipment**. In relation to a **Demand Customer's Connection Site**, a total or partial reduction in **Demand** in connection with the repair or maintenance of the **Demand Customer**'s **Connection Site** or any associated equipment or resulting from a breakdown or failure of the **Demand Customer**'s **Connection Site** or any associated equipment. In relation to the **DNO**, the removal from service for repair, maintenance, safety or other reason any part of the **Distribution System**.
Output	The actual **Active Power** output in **MW** of a **Generating Unit** as at the **Connection Point** derived from data measured pursuant to the **Metering Code**.
Overall Accuracy	The accuracy of any **Metering** as affected by its current and voltage transformers and **Generator Metering Circuits**.
Ownership Diagram	A diagram created pursuant to paragraph 9.1.4 in the **Connection Conditions** and prepared following the principles set out in Appendix 2 to the **Connection Conditions**.
Partial Shutdown	The same as a **Total Shutdown** except that all generation has ceased in a separate part of the **Total System** and there is no electricity supply across any **Interconnector** or **Inter-jurisdictional Tie Line** or other parts of the **Total System** to that part of the **Total System** and, therefore, that part of the **Total System** is shutdown, with the result that it is not possible for that part of the **Total System** to begin to function again without the **TSO's** directions relating to a **Black Start**.
Personal Data	The personal data (as defined in the Data Protection Act 1998) that is collected or processed under the **Distribution Metering Code**.
Planned Manual Disconnection	**Load** shedding carried out when it is known in advance that a **Regulating Margin** cannot otherwise be achieved.

Planning Code or PC	That part of the **Distribution Code** which is identified as the **Planning Code**.
Plant	Fixed and movable items other than **Apparatus**.
Power Generating Facility	An installation comprising one or more **Power Generating Module**s (even where sited separately) owned and/or controlled by the same **Generator**, which may reasonably be considered as being managed as one **Power Generating Facility.**
Power Generating Facility Equipment	Items of **Plant** in a **Power Generating Facility** which are integral to the operation of a **CDGU**, **Controllable PPM** and/or **Dispatchable PPM** but which are not used exclusively in the operation of such **CDGU**, **Controllable PPM** and/or **Dispatchable PPM**, the **Outage** of which will, or is likely to (when, for example, taken together with other **Power Generating Facility Equipment Outages**), reduce the level of Availability of a **CDGU**, **Controllable PPM** and/or **Dispatchable PPM**.
Power Generating Module	Either a **Synchronous Power Generating Module** or a **Power Park Module**.
Power Park Module	A **Generating Unit** or ensemble of **Generating Units** (including storage devices) generating electricity, which is either non-synchronously connected to the network or connected through power electronics, and that may be connected through a transformer and that also has a single **Connection Point** to a **Distribution System**.
Preliminary Notice	Has the meaning ascribed to it in paragraph 1.2 in the Appendix to OC9.
Preliminary Project Planning Data	Has the meaning set out in paragraph 8.2 in the **Planning Code**.
Process/Processing	Has the meaning given to "process" and "processing" under the Data Protection Act 1998.
Proposal Notice	Has the meaning ascribed to it in paragraph 4.1 of OC9.

Protected Demand Customer	A **Demand Customer** in relation to whom, in accordance with guidelines issued by the **Department**, **Planned Manual Disconnection** shall, so far as possible, not be exercised.
Protection	Equipment for detecting abnormal conditions on a **System** and initiating fault clearance and activating alarms and indications.
Prudent Operating Practice	In relation to a **User** or the **TSO**, the standard of practice attained by exercising that degree of skill, diligence, prudence and foresight which could reasonably be expected from a skilled and experienced operator engaged in the same type of undertaking under the same or similar circumstances.
Reactive Energy	The integral with respect to time of the **Reactive Power** measured in units of volt-ampere-hours reactive or standard multiples thereof, that is: 1000 VArh = 1 kVArh; 1000 kVArh = 1 MVArh.
Reactive Power or MVAr	The product of voltage and current and the sine of the phase angle between them measured in units of volt-amperes reactive and standard multiples thereof, i.e.: 1000 **VAr** = 1 k**VAr** 1000 k**VAr** = 1 **MVAr**
Record of Inter-System Safety Precautions or RISSP	The procedures set out in paragraph 7 of OC6.
Registered Capacity	The normal full load capacity of a **Power Generating Module**, or of a **Power Generating Facility**, as declared by the **Generator** less the MW consumed when producing the same. For **Power Generating Module**s connected to the **DNO**'s **Distribution Network** via an **Inverter**, the **Inverter** rating is deemed to be the **Power Generating Module**'s rating.
Registered Project Planning Data	Has the meaning set out in paragraph 8.4 of the **Planning Code**.

Regulating Margin	The margin of generating capacity that is **Synchronised** over **Demand** which is required in order to maintain **Frequency** control.
Relevant Connection Site	a site which includes a **Connection Point** of a **Power Generating Facility** or **Demand Customer** to the **Distribution System**.
Requesting Safety Co-ordinator	Has the meaning set out in paragraph 6.4 of OC6.
Responsible Engineer/Operator	A person nominated by a **User** to be responsible for control of the **User's System**.
Responsible Manager	A manager who has been duly authorised by a **User** or the **TSO** to sign **Site Responsibility Schedule**s on behalf of that **User** or the **TSO**, as the case may be.
Re-Synchronisation	The act of achieving the state where the Frequencies and phase relationships of parts of the **Total System** are identical.
Retail Market Procedure (MP)	Each of the retail market procedures forming part of the **Market Registration Code**.
RISSP-A and RISSP-B	Have the meanings set out in paragraph 7.2 of OC6.
Rota Load Shedding	Planned **Disconnection** of **Demand Customers** on a rota basis during circumstances when there is a significant shortfall of generation required to meet the total **Demand** for a protracted period.
Safety Co-ordinator	Has the meaning set out in paragraph 6 of OC6.
Safety From The System	That condition which safeguards persons working or testing **HV Apparatus** from the dangers which are inherent in working on items of **HV Apparatus**.
Safety Precautions	Has the meaning set out in paragraph 8.1 of OC6.
Safety Rules	The rules and procedures (as amended or restated from time to time) of the **DNO** or a **User** to ensure **Safety From The System**.
Schedule Day	The period from 0000 hours until 2400 hours on the same day.
Secretary of State	The Secretary of State for the Department of Energy and Climate Change

Setting Schedules	Documents that, depending on the type and **MW** rating of the **Power Generating Facility**, and the date on which the **Power Generating Facility** was installed, in accordance with **CC** 6.2 set out certain technical criteria that the **Generator** must comply with. For **Power Generating Facilities:** • of 5 MW or more, and connected from 27th April 2019, the applicable setting schedule is the "*PPM Settings Schedule";* • of 5 MW or more, and connected up to 27th April 2019, the applicable setting schedule is the "*WFPS Settings Schedule*"; and • less than 5 MW, and connected up to 27th April 2019, the applicable setting schedule is the "*SSG Setting Schedule*".
Settlement Period	Has the meaning given to that term in the TSC.
Settlement Values	Values of **Active Energy** and **Reactive Energy** delivered over a **Settlement Period** as recorded by **Metering** required by and operating in accordance with this **Distribution Metering Code** or as estimated or substituted in accordance with this **Distribution Metering Code**. **Settlement Values** are identified by the time at the end of the relevant **Settlement Period**.
Significant Incident	Has the meaning set out in paragraph 4.3.3 of OC4.
Single Electricity Market (SEM)	The wholesale all-island single electricity market established and governed pursuant to the relevant legislation and the TSC.
Site	A **User Site** or a **DNO Site**, as the case may be.
Site Responsibility Schedule	A schedule prepared by the **DNO** and a **User** and signed by both parties detailing the division of responsibilities at **Connection Site**s towards the ownership, control, operation and maintenance of **Plant** and **Apparatus** and the safety of personnel at the **Connection Site**. The format, principles and basic procedure to be used in the preparation of **Site Responsibility Schedule**s are set down in Appendix 1 to the **Connection Conditions**.
Small Scale Generation or SSG	A **Power Generating Facility** with a registered capacity from 100kW to under 5MW
Standard Planning Data	Data specified in Appendix A in the **Planning Code**.

Start Date	The date on which an **Outage** is to begin.
Statement on Distribution System Capacity	The statement of that name prepared pursuant to condition 32 of the **Licence** held by the **DNO**.
Substation	An assemblage of equipment including any necessary housing for the conversion, transformation or control of electrical power.
Sub-Code	Each of the **Sub-Codes** referred to in the **Main Code** and set out in the **Distribution Metering Code**.
Supplier	The holder of a **Licence** to supply electricity pursuant to Article 10(1)(c) of the **Order**.
Synchronised	The condition where an incoming **Generating Unit** or **System** is connected to another **System** so that the Frequencies and phase relationships of that **Generating Unit** or **System**, as the case may be, and the **System** to which it is connected are identical and all like terms shall be construed accordingly.
Synchronous Generating Unit	A **Generating Unit** which is connected and **Synchronised** to the **Distribution System**.
Synchronous Power Generating Module	Means an indivisible set of **Generating Unit**s (ie one or more units which cannot operate independently of each other) which can generate electrical energy such that the frequency of the generated voltage, the generator speed and the frequency of network voltage are in a constant ratio and thus **Synchronised**. Each set of **Generating Unit**s which cannot run independently from each other (such as those **Generating Unit**s on a common shaft or as part of an integrated **CCGT Module**), but can run independent of any other generating equipment, form an individual **Synchronous Power Generating Module**. Any prime mover and alternator combination that can run as an independent unit (irrespective of normal operating practice) is a **Synchronous Power Generating Module**.
System	Any **User System** and/or the **Distribution System** as the case may be.

System Data Collector	A data collector (sometimes referred to as an "outstation") owned by the **DNO** for transmitting data to the **DNO Data Collection System** for the purpose of providing **Settlement Values**.
System Test	Has the meaning set out in paragraph 1.1 of OC9.
Tariff Metering	Meters, associated current and voltage transformers, metering protection equipment including alarms, electrical circuitry, their associated data collectors (including **Generator** data collectors) and wiring and other devices or any part thereof which are part of the **Active Energy** or **Reactive Energy** measuring equipment at or relating to a **Relevant Connection Site**.
Test Co-ordinator	Has the meaning set out in paragraph 1.1 in the Appendix to OC9.
Test Panel	A panel, whose composition is detailed in the Appendix to OC10, which is responsible for various matters including considering a proposed **System Test** and preparing a **Test Programme**.
Test Programme	Has the meaning set out in paragraph 4.4 of OC9.
Test Proposer	Has the meaning set out in paragraph 4.1.4 of OC9.
Testing	Testing carried out by the **DNO** pursuant to OC10 of **Users' Equipment** and the term "**Test**" shall be construed accordingly.
Thermal Plant	A **Generating Unit** that uses any source of thermal **Energy**.
Total Shutdown	The situation existing when all generation has ceased and there is no electricity supply across any **Interconnector** and, therefore, the **Total System** has shutdown with the result that it is not possible for the **Total System** to begin to function again without the **TSO**'s directions relating to a **Black Start**.
Total System	Together, the **NI System** and all **User System**s in Northern Ireland.
Trading and Settlement Code or **TSC**	The **Single Electricity Market Trading and Settlement Code** adopted by the **Market Operator** and approved by the by the **Authority** and the **Other Authority**.

Transmission Interface Agreement	The agreement of the same name entered into by the **Transmission Owner** and the **TSO**.
Transmission Owner	Northern Ireland Electricity Networks Limited in its capacity as the owner of the **Transmission System**.
Transmission System	The **System** consisting (wholly or mainly) of high voltage electric lines and cables operated by the **TSO** for the purposes of transmission of electricity from one **Power Generating FacilityStation** to a **Substation** or to another **Power Generating FacilityStation** or between sub-stations or to or from any **Interconnector** including any **Plant** and **Apparatus** and meters owned or operated by the **TSO** or **Transmission Owner** in connection with the transmission of electricity.
TSO (Transmission System Operator)	The holder of the **Licence** granted pursuant to Article 10(1)(b) of the **Order** to operate a **Transmission System**.
TSO Data Collection System	The data collection system (sometimes referred to as an "instation") operated by the **TSO** to supply **Settlement Values** to the Market Operator (as such term is defined in the **Trading and Settlement Code**) for use in calculating payments due, inter alia, to **Generators** and from **Suppliers** (currently comprising a central computer together with datalinks to and from it connecting to **System Data Collectors**), or such other data collection system as the **TSO** may reasonably specify to be used for such purpose with the prior agreement of the **Authority** and after consultation with all **Generators** and those other **Users** which are, in the reasonable opinion of the **TSO**, interested in any such system. For the avoidance of doubt, the **System Data Collectors**, the **Generator** data collectors and the accounting software known as the contract management system are not part of the **Data Collection System**.
TSO Licence	The licence to carry out electricity transmission activities granted pursuant to Article 10(1)(b) of the **Order**.
User	A term utilised in each section of the **Distribution Code** specifying the persons (other than the **DNO**) bound by that section. In the **General Conditions** the term means all **Users** referred to in the individual sections of the **Distribution Code**.

User Site	A site owned (or occupied pursuant to a Lease, licence or other agreement) by a **User** (which in the case of an **Aggregator**, means the combination of the individual **Aggregated Generating Unit** or Aggregated **Demand Side Unit** sites as the case may be) in which there is a **Connection Point**. For the avoidance of doubt, a site owned by **DNO** but occupied by a **User** as aforesaid, is a **User Site**.
User System	Any system owned or operated by a **User** comprising **Generating Unit**s together with **Plant** and/or **Apparatus** connecting **Generating Unit**s and/or Large **Demand Customers**' equipment to the **Distribution System**.
User's Equipment	The **Plant** and/or **Apparatus** owned and/or operated by a **User**.
VAr	A single unit of **Reactive Power**.
Voltage Control	The retention of the voltage on the **System** within acceptable limits.

GD2. CONSTRUCTION OF REFERENCES

In the **Distribution Code**:

(i) the table of contents is 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, subparagraph, Appendix or Schedule shall be a reference to that paragraph, sub-paragraph 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 all other genders and references to persons shall include any individual, body corporate, corporation, joint venture, trust, unincorporated association, organisation, firm or partnership and any other entity, in each case whether or not having a separate legal personality;

(iv) references to the words "include" or "including" are to be construed without limitation to the generality of the preceding words;

(v) unless there is something in the subject matter or the context which is inconsistent therewith, any reference to an Order in Council or an Act of Parliament or any section of or schedule to, or other provision of an Order in Council or an Act of Parliament shall be construed at the particular time, as including a reference to any modification, extension or re-enactment thereof then in force and to all instruments, orders and regulations then in force and made or deriving from the relevant Order in Council or Act of Parliament;

(vi) references to "in writing" or "written" include typewriting, printing, lithography and other modes of reproducing words in a legible and non-transitory form;

(vii) where the Glossary and Definitions refers to any word or term which is more particularly defined in a part of the **Distribution Code**, the definition of that part of the **Distribution Code** will prevail over the definition in the Glossary & 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 obligation or confer any additional or further or co-existent right in the part of the text where such cross-reference is contained;

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

(x) a "holding company" means, in relation to any person, a holding company of such person within the meaning of Section 736, 736A and 736B of the Companies Act 1985 as substituted by Section 144 of the Companies Act 1989;

(xi) a "subsidiary" means, in relation to any person, a subsidiary of such person within the meaning of Section 736, 736A and 736B of the Companies Act 1985 as substituted by Section 144 of the Companies Act 1989; and

(xii) references to time are to Belfast time.

Annex 1

This Annex forms part of the Distribution Code technical requirements.

Distribution Code requirements implemented via electricity industry standards:

1 **Engineering Recommendation (EREC) G98/NI**

Requirements for the connection of Fully Type Tested Micro-generators (up to and including 16 A per phase) in parallel with public Low Voltage Distribution Networks in Northern Ireland on or after 27 April 2019

2 **Engineering Recommendation (EREC) G99/NI**

Requirements for the connection of generation equipment in parallel with public distribution networks in Northern Ireland on or after 27 April 2019