

## **CUSC – SCHEDULE 3**

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## **SCHEDULE 3**

### **BALANCING SERVICES**

#### **Part I**

#### **Balancing Services Market Mechanisms - Reactive Power**

#### **1 Definitions and Interpretations**

- 1.1 For the purpose of this Part I and the Appendices, “**Obligatory Reactive Power Service**” means the **Mandatory Ancillary Service** referred to in **Grid Code CC 8.1** which the relevant **User** is obliged to provide (for the avoidance of doubt, as determined by any direction in force from time to time and issued by the **Authority** relieving a relevant **User** from the obligation under its **Licence** to comply with such part or parts of the **Grid Code** or any **Distribution Code** or, in the case of **The Company**, the **Transmission Licence** as may be specified in such direction) in respect of the supply of **Reactive Power** (otherwise than by means of synchronous or static compensation except in the case of a **Power Park Module** where synchronous or static compensation within the **Power Park Module** may be used to provide **Reactive Power**) and in respect of the required **Reactive Power** capability referred to in **Grid Code CC 6.3.2**. This **Mandatory Ancillary Service** shall comprise, in relation to a **Generating Unit**, **DC Converter** or **Power Park Module** compliance by the relevant **User** in all respects with all provisions of the **Grid Code** applicable to it relating to that supply of **Reactive Power** and required **Reactive Power** capability, together with the provision of such despatch facilities (including the submission to **The Company** of all relevant technical, planning and other data in connection therewith) and metering facilities (meeting the requirements of Appendix 4), and upon such terms, as shall be set out in a **Mandatory Services Agreement** entered into between **The Company** and the relevant **User**.

For the avoidance of doubt, “**Obligatory Reactive Power Service**” when used in this Part I and the Appendices excludes provision of **Reactive Power** capability from **Synchronous Compensation** and from static compensation equipment ( except in the case of a **Power Park Module** where synchronous or static compensation

within the **Power Park Module** may be used to provide **Reactive Power**, and the production of **Reactive Power** pursuant thereto.

1.2 For the purpose of this Part I and the Appendices, “**Enhanced Reactive Power Service**” means the **Commercial Ancillary Service** of:-

- (a) the provision of **Reactive Power** capability of a **Generating Unit, DC Converter or Power Park Module** in excess of that which a **User** is obliged to provide from that **Generating Unit, DC Converter or Power Park Module**, under and in accordance with the **Connection Conditions** of the **Grid Code** and the production of **Reactive Power** pursuant thereto, which a **User** may agree to provide and which is capable of being made available to, and utilised by, **The Company** in accordance with the **Balancing Codes** of the **Grid Code** (or as may otherwise be agreed in writing between **The Company** and a **User**) for the purposes of voltage support on the **GB Transmission System**, upon and subject to such terms as may be agreed in writing between **The Company** and such **User**; or
- (b) the provision of **Reactive Power** capability from **Synchronous Compensation** or from static compensation equipment (except in the case of a **Power Park Module** where Grid Code CC8,1 specifies that such **Reactive Power** capability is a **Mandatory Ancillary Service**) and the production of **Reactive Power** pursuant thereto, which a **User** or any other person may agree to provide and which is capable of being made available to, and utilised by, **The Company** for the purposes of voltage support on the **GB Transmission System**, upon and subject to such terms as may be agreed in writing between **The Company** and such **User** or other person; or
- (c) such other provision or enhancement of capability of **Plant** and/or **Apparatus** or other equipment to generate or absorb **Reactive Power**, and the production of **Reactive Power** pursuant thereto, which a **User** or any other person may agree to provide and which is capable of being made available to, and utilised by, **The Company** for the purposes of voltage support on the **GB Transmission System**, upon and subject to such terms as may be agreed in writing between **The Company** and such **User** or other person.

- 1.3 Unless otherwise defined in the **CUSC**, terms and expressions found in the **Grid Code** have the same meanings, interpretations and constructions in this Part I and the Appendices.
- 1.4 In this Part I and the Appendices, except where the context otherwise requires, references to a particular Appendix, Part, Section, sub-section, Paragraph or sub-Paragraph shall be a reference to a particular Appendix to or part of this Part I or, as the case may be, that Section, sub-section, Paragraph or sub-Paragraph in this Part I.

## **2. Obligatory Reactive Power Service – Default Payment Arrangements**

- 2.1 Notwithstanding any other provision of the **CUSC**, the provisions of this Part I and the Appendices, together with the **Mandatory Services Agreements** referred to in sub-Paragraph 2.6, shall govern the rights and obligations of **The Company** and relevant **Users** with respect to payments to be made by **The Company** to such **Users** for the provision of the **Obligatory Reactive Power Service**.
- 2.2 Subject always to Paragraph 3, and notwithstanding the provisions of any **Ancillary Services Agreement** now or hereafter in effect (but subject always to sub-Paragraph 4.2), the payments to be made by **The Company** to **Users** for the provision of the **Obligatory Reactive Power Service** in all **Mandatory Services Agreements** under which **Users** are or will be paid for the **Obligatory Reactive Power Service** shall, subject always to sub-Paragraph 2.7, comprise solely payments for utilisation determined in respect of each **Settlement Period** in accordance with sub-Paragraph 2.3.
- 2.3 Save to the extent and for the duration of any **Market Agreement** (as defined in sub-Paragraph 3.1) which may be entered into between **The Company** and a **User** as referred to in Paragraph 3 the utilisation payment for provision of the **Obligatory Reactive Power Service** shall be determined in accordance with the provisions of Appendix 1.
- 2.4 The Parties acknowledge and agree that, as at 1<sup>st</sup> October 1997:-
- (a) the totality of payments for the provision of the **Obligatory Reactive Power Service**, determined in accordance with the provisions of this Paragraph 2, reflect so far as

reasonably practicable the overall variable costs (on the basis of the charging principles set out in Appendix 7) incurred across all relevant **Generating Units** of the provision of the **Obligatory Reactive Power Service** (whether or not payments are made in respect of those **Generating Units** pursuant to this Paragraph 2 or pursuant to **Market Agreements** entered into in accordance with Paragraph 3); and

(b) such totality of payments will continue to reflect those overall variable costs notwithstanding all and any variations thereto reasonably anticipated at such date.

- 2.5 It is hereby agreed and acknowledged that nothing in this Part I and the Appendices shall affect in any way the obligation on each **User** to comply with the provisions of the **Grid Code** insofar as they relate to **Reactive Power**. For the avoidance of doubt, and without limiting the foregoing, it is hereby agreed and acknowledged that, notwithstanding that the payments for the **Obligatory Reactive Power Service** shall comprise solely payments for utilisation, nothing in this Part I and the Appendices shall relieve **Users** from the obligations to comply with the provisions of the **Grid Code** in relation to **Reactive Power** by virtue of Paragraph 6.3.3 of the **CUSC** or otherwise howsoever.
- 2.6 **Mandatory Services Agreements** have been and will continue to be entered into bilaterally between **The Company** and **Users** but it is intended that, subject as provided below, **Mandatory Services Agreements** between **The Company** and **Users** providing the **Obligatory Reactive Power Service** will be amended or (if not in existence when this Part I takes effect) concluded so as to give effect to the provisions of sub-Paragraphs 2.2 and 2.3. Subject always to sub-Paragraphs 2.8 and 4.2, **The Company** and each relevant **User** therefore agree, as soon as reasonably practicable, to amend the existing **Mandatory Services Agreement** or conclude a new **Mandatory Services Agreement** in respect of each relevant **Generating Unit, DC Converter** or **Power Park Module** in order to give effect to the provisions of sub-Paragraphs 2.2 and 2.3.
- 2.7 For the avoidance of doubt, no payments referred to in this Paragraph 2 shall be payable by **The Company** to a **User** in relation to any **Generating Unit, DC Converter** or **Power park Module** unless and until the relevant **Mandatory Services Agreement** is so amended or concluded as provided in sub-Paragraph 2.6.

2.8 Notwithstanding the foregoing provisions of this Paragraph 2, and without prejudice to Paragraph 5, **The Company** shall only be obliged to amend or conclude any **Mandatory Services Agreement** with regard to any **Generating Unit, DC Converter** or **Power Park Module** if:-

(a) either:-

(i) the leading or lagging **Reactive Power** capability required of that **Generating Unit, DC Converter** or **Power Park Module** in accordance with **Grid Code CC 6.3.2** (or, where the **Generating Unit, DC Converter** or **Power Park Module** is **Derogated Plant** of an **Embedded Exemptable Large Power Station** the level to which, it has been **Derogated**) is 15Mvar or more (measured at the **Commercial Boundary**); or

(ii) that **Generating Unit, DC Converter** or **Power Park Module** is at or comprises a **Large Power Station** where such required capability is less than 15Mvar (measured at the **Commercial Boundary**) and the **User** requests **The Company** in writing to so amend or conclude a **Mandatory Services Agreement** with respect thereto; and

(b) there exists in relation to that **Generating Unit, DC Converter** or **Power Park Module** metering facilities meeting the requirements of Appendix 4.

### 3. **Obligatory Reactive Power Service and Enhanced Reactive Power Service – Market Payment Mechanism**

3.1 Nothing in this Part I and the Appendices, and nothing in any **Mandatory Services Agreement** entered into or amended in accordance with sub-Paragraph 2.6, shall prevent or restrict:-

(a) the entering into of an **Ancillary Services Agreement** or the amendment of any **Mandatory Services Agreement** between **The Company** and any **User** to provide for the making of payments by **The Company** to that **User** for the provision of the **Obligatory Reactive Power Service** on an alternative basis to that set out or referred to in Paragraph 2; or

- (a) the entering of an **Ancillary Services Agreement** between **The Company** and any **User** (or other person) for the provision of an **Enhanced Reactive Power Service**,

and any such agreement so entered into in accordance with the principles contained in sub-Paragraph 3.3 is referred to in this Part I and the Appendices as a "**Market Agreement**".

- 3.2 The coming into effect of a **Market Agreement** in relation to any **Generating Unit** , **DC Converter** or **Power Park Module** shall, in respect of that **Generating Unit**, **DC Converter** or **Power Park Module**, suspend and replace for the duration thereof the provisions for payment for the **Obligatory Reactive Power Service** (if applicable) set out or referred to in Paragraph 2. In such a case, and for the avoidance of doubt, with effect from the expiry or termination of the **Market Agreement**, the provisions for payment for the **Obligatory Reactive Power Service** set out or referred to in Paragraph 2 shall in relation to that **Generating Unit**, **DC Converter** or **Power Park Module** cease to be suspended and shall resume full force and effect.

- 3.3 The following principles shall govern the entering into of **Market Agreements**:-

- (a) *Relevant Dates*

- (i) Each **Market Agreement** will commence on either 1<sup>st</sup> April or 1<sup>st</sup> October, whichever next follows the submission by **The Company** of the package of information as more particularly described in sub-Paragraph 3.3(b)(i) ("**Contract Start Days**").

- (ii) For the purposes of this sub-Paragraph 3.3:-

- (a) a "**Market Day**" shall be a date not earlier than twelve weeks and not later than eight weeks prior to a **Contract Start Day**; and

- (b) a "**Tender Period**" shall be a period of at least four consecutive weeks commencing on a date nominated by **The Company** and ending on a **Market Day**.

- (b) *Submission of **Tender** information by **The Company***

- (i) **The Company** shall, acting reasonably and having regard to the principles contained in this sub-Paragraph 3.3, compile a package of information for the use of interested parties comprising technical, procedural and contractual requirements, directions and specifications to govern **Market Agreements** to take effect from the following **Contract Start Day**. **The Company** shall ensure that such requirements, directions and specifications do not conflict with any of the principles contained in this sub-Paragraph 3.3 and so far as reasonably practicable do not discriminate between **Tenderers**.
  - (ii) Prior to the commencement of each **Tender Period**, **The Company** shall provide to all persons who shall by then have requested the same the package of information as more particularly described in sub-Paragraph 3.3(b)(i).
- (c) *Submission of **Tenders***

During the **Tender Period**, but for the avoidance of doubt not later than the **Market Day**, an interested party may submit to **The Company**:-

- (i) in relation to any **Generating Unit, DC Converter** or **Power Park Module** providing the **Obligatory Reactive Power Service**, prices for and **Tendered Capability Breakpoints** relating to the provision thereof; or
- (ii) in relation to that **Generating Unit, DC Converter** or **Power Park Module** a tender for provision of the **Enhanced Reactive Power Service** specified in sub-Paragraph 1.2(a) and/or (b) and/or (c); and/or
- (iii) in relation to any other **Generating Unit, DC Converter** or **Power Park Module** or other **Plant and Apparatus** (or other equipment), a tender for provision of the **Enhanced Reactive Power Service** specified in sub-Paragraph 1.2(b) and/or (c),

in each case in accordance with sub-Paragraph 3.3(d). All such submissions are referred to in this Part I and the Appendices as "**Tenders**", and "**Tenderers**" shall be construed accordingly.

(d) *Form of Tenders*

- (i) All **Tenders** submitted by **Users** which comprise:-
  - (a) prices for and **Tendered Capability Breakpoints** relating to the provision of the **Obligatory Reactive Power Service**; and
  - (b) terms for the provision of the **Enhanced Reactive Power Service** specified in sub-Paragraph 1.2(a),

shall be completed on the basis that payment will be determined in respect of each **Settlement Period** in accordance with the formulae and other provisions set out in Appendix 2 and in the manner set out in Appendix 5.

- (ii) All other **Tenders** (including without limitation those comprising terms for the provision of the **Enhanced Reactive Power Service** specified in sub-Paragraphs 1.2(b) and (c)) shall be submitted in accordance with and on the basis of such (if any) reasonable directions given by **The Company** in the package of information referred to in sub-Paragraph 3.3(b)(i) or otherwise in such manner as may be reasonably specified by **The Company** from time to time, which directions shall in either case be, so far as reasonably practicable, consistent with the provisions of Appendices 2 and 5.
- (iii) Each **Tender** comprising prices for and **Tendered Capability Breakpoints** relating to the provision of the **Obligatory Reactive Power Service** shall be submitted on the basis that **The Company** may only select all (and not some) of the prices and **Tendered Capability Breakpoints** comprised therein.
- (iv) Save where expressly provided otherwise in a **Tender**, each **Tender** comprising terms for the provision of an **Enhanced Reactive Power Service** shall be treated as having been submitted on the basis that **The Company** may select all or part only of the **Reactive Power** capability comprised therein (which, in the case of the **Enhanced Reactive Power Service** specified in sub-Paragraph 1.2(a), shall

mean all or part only of the excess capability comprised therein).

- (v) All **Tenders** shall be submitted in respect of periods of whole and consecutive calendar months, to be not less than twelve months and in multiples of six months, to commence on the next following **Contract Start Day**. Save where expressly provided otherwise in a **Tender**, a **Tender** (whether in relation to the **Obligatory Reactive Power Service** or an **Enhanced Reactive Power Service**) shall be treated as having been submitted on the basis that **The Company** may select all or part only of any period so tendered (in multiples of six months), subject to a minimum period of twelve consecutive months, commencing on the next following **Contract Start Day**.
- (e) *Qualification and Evaluation of **Tenders***
  - (i) Each **Tender** must satisfy the mandatory qualification criteria set out in Section A of Appendix 6.
  - (ii) **The Company** shall evaluate and (without prejudice to sub-Paragraphs 3.3(d)(iii), (iv) and (v)) select **Tenders** (or part(s) thereof) on a basis consistent with its obligations under the **Act** the **Transmission Licence** and the **CUSC** and, subject thereto, in accordance with the evaluation criteria set out in Section B of Appendix 6. Without limitation, **The Company** reserves the right to require tests of a **Generating Unit, DC Converter or Power Park Module** or other **Plant and Apparatus** (or other equipment), on a basis to be agreed with a **Tenderer**, as part of the evaluation of a **Tender**.
  - (iii) **The Company** shall use reasonable endeavours to evaluate **Tenders** within five weeks from each **Market Day**.
- (f) *Entering into **Market Agreements***
  - (i) Having selected a **Tender** (or part(s) thereof) in accordance with sub-Paragraph 3.3(e), **The Company** shall notify the relevant **Tenderer** that it wishes to enter into a **Market Agreement** in respect

thereof, and that **Tenderer** and **The Company** shall each use reasonable endeavours to agree the terms of, and enter into a **Market Agreement** in respect thereof as soon as reasonably practicable but in any event not later than two weeks prior to the relevant **Contract Start Day**. Notwithstanding the foregoing, if a **Market Agreement** has not been entered into by the date being two weeks prior to the relevant **Contract Start Day**, then either **The Company** or the **Tenderer** shall be entitled, provided that it shall have used all reasonable endeavours to agree the terms of, and enter into, the **Market Agreement** as aforesaid, to notify the other that it no longer wishes to enter into the **Market Agreement**, whereupon the **Tender** in question shall be deemed to be withdrawn.

- (ii) In the event of a deemed withdrawal of a **Tender** in the circumstances set out in sub-Paragraph 3.3(f)(i), **The Company** shall be entitled to re-evaluate and select all or part of any outstanding **Tenders** in accordance with sub-Paragraphs 3.3(e)(i) and (ii) and to notify one or more **Tenderers** if, in substitution for the **Tender** so deemed to be withdrawn, it wishes to enter into a **Market Agreement** in respect of any other **Tender** or **Tenders** (or part(s) thereof). Following such notification, **The Company** and each **Tenderer** in question shall use reasonable endeavours to agree the terms of, and enter into, a **Market Agreement** prior to the relevant **Contract Start Day**.
  - (iii) If, in respect of any **Tender**, a **Market Agreement** is not entered into by the relevant **Contract Start Day**, that **Tender** shall be deemed to be withdrawn.
  - (iv) Save where otherwise provided in this Paragraph 3, all **Market Agreements** must be entered into on the basis of the terms set out in the relevant **Tender** (or relevant part(s) thereof).
- (g) *Legal Status of **Tenders***

For the avoidance of doubt, a **Tender** shall not constitute an offer open for acceptance by **The Company**, and in respect of any **Tender** (or part(s) thereof) selected by **The Company**

pursuant to sub-Paragraph 3.3(e) or (f), neither the **Tenderer** in question nor **The Company** shall be obliged to provide or pay for the **Obligatory Reactive Power Service** and/or an **Enhanced Reactive Power Service** upon the terms of that **Tender** (or the relevant part(s) thereof) unless and to the extent that those terms are incorporated in a **Market Agreement** subsequently entered into.

(h) *Publication*

- (i) Within the six weeks following each **Contract Start Day**, **The Company** shall provide to all persons requesting the same the following information:-
- (a) in respect of all **Market Agreements** then subsisting, prices and contracted **Reactive Power** capability on an individual **Tender** basis relating to the period from the immediately preceding **Contract Start Day** until the next following **Contract Start Day**;
  - (b) in respect of all **Mandatory Services Agreements** and **Market Agreements** subsisting in respect of the six month period ending on the immediately preceding **Contract Start Day**, details of utilisation of Mvarh provided by individual **BM Units** (or, where relevant, other **Plant** and/or **Apparatus** or other equipment) pursuant to the **Obligatory Reactive Power Service** and **Enhanced Reactive Power Service**;
  - (c) details of the circumstances surrounding any failure by **The Company** during the preceding six month period to perform any of its duties and responsibilities under this Paragraph 3 in the circumstances referred to in Paragraph 5; and
  - (d) any other information reasonably considered by **The Company** to be pertinent to the **Tender** process, and, to this extent, each relevant **User** consents to the disclosure by **The Company** of the information referred to in sub-sub-Paragraphs (a) and (b) above in so far as it relates to the provision of the **Obligatory**

**Reactive Power Service** and (where applicable) an **Enhanced Reactive Power Service** from its **Generating Units, DC Converters** or **Power Park Modules** and/or other **Plant** and **Apparatus** (or other equipment).

- (ii) Without prejudice to the provision of information pursuant to sub-Paragraph 3.3(h)(i), **The Company** further agrees to use all reasonable endeavours to provide to all persons requesting the same, within the six weeks following each **Contract Start Day**, estimates of the Mvarh absorption and generation by the **GB Transmission System**, where used for the purposes of voltage support, during the preceding six month period.

#### **4. Amendment and Conclusion of Mandatory Services Agreements**

- 4.1 **The Company** and each relevant **User** shall promptly do all such acts and execute and deliver such agreements and other documentation as may be necessary to amend or conclude the relevant **Mandatory Services Agreements** so as to give effect to the provisions of this Part I and the Appendices as amended from time to time.
- 4.2 Sub-Paragraphs 2.6 and 4.1 shall not require **The Company** or any **User** to amend or conclude a **Mandatory Services Agreement** so as to give effect to this Part I and the Appendices if and to the extent that, in respect of any **Generating Unit, DC Converter** or **Power Park Module**. **The Company** and such **User** shall have expressly agreed in writing that no payments shall be made by **The Company** to such **User** under an **Ancillary Services Agreement** for the provision of the **Obligatory Reactive Power Service** from that **Generating Unit, DC Converter** or **Power Park Module** (as the case may be).

#### **5. Statutory and Regulatory Obligations**

- 5.1 Neither **The Company** nor any **User** shall be bound to perform any of its duties or responsibilities under this Part I and the Appendices (including without limitation with regard to the amending or concluding of **Mandatory Services Agreements** in accordance with sub-Paragraph 2.6 and the entering into of **Market Agreements** in accordance with Paragraph 3) if and to the extent that to do so would be likely to involve that party in breach of its

duties and obligations (if any) under the **Act** of or any condition of a **Licence**. Accordingly, nothing in this Part I and the Appendices shall preclude **The Company** from procuring the provision of any **Enhanced Reactive Power Service** in a manner otherwise than in accordance with Paragraph 3 in order to comply with its duties and obligations under the **Act** and/or any condition of the **Transmission Licence** to the extent such compliance cannot reasonably be assured by the performance of its duties and responsibilities under Paragraph 3.

- 5.2 Without prejudice to sub-Paragraph 5.1, **The Company** shall not be bound to comply with the provisions of sub-Paragraph 3.3(h) with regard to the disclosure of information to the extent that to do so would be likely to restrict, distort or prevent competition in the provision of the **Obligatory Reactive Power Service** and/or **Enhanced Reactive Power Service**.

## 6. Redundant Provisions

Certain redundant provisions of Schedule 5 to the **MCUSA** with respect to capability payments comprised within the default payment arrangements and matters for review which were applicable on and from 1 October 1997 but are of no continuing effect by effluxion of time or otherwise, together with other provisions contained elsewhere in this Part I and the Appendices which, prior to the **CUSC Implementation Date**, included reference to such provisions, are set out (or, as the case may be, repeated) for information purposes only in Appendix 9.

## APPENDIX 1

### Obligatory Reactive Power Service – Default Payment Arrangements

The provisions of this Appendix 1, as referred to in sub-Paragraph 2.2 of this Part I, shall apply to the calculation of default payments for provision of the **Obligatory Reactive Power Service** from **BM Units**. All payments shall be expressed in pounds sterling.

#### 1. Total Payment

Total Payment (PT) = PU [*£ per Settlement Period per BM Unit*]

where, subject always to paragraphs 5 and 6 below:

PU = the utilisation payment in respect of a **BM Unit** for a **Settlement Period** determined in accordance with paragraph 2 below.

#### 2. Utilisation Payment

PU =  $BP_U * U$  [*£ per Settlement Period per BM Unit*]

Where

$BP_U = \frac{46,270,000 * I * X * Y}{42,054,693}$  [*£/Mvarh*]

Where

I = defined in paragraph 3 below;

X = 1 (unless the circumstances in sub-paragraphs (a) through to (d) apply)

And where X shall be 0.2 in all **Settlement Periods** from (and including) that in which:-

- (a) the relevant **BM Unit** (or, in relation to a **CCGT Module**, any relevant **CCGT Unit**) fails a **Reactive Test** until (and including) the

**Settlement Period** in which a subsequent **Reactive Test** is passed in relation to that **BM Unit** (or **CCGT Unit** (as the case may be)); or

- (b) the **User** fails (other than pursuant to an instruction given by **The Company** or as permitted by the **Grid Code**) to set the automatic voltage regulator of the **BM Unit** (or, in relation to a **CCGT Module**, any relevant **CCGT Unit**) to a voltage following mode until (and including) the **Settlement Period** in which the **User** notifies **The Company** that the automatic voltage regulator is so set; or
- (c) the **BM Unit** fails to comply with a **Reactive Despatch Instruction** due to the fact that the **BM Unit** (or, in relation to a **CCGT Module**, any relevant **CCGT Unit**) is unable to increase and/or decrease its Mvar output (other than as a direct result of variations in **System** voltage) until (and including) the **Settlement Period** in which the **User** notifies **The Company** that the **BM Unit** is so able to comply; or
- (d) the **BM Unit** fails to have a Mvar range which includes the ability to provide zero Mvar at the **Commercial Boundary** until (and including) the **Settlement Period** in which the **User** notifies **The Company** that the **BM Unit** has or once more has such range; and

Y = 1, except that Y shall be 0 in all **Settlement Periods** from and including that in which the **BM Unit** is affected by a **Reactive Despatch to Zero Mvar Network Restriction** until (and including) the **Settlement Period** in which notification is given to **The Company** pursuant to the **Grid Code** that such **Reactive Despatch to Zero Mvar Network Restriction** is no longer affecting that **BM Unit**

U = defined in Section 1 of Appendix 3

### 3. Indexation

3.1 The indexation factor I used in the formulae in paragraph 2 above shall be determined as follows:-

- (a) For all periods up to (and including) 31<sup>st</sup> March, 2004, I shall with effect from 1<sup>st</sup> April in respect of each subsequent 12 month period ending 31<sup>st</sup> March be determined as follows:-

$$I = \frac{RP1_2}{RP1_1}$$

where

For the period from (and including) 1<sup>st</sup> October, 1997 to (and including) 31<sup>st</sup> March, 1998  $RPI_2 = 155.4$ , and thereafter  $RPI_2$  is the RPI for March of the immediately preceding twelve month period ending 31<sup>st</sup> March.

$RPI_1$  is the RPI for March, 1994 (142.5).

### 3.2

- (b) For all periods from (and including) 1<sup>st</sup> April, 2004, I shall in respect of each calendar month be determined as follows:-

$$I = I_m$$

where

$I_m$  = the indexation factor I for the calendar month in question

$$I_m = C * [(0.5 * FRPI_m / RPI_x) + (0.5 * PI_m)]$$

where

$$C = RPI_x / RPI_1$$

$RPI_x$  is the RPI for March, 2003 (179.9)

$RPI_1$  is as defined in sub-paragraph (a) above

$FRPI_m$  is the Forecast RPI for the calendar month in question

and where  $PI_m$  is a wholesale power price index determined as follows:-

$$PI_m = [(p * HPI_m / HPI_1) + (q * PAPI_m / PAPI_1) + (r * PPI_m / PPI_1)]$$

Where

$HPI_m$  is the mean average of the OTC baseload month ahead Heren power index bid and offer prices for all days on which this index is published in the calendar month immediately preceding the calendar month in question

$PAPI_m$  is the mean average of the OTC baseload month ahead Petroleum Argus power index bid and offer prices for all days on which this index is published in the calendar month immediately preceding the calendar month in question

$PPI_m$  is the mean average of the OTC baseload month ahead Platts power index bid and offer prices for all days on which this index is published in the calendar month immediately preceding the calendar month in question

and where

$p = 1/3$  (subject always to sub-paragraph 3.2 (c))

$q = 1/3$  (subject always to sub-paragraph 3.2(c))

$r = 1/3$  (subject always to sub-paragraph 3.2(c))

and where

$HPI_1$  is the mean average of the OTC baseload month ahead Heren power index bid and offer prices for all days on which this index is published during the period from (and including) 1<sup>st</sup> October 2002 to (and including) 30<sup>th</sup> September 2003

$PAPI_1$  is the mean average of the OTC baseload month ahead Petroleum Argus power index bid and offer prices for all days on which this index is published during the period from (and including) 1<sup>st</sup> October 2002 to (and including) 30<sup>th</sup> September 2003

$PPI_1$  is the mean average of the OTC baseload month ahead Platts power index bid and offer prices for all days on which this index is published during the period from (and including) 1<sup>st</sup> October 2002 to (and including) 30<sup>th</sup> September 2003

3.2 For the purposes of sub-paragraph 3.1 above:-

- (a) the RPI Index used is the **Retail Price Index** with 1987 = 100 base, and the source of the RPI Index is the monthly Office for National Statistics "Business Monitor MM23";
- (b) Forecast RPI is as provided monthly by Experian Business Strategies Ltd; and
- (c) if in respect of any calendar month the mean average of any of the power indices more particularly referred to in sub-paragraph 3.1(b) is incapable of being derived and/or there is a material change in the basis of that power index, then subject as provided below, for the purpose of sub-paragraph 3.1(b) **The Company** shall determine the wholesale power price index  $PI_m$  for that calendar

month by substituting for the original value of factor p,q, or r as relates to that power index (“the Affected Factor”) the value of zero, and by substituting for the original value of each of the remaining factors p, q, or r a value which is increased from the original value by a pro rata proportion of the original value of the Affected Factor. Provided always that if in respect of any calendar month the mean average of each of such power indices is incapable of being derived and/or there is a material change in the basis of each such power index, then **The Company** shall determine the wholesale power price index  $PI_m$  for that calendar month by substituting for the value  $PI_m$  in the determination of  $I_m$  the value  $FRPI_m/RPI_x$ .

#### 4. Information Unavailable

Save where otherwise provided in this Part I, where any information or data required by **The Company** for the calculation of payments to be made pursuant to this Part I is not available to **The Company** at the relevant time, **The Company** shall calculate payments using **The Company’s** best estimate of the unavailable information of data. Once such information or data is available, **The Company** shall accordingly make all consequential adjustments to the payments from itself to **Users** as soon as reasonably practicable thereafter to reflect any repayment or additional payment so required to be made by one party to the other in respect of the relevant period (including interest thereon at the **Base Rate** from the original date of payment or due date (as the case may be) until the date of such repayment or additional payment).

#### 5. Commissioning

- 5.1 Save in relation to **BM Units** operational prior to 1<sup>st</sup> April, 1997 no utilisation payments referred to in this Appendix 1 shall fall due and payable to any **User** in respect of any **BM Unit** until the **Settlement Period** in which it is demonstrated to the reasonable satisfaction of **The Company**, having regard to industry practice, that the **BM Unit** (or, in the case of a **CCGT Module**, but subject always to sub-paragraph 5.4 below, each relevant **CCGT Unit**) complies with the provisions of **Grid Code CC 6.3.2** and **CC 6.3.4** or (where **The Company** in its sole discretion requires **Reactive Power** from a **BM Unit** before then for the purposes of security of the **GB Transmission System**) such earlier date as **The Company** may agree with a **User** in respect of that **BM Unit**.
- 5.2 Before any demonstration of compliance referred to in sub-paragraph 5.1 above, it shall be necessary for the **User** to demonstrate to **The Company’s** reasonable satisfaction, having regard to industry practice, that the **BM Unit’s** (or, in the case of a **CCGT Module**, each relevant **CCGT Unit’s**) **Excitation System**, and in particular the under–excitation

limiter, has been successfully commissioned and complies with the provisions of **Grid Code CC 6.3.8**.

5.3 For the avoidance of doubt the issue by **The Company** in relation to a **BM Unit** of a **Reactive Despatch Instruction** to unity power factor or zero Mvar shall neither imply by itself that **The Company** is reasonably satisfied with compliance as referred to in sub-paragraph 5.1 above nor imply in relation to the **BM Unit** agreement by **The Company** of an earlier date as also referred to therein.

5.4 Until such time as it shall be demonstrated to the reasonable satisfaction of **The Company** that, in relation to a **CCGT Module**, all relevant **CCGT Units** comply with the provisions of **Grid Code CC 6.3.2** and **CC 6.3.4** as referred to in sub-paragraph 5.1 above, it is the intention that utilisation payments shall fall due to a **User** in respect of that **CCGT Module** notwithstanding the provisions of sub-paragraph 5.1 above. For such period, and in relation to that **CCGT Module**, only, this Appendix 1 and the definitions of QC and QR set out in Appendix 3 shall be read and construed accordingly.

## 6. **De-energisation and Disconnection**

Subject to all rights and obligations of **The Company** and the **User** accrued at such date, utilisation payments referred to in this Appendix 1 shall cease to fall due and payable to any **User** in respect of any **BM Unit** with effect from the date of expiry or termination for whatever reason of the relevant **Mandatory Services Agreement** in accordance with its terms or (if earlier) with effect from the date of **De-energisation** or **Disconnection** of that **BM Unit** for any reason pursuant to the relevant **Bilateral Agreement** or the **CUSC**.

## Appendix 2

### Obligatory Reactive Power Service and Enhanced Reactive Power Services – Market Payment Mechanism

The provisions of this Appendix 2, as referred to in sub-Paragraph 3.3(d)(i) of this Part I, shall apply to the calculation of payments in respect of **Tenders** comprising prices for and **Tendered Capability Breakpoints** relating to the **Obligatory Reactive Power Service** and in respect of **Tenders** comprising terms for the provision of the **Enhanced Reactive Power Services** specified in sub-Paragraph 1.2(a) of this Part I, in each case in respect of **BM Units**. All payments shall be expressed in pounds sterling. All algebraic terms contained in this Appendix 2 shall bear the meanings set out in paragraph 1 below unless the context otherwise requires.

#### 1. Definitions

For the purposes of this Appendix 2, unless the context otherwise requires, the following terms shall have the following meanings:-

- CA1,CA2 and CA3 = the available capability prices (expressed to apply to both leading and lagging) (£/Mvar/h) (as more particularly described in paragraph 2 of Appendix 5) as specified in the relevant **Market Agreement**;
- CS1,CS2 and CS3 = the synchronised capability prices (expressed to apply to both leading and lagging) (£/Mvar/h) (as more particularly described in paragraph 2 of Appendix 5) as specified in the relevant **Market Agreement**;
- CU1,CU2 and CU3 = the utilisation prices (expressed to apply to both leading and lagging) (£/Mvarh) (as more particularly described in paragraph 2 of Appendix 5) as specified in the relevant **Market Agreement**;
- K = in respect of **CCGT Modules** and **Power Park Modules** the relevant configuration factor as specified in the relevant **Market Agreement**, otherwise 1;
- $Q_{lead}$  = defined in Section 2 of Appendix 3;
- $Q_{lag}$  = defined in Section 2 of Appendix 3;

$QM_{ij}$	=	<b>BM Unit Metered Volume</b> (as defined in the <b>Balancing and Settlement Code</b> );
Q1, Q2 and Q3	=	the contracted capability breakpoints (expressed to apply to both leading and lagging) in whole Mvar as may be specified in the relevant <b>Market Agreement</b> , where: <ul style="list-style-type: none"> <li>(i) Q1 = TQ1, Q2 = TQ2 and Q3 = QC where <math>TQ2 &lt; QC \leq TQ3</math></li> <li>(ii) Q1 = TQ1, Q2 = QC Q3 = null where <math>TQ1 &lt; QC \leq TQ2</math></li> <li>(iii) Q1 = QC, Q2 = null Q3 = null where <math>0 \leq QC \leq TQ1</math></li> </ul>
SPD	=	the duration of a <b>Settlement Period</b> , being 0.5;
TQ1, TQ2 and TQ3	=	defined in Appendix 5;
$U_{lead}$	=	defined in Section 1 of Appendix 3;
$U_{lag}$	=	defined in Section 1 of Appendix 3;
V	=	the system voltage range performance factor (expressed to apply to both leading and lagging) as calculated in accordance with the formulae set out in the relevant <b>Market Agreement</b> , otherwise 1;
$MEL_i(t)$	=	<b>Maximum Export Limit</b> (as defined in the <b>Balancing and Settlement Code</b> ).

## 2. Total Payment

Total Payment (PTM) = PUM + PCA + PCS      [*£ per Settlement Period per BM Unit*]

where, subject always to paragraphs 6, 7 and 8 below:

PUM = the utilisation payment in respect of a **BM Unit** for a **Settlement Period** determined in accordance with paragraph 3 below;

PCA = the available capability payment in respect of a **BM Unit** for a **Settlement Period** determined in accordance with paragraph 4 below; and

PCS = the synchronised capability payment in respect of a **BM Unit** for a **Settlement Period** determined in accordance with paragraph 5 below.

Provided always that PTM shall be 0 in all **Settlement Periods** from and including that in which:-

- (a) the relevant **BM Unit** (or, in relation to a **CCGT Module**, any relevant **CCGT Unit**) fails a **Reactive Test** or a **Contract Test** until (and including) the **Settlement Period** in which a subsequent **Reactive Test** or **Contract Test** (as the case may be) is passed in relation to that **BM Unit** (or **CCGT Unit** (as the case may be)); or
- (b) the **User** fails (other than pursuant to an instruction given by **The Company** or as permitted by the **Grid Code**) to set the automatic voltage regulator of the **BM Unit** (or, in relation to a **CCGT Module**, any relevant **CCGT Unit**) to a voltage following mode until (and including) the **Settlement Period** in which the **User** notifies **The Company** that the automatic voltage regulator is so set; or
- (c) the **BM Unit** fails to comply with a **Reactive Despatch Instruction** due to the fact that the **BM Unit** (or, in relation to a **CCGT Module**, any relevant **CCGT Unit**) is unable to increase and/or decrease its Mvar **Output** (other than as a direct result of variations in **System** voltage) until (and including) the **Settlement Period** in which the **User** notifies **The Company** that the **BM Unit** is so able to comply; or
- (d) the **BM Unit** fails to have a Mvar range which includes the ability to provide zero Mvar at the **Commercial Boundary** until (and

including) the **Settlement Period** in which the **User** notifies **The Company** that the **BM Unit** has or once more has such range; or

- (e) the **BM Unit** is affected by a **Reactive Despatch to Zero Mvar Network Restriction** until (and including) the **Settlement Period** in which notification is given to **The Company** pursuant to the **Grid Code** that such **Reactive Despatch to Zero Mvar Network Restriction** is no longer affecting that **BM Unit**

### 3 Utilisation Payment

3.1 For each **Settlement Period**,

$$PUM = PUM_{lead} + PUM_{lag} \quad [\text{£ per Settlement Period per BM Unit}]$$

where

$PUM_{lead}$  = defined in sub-paragraph 3.2 below;

$PUM_{lag}$  = defined in sub-paragraph 3.3 below.

3.2 Leading Utilisation ( $PUM_{lead}$ )

There are four mutually exclusive cases (a), (b), (c) or (d):

(a) If  $Q2_{lead} < (U_{lead}/SPD)$  and both  $Q2_{lead}$  and  $Q3_{lead}$  are not deemed null  
(i.e. there are three breakpoints)

then  $PUM_{lead} = SPD * [(CU1_{lead} * Q1_{lead}) + (CU2_{lead} * (Q2_{lead} - Q1_{lead})) + (CU3_{lead} * ((U_{lead}/SPD) - Q2_{lead}))]$

(b) If either  $Q1_{lead} < (U_{lead}/SPD) \leq Q2_{lead}$  and  $Q2_{lead}$  is not deemed null  
(i.e. there are at least two breakpoints)

or  $Q2_{lead} < (U_{lead}/SPD)$  and  $Q2_{lead}$  is not deemed null and  $Q3$  is deemed null  
(i.e. there are only two breakpoints)

then  $PUM_{lead} = SPD * [(CU1_{lead} * Q1_{lead}) + (CU2_{lead} * ((U_{lead}/SPD) - Q1_{lead}))]$

- (c) If
- either  $0 < (U_{lead}/SPD) \leq Q1_{lead}$   
*(i.e. irrespective of the number of breakpoints)*
- or  $Q1_{lead} < (U_{lead}/SPD)$  and  $Q2_{lead}$  and  $Q3_{lead}$  are deemed null  
*(i.e. there is only one breakpoint)*
- then  $PUM_{lead} = CU1_{lead} * U_{lead}$
- (d) otherwise
- $PUM_{lead} = 0$                       *[£ per **Settlement Period** per **BM Unit**]*

### 3.3 Lagging Utilisation ( $PUM_{lag}$ )

There are four mutually exclusive cases (a), (b), (c) or (d):

- (a) If  $Q2_{lag} < (U_{lag}/SPD)$  and both  $Q2_{lag}$  and  $Q3_{lag}$  are not deemed null  
*(i.e. there are three breakpoints)*
- then  $PUM_{lag} = SPD * [(CU1_{lag} * Q1_{lag}) + (CU2_{lag} * (Q2_{lag} - Q1_{lag})) + (CU3_{lag} * ((U_{lag}/SPD) - Q2_{lag}))]$
- (b) If
- either  $Q1_{lag} < (U_{lag}/SPD) \leq Q2_{lag}$  and  $Q2_{lag}$  is not deemed null  
*(i.e. there are at least two breakpoints)*
- or  $Q2_{lag} < (U_{lag}/SPD)$  and  $Q2_{lag}$  is not deemed null and  $Q3$  is deemed null  
*(i.e. there are only two breakpoints)*
- then  $PUM_{lag} = SPD * [(CU1_{lag} * Q1_{lag}) + (CU2_{lag} * ((U_{lag}/SPD) - Q1_{lag}))]$
- (c) If
- either  $0 < (U_{lag}/SPD) \leq Q1_{lag}$   
*(i.e. irrespective of the number of breakpoints)*
- or  $Q1_{lag} < (U_{lag}/SPD)$  and  $Q2_{lag}$  and  $Q3_{lag}$  are deemed to be null

(i.e. there is only one breakpoint)

then  $PUM_{lag} = CU1_{lag} * U_{lag}$

(d) otherwise

$PUM_{lag} = 0$  [£ per **Settlement Period** per **BM Unit**]

#### **4 Available Capability Payment**

4.1 For each **Settlement Period**,

where at any time  $MEL_i(t) > 10MW$

then  $PCA = K * ((V_{lead} * PCA_{lead}) + (V_{lag} * PCA_{lag}))$

otherwise

$PCA = 0$  [£ per **Settlement Period** per **BM Unit**]

where

$PCA_{lead}$  = defined in sub-paragraph 4.2 below;

$PCA_{lag}$  = defined in sub-paragraph 4.3 below.

4.2 Available Leading Capability ( $PCA_{lead}$ )

There are four mutually exclusive cases (a), (b), (c) or (d):

(a) If  $Q2_{lead} < Q_{lead} \leq Q3_{lead}$  and both  $Q2_{lead}$  and  $Q3_{lead}$  are not deemed null  
(i.e. there are three breakpoints)

then  $PCA_{lead} = SPD * [(CA1_{lead} * Q1_{lead}) + (CA2_{lead} * (Q2_{lead} - Q1_{lead})) + (CA3_{lead} * (Q_{lead} - Q2_{lead}))]$

(b) If  $Q1_{lead} < Q_{lead} \leq Q2_{lead}$  and  $Q2_{lead}$  is not deemed null  
(i.e. there are at least two breakpoints)

then  $PCA_{lead} = SPD * [(CA1_{lead} * Q1_{lead}) + (CA2_{lead} * (Q_{lead} - Q1_{lead}))]$

(c) If  $0 < Q_{lead} \leq Q1_{lead}$

*(i.e. irrespective of the number of breakpoints)*

then  $PCA_{lead} = SPD * CA1_{lead} * Q_{lead}$

(d) otherwise

$PCA_{lead} = 0$  *[£ per **Settlement Period** per **BM Unit**]*

#### 4.3 Available Lagging Capability ( $PCA_{lag}$ )

There are four mutually exclusive cases (a), (b), (c) or (d):

(a) If  $Q2_{lag} < Q_{lag} \leq Q3_{lag}$  and  $Q2_{lag}$  and  $Q3_{lag}$  are not deemed null  
*(i.e. there are three breakpoints)*

then  $PCA_{lag} = SPD * [(CA1_{lag} * Q1_{lag}) + (CA2_{lag} * (Q2_{lag} - Q1_{lag})) + (CA3_{lag} * (Q_{lag} - Q2_{lag}))]$

(b) If  $Q1_{lag} < Q_{lag} \leq Q2_{lag}$  and  $Q2_{lag}$  is not deemed null  
*(i.e. there are at least two breakpoints)*

then  $PCA_{lag} = SPD * [(CA1_{lag} * Q1_{lag}) + (CA2_{lag} * (Q_{lag} - Q1_{lag}))]$

(c) If  $0 < Q_{lag} \leq Q1_{lag}$   
*(i.e. irrespective of the number of breakpoints)*

then  $PCA_{lag} = SPD * CA1_{lag} * Q_{lag}$

(d) otherwise

$PCA_{lag} = 0$  *[£ per **Settlement Period** per **BM Unit**]*

### 5. Synchronised Capability Payment

5.1 For each **Settlement Period**,

where  $QM_{ij} > 5MWh$

$PCS = K * ((V_{lead} * PCS_{lead}) + (V_{lag} * PCS_{lag}))$

Otherwise

$$PCS = 0 \quad [\text{£ per Settlement Period per BM Unit}]$$

where

$PCS_{lead}$  = defined in sub-paragraph 5.2 below;

$PCS_{lag}$  = defined in sub-paragraph 5.3 below.

## 5.2 Synchronised Leading Capability ( $PCS_{lead}$ )

There are four mutually exclusive cases (a), (b), (c) and (d):

(a) If  $Q2_{lead} < Q_{lead} \leq Q3_{lead}$  and  $Q2_{lead}$  and  $Q3_{lead}$  are not deemed null  
(i.e. there are three breakpoints)

$$\text{then } PCS_{lead} = SPD * [(CS1_{lead} * Q1_{lead}) + (CS2_{lead} * (Q2_{lead} - Q1_{lead})) + (CS3_{lead} * (Q_{lead} - Q2_{lead}))]$$

(b) If  $Q1_{lead} < Q_{lead} \leq Q2_{lead}$  and  $Q2_{lead}$  is not deemed null  
(i.e. there are at least two breakpoints)

$$\text{then } PCS_{lead} = SPD * [(CS1_{lead} * Q1_{lead}) + (CS2_{lead} * (Q_{lead} - Q1_{lead}))]$$

(c) If  $0 < Q_{lead} \leq Q1_{lead}$   
(i.e. irrespective of the number of breakpoints)

$$\text{then } PCS_{lead} = SPD * CS1_{lead} * Q_{lead}$$

(d) otherwise

$$PCS_{lead} = 0 \quad [\text{£ per Settlement Period per BM Unit}]$$

## 5.3 Synchronised Lagging Capability ( $PCS_{lag}$ )

There are four mutually exclusive cases (a), (b), (c) or (d):

(a) If  $Q2_{lag} < Q_{lag} \leq Q3_{lag}$  and  $Q2_{lag}$  and  $Q3_{lag}$  are not deemed null  
(i.e. there are three breakpoints)

$$\text{then } PCS_{lag} = SPD * [(CS1_{lag} * Q1_{lag}) + (CS2_{lag} * (Q2_{lag} - Q1_{lag})) + (CS3_{lag} * (Q_{lag} - Q2_{lag}))]$$

- (b) If  $Q1_{lag} < Q_{lag} \leq Q2_{lag}$  and  $Q2_{lag}$  is not deemed null  
*(i.e. there are at least two breakpoints)*
- then  $PCS_{lag} = SPD * [(CS1_{lag} * Q1_{lag}) + (CS2_{lag} * (Q_{lag} - Q1_{lag}))]$
- (c) If  $0 < Q_{lag} \leq Q1_{lag}$   
*(i.e. irrespective of the number of breakpoints)*
- then  $PCS_{lag} = SPD * CS1_{lag} * Q_{lag}$
- (d) otherwise
- $PCS_{lag} = 0$  [ $\pounds$  per **Settlement Period** per **BM Unit**]

## 6. Testing

**The Company** reserves the right to require to be included in any **Market Agreement**, on a basis to be agreed with a **Tenderer**, terms with regard to the carrying out of a **Contract Test**. The provisions of **Grid Code OC 5.5.1** relating to the carrying out of a **Reactive Test** (including re-tests) shall apply to the carrying out of **Contract Tests**.

## 7. Termination

Save where expressly provided otherwise in a **Tender**, each **Market Agreement** shall contain terms entitling **The Company** to terminate that **Market Agreement** in the event that the **User** fails to provide a satisfactory level of service and entitling the **User** to terminate the **Market Agreement** in the event that **The Company** fails (without reasonable cause) to make due payment to the **User**, in each case as more particularly defined therein.

## 8. De-energisation and Disconnection

Subject to all rights and obligations of **The Company** and the **User** accrued at such date, utilisation, available capability and synchronised capability payments referred to in this Appendix 2 shall cease to fall due and payable to any **User** in respect of any **BM Unit** with effect from the date of expiry or termination for whatever reason of the relevant **Market Agreement** in accordance with its terms or (if earlier) with effect from the date of **De-energisation** or **Disconnection** of that **BM Unit** for any reason pursuant to the relevant **Bilateral Agreement** or the **CUSC**.

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### Appendix 3

#### Technical Data

##### Section 1 Reactive Utilisation Data

This Section 1 of Appendix 3 specifies the technical data to be used to determine the utilisation payments to be made in accordance with Appendix 1 and Appendix 2. For the purposes thereof, the following terms shall have the following meanings:-

$U_{lead}$  = leading Mvarh produced by the relevant **BM Unit** at the **Commercial Boundary** in the relevant **Settlement Period** measured by metering meeting the requirements of Appendix 4 and as specified in the relevant **Mandatory Services Agreement** and/or **Market Agreement** where the **User** has complied with a **Reactive Despatch Instruction** in accordance with **Grid Code BC 2**, otherwise 0;

$U_{lag}$  = lagging Mvarh produced by the relevant **BM Unit** at the **Commercial Boundary** in the relevant **Settlement Period** measured by metering meeting the requirements of Appendix 4 and as specified in the relevant **Mandatory Services Agreement** and/or **Market Agreement** where the **User** has complied with a **Reactive Despatch Instruction** in accordance with **Grid Code BC 2**, otherwise 0;

$U$  = the total Mvarh (leading and lagging)

where

$$U = U_{lead} + U_{lag} \quad [Mvarh \text{ per } \mathbf{Settlement Period} \text{ per } \mathbf{BM Unit}]$$

For the avoidance of doubt, leading Mvarh shall mean Mvarh imported by the **BM Unit** at the **Commercial Boundary** irrespective of the direction of **Active Power** flow, and lagging Mvarh shall mean Mvarh exported by the **BM Unit** at the **Commercial Boundary** irrespective of the direction of **Active Power** flow.

**Section 2**  
**Reactive Power Capability Data and Redeclarations**

This Section 2 of Appendix 3 specifies the technical data to be used to determine the capability payments to be made in accordance with Appendix 2.

1. For the purposes thereof, the following terms shall have the following meanings:-

$$Q_{\text{lead}} = \min (QR_{\text{lead}}, QC_{\text{lead}}) [Mvar]$$

$$Q_{\text{lag}} = \min (QR_{\text{lag}}, QC_{\text{lag}}) [Mvar]$$

where

QC = as specified in the relevant **Mandatory Services Agreement** and/or **Market Agreement**, being either (1) the high voltage value (specified in whole Mvar) equivalent at the **Commercial Boundary** to the low voltage Mvar capability (leading or lagging) of the relevant **BM Unit** as described in paragraph 2 below, or (2) where applicable, the high voltage Mvar capability (leading or lagging) of the relevant **BM Unit** as described in paragraph 2 below, in each case representing the capability to supply continuously leading or lagging Mvar (as the case may be);

QR = as determined in accordance with the relevant **Mandatory Services Agreement** and/or **Market Agreement**, being, in relation to a **Settlement Period**, either (1) the high voltage value (specified in whole Mvar) equivalent to the redeclared low voltage Mvar capability (leading or lagging) or (2) the redeclared high voltage Mvar capability (leading or lagging), in each case of the relevant **BM Unit** (or, in the absence of such redeclaration, such high voltage value reasonably determined by **The Company** as a result of monitoring and/or testing as provided in the relevant **Mandatory Services Agreement** and/or **Market Agreement**), and  $QR_{\text{lead}}$  and  $QR_{\text{lag}}$  shall be construed accordingly.

2. (a) In respect of capability payments made in accordance with Appendix 1:-
- (i) QC shall be the low voltage (or high voltage, as the case may be) capability required to be provided under and in accordance with the **Connection Conditions** of the **Grid Code** (where applicable, as determined by any direction in

force from time to time and issued by the **Authority** relieving the relevant **User** from the obligation under its **Licence** to comply with such part or parts of the **Grid Code** as may be specified therein); and

- (ii) QC and QR shall represent the high voltage (or high voltage value equivalent capability (or redeclared capability) at **Rated MW** at the **Commercial Boundary**.
- (b) In respect of capability payments made pursuant to a **Market Agreement** in accordance with Appendix 2:-
- (i) QC shall be the capability required to be provided under and in accordance with the **Connection Conditions** of the **Grid Code** or, where the **Market Agreement** is in respect of a **Tender** for terms for the provision of the **Enhanced Reactive Power Service** specified in sub-Paragraph 1.3(a) of this Part I, a capability agreed to be provided in excess of that required under and in accordance with the **Connection Conditions** of the **Grid Code** but so that in such a case QC cannot exceed TQ3 (defined in Appendix 5);
  - (ii) QC shall represent the high voltage value equivalent at a nominated **Registered Capacity** specified by a **Tenderer** in the **Tender** at the **Commercial Boundary** within the system voltage range specified in the relevant **Market Agreement**; and
  - (iii) QR shall represent the high voltage value equivalent at the then current **Registered Capacity** at the **Commercial Boundary** within the system voltage range specified in the relevant **Market Agreement**.
- (c) For the purposes of this Section 2, the figures for QC and QR shall be determined in a manner consistent with the principles and methodologies set out in a document published or to be published from time to time by **The Company** for this purpose.

For the avoidance of doubt, leading capability shall mean the ability to import **Reactive Power** at the **Commercial Boundary** irrespective of the direction of **Active Power** flow, and lagging capability shall mean the ability to export **Reactive Power** at the **Commercial Boundary** irrespective of the direction of **Active Power** flow.

## Appendix 4 Metering

### 1 Balancing and Settlement Code

For the avoidance of doubt, nothing in this Appendix shall affect the rights and obligations of **The Company** and those **Users** also bound by the **Balancing and Settlement Code** by virtue of being a party to the **BSC Framework Agreement** with regard to **Metering Equipment** and **Metering Systems** insofar as such provisions relate to **Reactive Energy**.

### 2. BM Units

2.1 For the purposes of this Part I and the Appendices, subject always to sub-paragraph 2.2, the quantities of Mvarh imported and exported by a **BM Unit** shall be derived from the relevant **Metering System** for that **BM Unit** registered pursuant to Section K of the **Balancing and Settlement Code**.

2.2 Where the existing **Metering System** for the **BM Unit** registered pursuant to Section K of the **Balancing and Settlement Code** does not incorporate **Metering Equipment** capable of measuring and recording Mvarh imports and exports for that **BM Unit** for each **Settlement Period**, then the relevant **User** shall register or procure that there is registered pursuant to Section K of the **Balancing and Settlement Code** a **Metering System** which does incorporate such **Metering Equipment**.

2.3 All relevant **Metering Equipment** identification and location codes shall be set out in the relevant **Mandatory Services Agreement**, and the **User** hereby agrees to facilitate agreement between **The Company** and that **User** with respect thereto by providing **The Company** as soon as reasonably practicable following request with all necessary supporting diagrams and other written documentation.

2.4 Where the configuration of the **Metering System** is such that:-

2.4.1 Mvarh import and export values for the **BM Unit** are not measured at the **Commercial Boundary**; and/or

2.4.2 Mvarh import and export values for the **BM Unit** are measured by more than one **Meter**; and/or

2.4.3 the Mvarh import and export values for the **BM Unit** are measured by a **Meter** which also measures the Mvarh import and export values of one or more other **Generating Units, DC Converters, Power Park Modules Plant and Apparatus** or other equipment,

then appropriate loss adjustment factors and aggregation methodologies (as the case may be) shall be used to determine on a **Settlement Period** basis the Mvarh import value and Mvarh export value for the relevant **BM Unit** at the **Commercial Boundary** to be used for the purposes of this Part I.

The appropriate factors and methodologies for each relevant **BM Unit** shall be agreed by **The Company** and each relevant **User** (both acting reasonably) in the relevant **Mandatory Services Agreement** by adoption of one or more of the factors or methodologies set out in the document entitled "Methodology Document for the Aggregation of Reactive Power Metering" (as amended from time to time) published by **The Company** for this purpose. This document shall specify the respective factors and methodologies to be applied for particular **Metering System** configurations in order to determine so far as reasonably practicable the Mvarh import value and Mvarh export value for the relevant **BM Unit** at the **Commercial Boundary** as required by this sub-paragraph 2.4

### **3. Other Plant and/or Apparatus (or other equipment)**

In all other cases not covered by paragraph 2, unless otherwise agreed in writing by The Company, the following provisions shall apply:-

- 3.1 The quantities of Mvarh imported and exported shall be measured and recorded through **Meters** complying with all relevant **Codes of Practice** to the extent applying to **Reactive Energy**, which shall include without limitation those relating to calibration, testing and commissioning.
- 3.2 Such **Meters** shall be capable of providing a Mvarh import and export value for each **Settlement Period** for each item of **Plant** and/or **Apparatus** or other equipment.
- 3.3 Such **Meters** shall be situated as close as reasonably practicable to the **Commercial Boundary** taking into account relevant financial considerations.

- 3.4 The principles set out in paragraph 2.4 in relation to adjustment and aggregation shall apply.
- 3.5 For the purposes of remote interrogation the relevant **Mandatory Services Agreement** shall include appropriate terms with regard to the provision and maintenance of all communication links.

## Appendix 5 Submission of Tenders

The provisions of this Appendix 5 specify the manner in which **Users** shall complete **Tenders** comprising prices and **Tendered Capability Breakpoints** relating to the **Obligatory Reactive Power Service** and terms for the provision of the **Enhanced Reactive Power Service** specified in sub-Paragraph 1.3 (a) of this Part I, in each case in respect of **BM Units**.

A **Tender** shall include (inter alia) details of the **Reactive Power** range, the prices tendered for utilisation and capability and an indexation mechanism as set out below. Each **Tender** must relate to one **BM Unit** only. **Users** wishing to tender in relation to more than one **BM Unit** must therefore submit separate **Tenders** for each **BM Unit**.

### **1. Reactive Power Capability**

- 1.1 In respect of each **BM Unit**, a **Tenderer** must nominate a **Registered Capacity** which it anticipates will be the actual **Registered Capacity** on the **Contract Start Day** for that **BM Unit** (in this Appendix 5 referred to as “**Nominated Registered Capacity**”) to be used for the duration of the **Market Agreement**. All capability data used for the purpose of a **Tender** must be expressed as the capability of a **BM Unit** at the **Commercial Boundary** and must represent the value of **Reactive Power** output which can be supplied continuously at the **Commercial Boundary** when the **BM Unit** is operating at the **Nominated Registered Capacity**.
- 1.2 In respect of each **BM Unit**, all capability data relating to the provision of the **Enhanced Reactive Power Service** specified in sub-Paragraph 1.2(a) of this Part I must be expressed as the capability of that **BM Unit** at the **Commercial Boundary** across a system voltage range to be specified by the **Tenderer** in its **Tender** (or otherwise in accordance with directions given by **The Company**).
- 1.3 All **Reactive Power** capability data in respect of a **BM Unit** must be expressed as positive, whole numbers in Mvar, with leading and lagging capability data distinguished by the subscripts <sub>lead</sub> and <sub>lag</sub>.
- 1.4 In respect of each **BM Unit**, and subject to any directions issued from time to time by **The Company** with regard to such values, the **User** must submit at least one **Reactive Power** capability value and may in addition submit up to a further two **Reactive Power** capability values (all three being “**Tendered Capability Breakpoints**”), for both leading and lagging Mvar. One of these **Tendered Capability Breakpoints**, in respect of both leading and lagging Mvar, must be equivalent to the minimum **Reactive Power** capability of a **BM Unit** which a **User** is obliged to provide under

and in accordance with the **Connection Conditions** of the **Grid Code** (to the nearest whole Mvar) after application of the principles set out in subparagraphs 1.2 and 1.3 above and as further described in the package of information referred to in sub-Paragraph 3.3(b)(i) of this Part I.

- 1.5 The **Tendered Capability Breakpoints** shall be defined for the purposes of this Appendix as TQ1, TQ2, TQ3, for leading and lagging Mvar as the case may be, where:-

$$TQ3_{lead} > TQ2_{lead} > TQ1_{lead} > 0$$

and  $TQ3_{lag} > TQ2_{lag} > TQ1_{lag} > 0$

- 1.6 Where only two **Tendered Capability Breakpoints** are tendered, for leading or lagging Mvar as the case may be, then the value of TQ3 shall be deemed to be null for the purposes of calculating payments for capability and utilisation and no additional payments for capability will fall due and payable in respect of a **BM Unit** for the provision of **Reactive Power** capability above **Tendered Capability Breakpoint** TQ2.
- 1.7 Where only one **Tendered Capability Breakpoint** is tendered, for leading or lagging Mvar as the case may be, then the values of TQ2 and TQ3 shall be deemed to be null for the purposes of calculating payments for capability and utilisation and no additional payments for capability will fall due and payable in respect of a **BM Unit** for the provision of **Reactive Power** capability above **Tendered Capability Breakpoint** TQ1.
- 1.8 The **Reactive Power** capability value at zero Mvar (referred to in paragraph 2 below as Q0) shall be treated as a **Tendered Capability Breakpoint** for the purposes of tendering capability and utilisation prices and calculating capability and utilisation payments.

## 2. Prices

In respect of each **Tendered Capability Breakpoint**, prices submitted by **Users** must be zero or positive, quoted in pounds sterling to the nearest tenth of a penny and shall otherwise be tendered as described in subparagraphs 2.1, 2.2 and 2.3 below. The prices shall be described using the following notation:-

$C1_{lag}$  is the price applicable between **Tendered Capability Breakpoints** Q0 and  $TQ1_{lag}$  including  $TQ1_{lag}$

$C2_{lag}$  is the price applicable between **Tendered Capability Breakpoints**  $TQ1_{lag}$  and  $TQ2_{lag}$  including  $TQ2_{lag}$

$C_{3lag}$  is the price applicable between **Tendered Capability Breakpoints**  $TQ_{2lag}$  and  $TQ_{3lag}$  including  $TQ_{3lag}$

$C_{1lead}$  is the price applicable between **Tendered Capability Breakpoints**  $Q_0$  and  $TQ_{1lead}$  including  $TQ_{1lead}$

$C_{2lead}$  is the price applicable between **Tendered Capability Breakpoints**  $TQ_{1lead}$  and  $TQ_{2lead}$  including  $TQ_{2lead}$

$C_{3lead}$  is the price applicable between **Tendered Capability Breakpoints**  $TQ_{2lead}$  and  $TQ_{3lead}$  including  $TQ_{3lead}$

where C shall represent CU, CA or CS as the case may be.

## 2.1 Utilisation Prices (CU)

- (a) Utilisation prices submitted by **Users** must be:-
- (i) quoted in units of £/Mvarh; and
  - (ii) no greater than £999.999/Mvarh.
- (b) Utilisation prices must increase across the **Reactive Power** capability range, for leading or lagging Mvar as the case may be, such that:-

$$CU_{3lead} \geq CU_{2lead} \geq CU_{1lead} \geq 0$$

$$CU_{3lag} \geq CU_{2lag} \geq CU_{1lag} \geq 0$$

- (c) Utilisation payments shall be made for metered **Reactive Power** output and shall be calculated in accordance with Appendix 2.

## 2.2 Available Capability Prices (CA)

- (a) Available capability prices submitted by **Users** must be:-
- (i) quoted in units of £/Mvar/h; and
  - (ii) no greater than £999.999/Mvar/h.
- (b) Available capability prices must increase across the **Reactive Power** capability range, for leading or lagging Mvar as the case may be, such that:-

$$CA3_{\text{lead}} \geq CA2_{\text{lead}} \geq CA1_{\text{lead}} \geq 0$$

$$CA3_{\text{lag}} \geq CA2_{\text{lag}} \geq CA1_{\text{lag}} \geq 0$$

- (c) Available capability payments shall be calculated in accordance with Appendix 2

### 2.3 Synchronised Capability Prices (CS)

- (a) Synchronised capability prices submitted by **Users** must be:-
- (i) quoted in units of £/Mvar/h; and
  - (ii) no greater than £999.999/Mvar/h.
- (b) Synchronised capability prices must increase across the **Reactive Power** capability range, for leading or lagging Mvar as the case may be, such that:-

$$CS3_{\text{lead}} \geq CS2_{\text{lead}} \geq CS1_{\text{lead}} \geq 0$$

$$CS3_{\text{lag}} \geq CS2_{\text{lag}} \geq CS1_{\text{lag}} \geq 0$$

- (c) Synchronised capability payments shall be calculated in accordance with Appendix 2.

### 3. Indexation

Where a **Tender** is submitted in respect of a period which exceeds the minimum twelve month period required by sub-Paragraph 3.3(d)(v) of this Part I, then the **User** shall submit one mechanism for calculating indexation on an annual basis which shall apply to all prices submitted in the **Tender** for all subsequent periods of twelve months following the minimum twelve month period to which the **Tender** applies. Such mechanism shall be based on either the Retail Prices Index (as referred to in paragraph 3 of Appendix 1), a fixed percentage (which may be positive, zero or negative) or a summation of such Retail Prices Index and such fixed percentage.

### 4. Other Technical Information

A **User** shall submit with a **Tender** such other technical information as reasonably directed by **The Company** in accordance with sub-Paragraph 3.3 (b)(i) of this Part I. Such information may include (without limitation):-

- 4.1 in relation to a **Tender** for the **Enhanced Reactive Power Service** specified in sub-Paragraph 1.2 (a) of this Part I, details of the capability of the **Generating Unit, DC Converter or Power Park Module (as the case may be)** to provide **Reactive Power** either:-
- (a) in the case of **Generating Unit**, at the generator stator terminals: or
  - (b) in the case of a **Non-Synchronous Generating Unit, DC Converter or Power Park Module**, either at the **Grid Entry Point** in England and Wales or at the HV side of the 33/132 kV or 33/275 kV or 33/400 kV transformer for **Users** connected to the **National Electricity Transmission System** in Scotland or the **User System Entry Point** if **Embedded**,

In each case by reference to the **Generator Performance Chart** submitted in accordance with **Operating Condition 2.4.2** of the **Grid Code**, which capability must represent the true operating characteristics of that **Generating Unit, DC Converter or Power Park Module**; and

- 4.2 details of the system voltage range over which the **User** proposes to make available from the **Generating Unit, DC Converter or Power park Module** such **Enhanced Reactive Power Service** (and in each case any restrictions thereto); and
- 4.3 in relation to a **Tender** for the **Enhanced Reactive Power Service** specified in sub-Paragraph 1.2 (a) of this Part I, the ambient air temperature at which such **Enhanced Reactive Power Service** is specified, and variations to such **Enhanced Reactive Power Service** in accordance with any air temperature range specified by **The Company**; and
- 4.4 details, including prices, of any additional services offered as part of any **Enhanced Reactive Power Service** (not being the **Enhanced Reactive Power Service** specified in sub-Paragraph 1.2 (a) of this Part I); and
- 4.5 any restrictions on **The Company** selecting part of an **Enhanced Reactive Power Service**.

## **Appendix 6** **Qualification and Evaluation Criteria**

### **Section A – Qualification Criteria**

1. Without prejudice to the requirements of sub-Paragraph 3.3 of this Part I, all **Tenders** must satisfy the following mandatory qualification criteria:-
  - 1.1 in relation to a **Tender** for provision of the **Enhanced Reactive Power Service** specified in sub-Paragraph 1.2 (a) of this Part I, the leading and/or lagging capability (as the case may be) comprised therein, being the capability in excess of that required under and in accordance with the **Connection Conditions** of the **Grid Code**, must be at least 15 Mvar leading and/or 15 Mvar lagging (as the case may be) or (if lower) such amount of Mvar representing an additional 10% of that required under and in accordance with the **Connection Conditions** of the **Grid Code** (in each case as measured at the **Commercial Boundary**); and
  - 1.2 in relation to a **Tender** for provision of any other **Enhanced Reactive Power Service**, the leading and/or lagging capability (as the case may be) comprised therein meet the requirements of sub-Paragraph 2.8(a) of this Part I; and
  - 1.3 the tendered capability must be subject to Mvar metering meeting the requirements of Appendix 4; and
  - 1.4 the tendered capability must be subject to Mvar despatch facilities reasonably acceptable to **The Company**, incorporating the ability for **The Company** to receive from the **Tenderer** relevant technical, planning and other data in **The Company's** reasonable opinion necessary in connection therewith; and
  - 1.5 the site in question must be the subject of an agreement for connection to, and/or use of, the **GB Transmission System** or (as the case may be) a **Distribution System**.

### **Section B – Evaluation Criteria**

2. The overall economic value of a **Tender** (and where appropriate any part thereof) will be assessed by reference to the following criteria (which are not listed in any order of importance or priority):-

- 2.1 in relation to a **Generating Unit, DC Converter or Power park Module** providing the **Obligatory Reactive Power Service**, a comparison with the default payment arrangements for that **Generating Unit, DC Converter or Power Park Module** including the effect (if any) of the balance of tendered capability and utilisation prices as a hedge against forecast costs of that **Generating Unit, DC Converter or Power Park Module** pursuant to the default payment arrangements;
  - 2.2 the location of the tendered capability and its effectiveness in providing voltage support for the **GB Transmission System**;
  - 2.3 its interaction with other **Tenders**, in terms (inter alia) of relative prices and capability tendered and relative effectiveness in providing voltage support as referred to in sub-paragraph 2.2 above;
  - 2.4 forecast savings (if any) in constraint costs resulting from the consequential effect on power flows; and
  - 2.5 any forecast benefit or detriment attributable to it in the context of the investment planning process referred to at paragraph 4 below.
3. Particular factors affecting the value of a **Tender** (and where appropriate any part thereof) may include (without limitation) the following evaluation criteria (which are not listed in any order of importance or priority):-
- 3.1 the amount of leading and lagging Mvar tendered and the impact (if any) of any changes in the technical data, the **Registered Capacity** and other information submitted to **The Company** pursuant to the **Data Registration Codes** of the **Grid Code** since the date of submission of the **Tender**;
  - 3.2 prices and other terms offered within the **Tender**;
  - 3.3 the number of months over which capability is tendered;
  - 3.4 forecast Mvarh output, including any revised forecast of Mvarh output taking into account tendered utilisation prices (for the avoidance of doubt of the **Tender** and of all other **Tenders** pursuant to sub-paragraph 2.3 above);
  - 3.5 in relation to a **Generating Unit, DC Converter or Power Park Module** forecast MW output and MW availability;

- 3.6 the expected availability and quality of capability tendered, in terms of reliability and dependability for despatch purposes, derived from:-
    - (i) historical performance (where relevant);
    - (ii) expected reliability of capability tendered signalled by tendered prices;
    - (iii) any programme agreed with **The Company** for the restoration of capability;
  - 3.7 the availability of suitable monitoring facilities;
  - 3.8 the capability (if any) of a **Generating Unit, DC Converter or Power Park Module** to provide voltage support services when not providing **Active Power** (for example pumped storage plant operating in spin-gen mode or when pumping and open cycle gas turbine plant when declutched and operating in **Synchronous Compensation** mode);
  - 3.9 the complexity of the terms offered within the **Tender**;
  - 3.10 the results of any testing carried out pursuant to sub-Paragraph 4.3 (e) (ii) of this Part I and (where applicable) the absence of any such testing; and
  - 3.11 any other factors enhancing or constraining the capability tendered, derived (inter alia) from technical and other information made available to **The Company** (including without limitation operational and planning data provided to **The Company** pursuant to the **Grid Code**).
4. For the avoidance of doubt, **Tenders** will be considered in the investment planning process of **The Company's Transmission Business** only if, and to the extent, required to enable **The Company** to comply with its obligations under the **Act** and the **Transmission Licence**, and in such a case any consequential benefit or detriment attributable to the **Tender** will be taken into account in the tender evaluation process and **Tenders** will be evaluated accordingly.
  5. For the avoidance of doubt:-
    - (a) extant voltage support for the **GB Transmission System** whether via contracted services from third parties or assets owned and/or operated by **The Company's Transmission Business**; and

- (b) forecast Mvarh **Demand** on the **GB Transmission System** and at **Grid Supply Points**

in each case as at the relevant **Market Day** and as anticipated by **The Company** at the subsequent **Contract Start Day** and throughout the term of the **Tender**, will be taken into account in the tender evaluation process and **Tenders** will be evaluated accordingly.

## Appendix 7 Charging Principles

In accordance with the relevant provisions of this Part I, the following principles are intended to form the basis of the default payment arrangements for the provision of the **Obligatory Reactive Power Service** set out in this Part I and are intended to be taken into account in any review of the indexation factor referred to in Appendix 1. However, they are not intended to stifle innovation in the development of the default payment arrangements or the giving of appropriate economic signals.

1. The totality of payments that would be made pursuant to the default payment arrangements in the absence of **Market Agreements** shall be based and founded upon the following variable costs (actual or estimated) incurred or to be incurred in respect of, and aggregated across, all **Generating Units, DC Converters and Power Park Modules** providing the **Obligatory Reactive Power Service**:-
  - 1.1 the additional heat losses incurred as a consequence of producing **Reactive Power**, measured at the high voltage side of the generator/transformer terminals, the calculation of such heat losses to take account of the square law relationship between the electric current and the additional heat losses incurred; and
  - 1.2 maintenance costs incurred as a direct result of **Reactive Power** output (including a sum in respect of any reduction in the working life of **Generating Unit, DC Converter or Power Park Module** components consequent upon **Reactive Power** output).
2. For the avoidance of doubt, and without limitation, the totality of payments referred to in paragraph 1 above shall not take into account in respect of any **Generating Unit, DC converter or Power Park Module** providing the **Obligatory Reactive Power Service** the fixed costs incurred in achieving initial compliance with the relevant provisions of the **Grid Code**.
3. Further for the avoidance of doubt, the totality of payments referred to in paragraph 1 above shall, to the extent affecting the specific costs therein identified, take due account of any change in or amendments to, or replacement of, the **Pooling and Settlement Agreement**, the **Balancing and Settlement Code**, the **Grid Code** and any other statutory or regulatory obligation, in each case coming into force or effect after 1<sup>st</sup> October, 1997 and affecting the provision of the **Obligatory Reactive Power Service**.

**Appendix 8**  
**Calculation of Reactive Power Capability**  
**at the Commercial Boundary**

**Part 1**

In accordance with the terms of the **Mandatory Services Agreement**, where applicable the formulae in this Part 1 will be used to convert **Reactive Power** capability of a **BM Unit** at the generator stator terminals to the capability at the **Commercial Boundary**.

$$Q_{lead} = (Q_{Glead} + Q_U) + \left[ \frac{[(P_G - P_U)^2 + (Q_{Glead} + Q_U)^2] * F * X_t}{100. MVA_X} \right] + Q_{ts}$$

Where the **BM Unit** has a **Reactive Power** capability (leading), this shall be expressed as a positive integer. Where the **BM Unit** does not have a **Reactive Power** capability (leading),  $Q_{lead}$  and/or  $Q_{Glead}$  shall be the minimum **Reactive Power** capability (lagging) expressed as a negative integer or zero.

$$Q_{lag} = (Q_{Glag} - Q_U) - \left[ \frac{[(P_G - P_U)^2 + (Q_{Glag} - Q_U)^2] * F * X_t}{100. MVA_X} \right] - Q_{ts}$$

Where the **BM Unit** has a **Reactive Power** capability (lagging), this shall be expressed as a positive integer. Where the **BM Unit** does not have a **Reactive Power** capability (lagging),  $Q_{lag}$  and/or  $Q_{Glag}$  shall be the minimum **Reactive Power** capability (leading) expressed as a negative integer or zero.

Where:

- $Q_{lead}$  = the **Reactive Power** capability (leading) of the **BM Unit** at **Rated MW** at the **Commercial Boundary** in Mvar;
- $Q_{lag}$  = the **Reactive Power** capability (lagging) of the **BM Unit** at **Rated MW** at the **Commercial Boundary** in Mvar;
- $P_G$  = **Rated MW** referred to in Schedule 1 of **Grid Code DRC**;
- $P_U$  = normal auxiliary load (**Active Power**) supplied by the **BM Unit** at **Rated MW** referred to in Schedule 1 of **Grid Code DRC** in MW;
- $Q_U$  = normal auxiliary lagging load (**Reactive Power**) supplied by the **BM Unit** at **Rated MW** referred to in Schedule 1 of **Grid Code DRC** in Mvar;
- $X_t$  = positive sequence reactance, nominal tap, of the **BM Unit** step-up transformer in percentage of rating as referred to in Schedule 1 of **Grid Code DRC**;

- F = the factor (if any) identified as such in the **Mandatory Services Agreement** representing the number of station transformers, otherwise 1;
- $Q_{Glag}$  = the **Reactive Power** capability (lagging) of the **BM Unit** at **Rated MW** at the generator stator terminals, where applicable as set out in Table B of Appendix 1, Section A, Part I of the **Mandatory Services Agreement** or as redeclared by the **User** pursuant to **Grid Code BC**;
- $Q_{Glead}$  = the **Reactive Power** capability (leading) of the **BM Unit** at **Rated MW** at the generator stator terminals, where applicable as set out in Table B of Appendix 1, Section A, Part I of the **Mandatory Services Agreement** or as redeclared by the **User** pursuant to **Grid Code BC**;
- $Q_{ts}$  = the relevant reactive load applicable to each of the relevant **BM Unit** shown in the relevant table in the **Mandatory Services Agreement**, the summation of which represents the lagging reactive load in Mvar taken by a **Trading Unit** calculated in accordance with the values for **Demand (Active Power)** and **Power Factor** referred to in **Grid Code PC.A.4.3.1(a)** or **Grid Code PC.A.5.2.2(a)** (as the case may be), or as agreed between **The Company** and the **User** from time to time (and where such load is leading,  $Q_{ts}$  will be negative);
- $MVA_x$  = **BM Unit** step-up transformer rated MVA referred to in Schedule 1 of **Grid Code DRC**.

N.B. All of the above factors referred to in **Grid Code DRC** shall be expressed in such units as are specified in **Grid Code DRC** and to the same number of significant figures as also specified therein (as varied from time to time).

## Part 2

In accordance with the terms of the **Mandatory Services Agreement**, where applicable the formulae in Section 1 of this Part 2 will be used by **The Company** to convert **Reactive Power** capability of a **CCGT Unit** at the generator stator terminals to the capability at the HV side of the **Generating Unit** step-up transformer, and the formulae in Section 2 of this Part 2 will be used to calculate the **Reactive Power** capability of the **BM Unit** at the **Commercial Boundary**.

### Section 1

$$CQ_{\text{lead}} = (Q_{\text{Glead}} + Q_{\text{U}}) + \left[ \frac{[(P_{\text{G}} - P_{\text{U}})^2 + (Q_{\text{Glead}} + Q_{\text{U}})^2] * F * X_{\text{t}}}{100.MVA_{\text{X}}} \right]$$

Where the **CCGT Unit** has a **Reactive Power** capability (leading), this shall be expressed as a positive integer. Where the **CCGT Unit** does not have a **Reactive Power** capability (leading),  $Q_{\text{lead}}$  and/or  $Q_{\text{Glead}}$  shall be the minimum **Reactive Power** capability (lagging) expressed as a negative integer or zero.

$$CQ_{\text{lag}} = (Q_{\text{Glag}} - Q_{\text{U}}) - \left[ \frac{[(P_{\text{G}} - P_{\text{U}})^2 + (Q_{\text{Glag}} - Q_{\text{U}})^2] * F * X_{\text{t}}}{100.MVA_{\text{X}}} \right]$$

Where the **CCGT Unit** has a **Reactive Power** capability (lagging), this shall be expressed as a positive integer. Where the **CCGT Unit** does not have a **Reactive Power** capability (lagging),  $Q_{\text{lag}}$  and/or  $Q_{\text{Glag}}$  shall be the minimum **Reactive Power** capability (leading) expressed as a negative integer or zero.

Where:

- $CQ_{\text{lead}}$  = the **Reactive Power** capability (leading) of the **CCGT Unit** at **Rated MW** at the HV side of the **Generating Unit** step-up transformer in Mvar;
- $CQ_{\text{lag}}$  = the **Reactive Power** capability (lagging) of the **CCGT Unit** at **Rated MW** at the HV side of the **Generating Unit** step-up transformer in Mvar;
- $P_{\text{G}}$  = **Rated MW** of a **CCGT Unit** referred to in Schedule 1 of **Grid Code DRC**;
- $P_{\text{U}}$  = normal auxiliary load (**Active Power**) supplied by the **CCGT Unit** at **Rated MW** referred to in Schedule 1 of **Grid CodeDRC** in MW;
- $Q_{\text{U}}$  = normal auxiliary lagging load (**Reactive Power**) supplied by the **CCGT Unit** at **Rated MW** referred to in Schedule 1 of **Grid Code DRC** in Mvar;

- F = the factor (if any) identified as such in the **Mandatory Services Agreement** representing the number of station transformers, otherwise 1;
- $X_t$  = positive sequence reactance, nominal tap, of the **CCGT Unit** step-up transformer in percentage of rating as referred to in Schedule 1 of **Grid Code DRC**;
- $Q_{Glag}$  = the **Reactive Power** capability (lagging) of the **CCGT Unit** at **Rated MW** at the **User** stator terminals as set out in Table B of Appendix 1, Part I of the **Mandatory Services Agreement** or as redeclared by the **User** pursuant to **Grid Code BC**;
- $Q_{Glead}$  = the **Reactive Power** capability (leading) of the **CCGT Unit** at **Rated MW** at the **User** stator terminals as set out in Table B of Appendix 1, Part I of the **Mandatory Services Agreement** or as redeclared by the **User** pursuant to **Grid Code BC**;
- $MVA_X$  = **Generating Unit** step-up transformer rated MVA referred to in Schedule 1 of **Grid Code DRC**.

## Section 2

$$Q_{lead} = \left( \sum_n^{CCGTunits} CQ_{lead} \right) + Q_{ts}$$

$$Q_{lag} = \left( \sum_n^{CCGTunits} CQ_{lag} \right) - Q_{ts}$$

Where

$Q_{lead}$  = the **Reactive Power** capability (leading) of the **BM Unit** at the **Commercial Boundary** in Mvar;

$\sum_n^{CCGTunits}$  = the summation over each relevant **CCGT Unit**;

$Q_{lag}$  = the **Reactive Power** capability (lagging) of the **BM Unit** at the **Commercial Boundary** in Mvar;

$Q_{ts}$  = the relevant reactive load applicable to each of the **BM Units** shown in the relevant table in the **Mandatory Services Agreement**, the summation of which represents the lagging

reactive load in Mvar taken by a **Trading Unit** calculated in accordance with the values for **Demand (Active Power)** and **Power Factor** referred to in **Grid Code PC.A.4.3.1(a)** or **Grid Code PC.A.5.2.2(a)** (as the case may be), or as agreed between **The Company** and the **User** from time to time (and where such load is leading,  $Q_{ts}$  will be negative).

N.B. All of the above factors referred to in **Grid Code DRC** shall be expressed in such units as are specified in **Grid Code DRC** and to the same number of significant figures as also specified therein (as varied from time to time).

### Part 3

In accordance with the terms of the **Mandatory Services Agreement**, where applicable the formulae in Section 1 of this Part 3 will be used by **The Company** to convert **Reactive Power** capability of a **Power Park Unit** at the generator stator terminals to the capability at the HV side of the **Generating Unit** step-up transformer, and the formulae in Section 2 of this Part 3 will be used to calculate the **Reactive Power** capability of the **Power Park Module** at the **Commercial Boundary**.

#### Section 1

$$CQ_{\text{lead}} = (Q_{\text{Glead}} + Q_{\text{u}}) + \left[ \frac{[(P_{\text{G}} - P_{\text{U}})^2 + (Q_{\text{Glead}} + Q_{\text{U}})^2] * F * X_{\text{t}}}{100.MVA_{\text{x}}} \right]$$

Where the **Power Park Unit** has a **Reactive Power** capability (leading), this shall be expressed as a positive integer. Where the **Power Park Unit** does not have a **Reactive Power** capability (leading),  $Q_{\text{lead}}$  and/or  $Q_{\text{Glead}}$  shall be the minimum **Reactive Power** capability (lagging) expressed as a negative integer or zero.

$$CQ_{\text{lag}} = (Q_{\text{Glag}} - Q_{\text{u}}) - \left[ \frac{[(P_{\text{G}} - P_{\text{U}})^2 + (Q_{\text{Glag}} - Q_{\text{U}})^2] * F * X_{\text{t}}}{100.MVA_{\text{x}}} \right]$$

Where the **Power Park Unit** has a **Reactive Power** capability (lagging), this shall be expressed as a positive integer. Where the **Power Park Unit** does not have a **Reactive Power** capability (lagging),  $Q_{\text{lag}}$  and/or  $Q_{\text{Glag}}$  shall be the minimum **Reactive Power** capability (leading) expressed as a negative integer or zero.

Where:

- $CQ_{\text{lead}}$  = the **Reactive Power** capability (leading) of the **Power Park Unit** at **Rated MW** at the HV side of the **Generating Unit** step-up transformer in Mvar;
- $CQ_{\text{lag}}$  = the **Reactive Power** capability (lagging) of the **Power Park Unit** at **Rated MW** at the HV side of the **Generating Unit** step-up transformer in Mvar;
- $P_{\text{G}}$  = **Rated MW** of a **Power Park Unit** referred to in Schedule 1 of **Grid Code DRC**;

$P_U$	=	normal auxiliary load ( <b>Active Power</b> ) supplied by the <b>Power Park Unit</b> at <b>Rated MW</b> referred to in Schedule 1 of <b>Grid Code DRC</b> in MW;
$Q_U$	=	normal auxiliary lagging load ( <b>Reactive Power</b> ) supplied by the <b>Power Park Unit</b> at <b>Rated MW</b> referred to in Schedule 1 of <b>Grid Code DRC</b> in Mvar;
$F$	=	the factor (if any) identified as such in the <b>Mandatory Services Agreement</b> representing the number of <b>Power Park Units</b> transformers, otherwise 1;
$X_t$	=	positive sequence reactance, nominal tap, of the <b>Power Park Unit</b> step-up transformer in percentage of rating as referred to in Schedule 1 of <b>Grid Code DRC</b> ;
$Q_{Glag}$	=	the <b>Reactive Power</b> capability (lagging) of the <b>Power Park Unit</b> at <b>Rated MW</b> at the <b>User</b> stator terminals as set out in Table B of Appendix 1, Part I of the <b>Mandatory Services Agreement</b> or as redeclared by the <b>User</b> pursuant to <b>Grid Code BC</b> ;
$Q_{Glead}$	=	the <b>Reactive Power</b> capability (leading) of the <b>Power Park Unit</b> at <b>Rated MW</b> at the <b>User</b> stator terminals as set out in Table B of Appendix 1, Part I of the <b>Mandatory Services Agreement</b> or as redeclared by the <b>User</b> pursuant to <b>Grid Code BC</b> ;
$MVA_X$	=	<b>Generating Unit</b> step-up transformer rated MVA referred to in Schedule 1 of <b>Grid Code DRC</b> .

## Section 2

$$Q_{lead} = \left( \sum_n^{PPUnits} CQ_{lead} \right) + Q_{is} + \left[ \frac{\left[ (P1_G - P1_U)^2 + (Q1_{Glead} + Q1_U)^2 \right] * F1 * X1_t}{100.MVA1_x} \right]$$

$$Q_{lag} = \left( \sum_n^{PPUnits} CQ_{lag} \right) - Q_{is} - \left[ \frac{\left[ (P1_G - P1_U)^2 + (Q1_{Glag} - Q1_U)^2 \right] * F1 * X1_t}{100.MVA1_x} \right]$$

Where

$Q_{lead}$  = the **Reactive Power** capability (leading) of the **Power Park Module** at the **Commercial Boundary** in Mvar;

$\sum_n^{PPUnits}$  = the summation over each relevant **Power Park Unit**;

$Q_{lag}$  = the **Reactive Power** capability (lagging) of the **BM Unit** at the **Commercial Boundary** in Mvar;

$Q_{ts}$  = [the relevant reactive load applicable to the **Power Park Module** shown in the relevant table in the **Mandatory Services Agreement**, the summation of which represents the lagging reactive load in Mvar taken by a **Trading Unit** calculated in accordance with the values for **Demand (Active Power)** and **Power Factor** referred to in **Grid Code PC.A.4.3.1(a)** or **Grid Code PC.A.5.2.2(a)** (as the case may be), or as agreed between **The Company** and the **User** from time to time (and where such load is leading,  $Q_{ts}$  will be negative).]

$$P1_G = \sum_n^{PPUnits} P_G$$

$$P1_U = \sum_n^{PPUnits} P_U$$

$$Q1_{Glag} = \sum_n^{PPUnits} Q_{Glag}$$

$$Q1_{Glead} = \sum_n^{PPUnits} Q_{Glead}$$

$F1$  = the factor (if any) identified as such in the **Mandatory Services Agreement** representing the number of station transformers, otherwise 1;

$X1_t$  = positive sequence reactance, nominal tap, of the **Power Park Module** step up transformer in percentage of rating as referred to in Schedule 1 of **Grid Code DRC**

$MVA1_x$  = **Power Park Module** step-up transformer rated MVA referred to in Schedule 1 of **Grid Code DRC**

- N.B. All of the above factors referred to in **Grid Code DRC** shall be expressed in such units as are specified in **Grid Code DRC** and to the same number of significant figures as also specified therein (as varied from time to time).

## **Appendix 9** **Redundant Provisions**

### **1. Introduction**

This Appendix 9 is included in this Part I for information purposes only as more particularly described in Paragraph 6 of this Part I.

### **2. Definitions - Paragraph 1.1 of MCUSA, Schedule 5.**

In this Appendix 9, except where the context otherwise requires, the following expressions shall have the following meanings:-

**“Reactive Power Zone”** means those separate areas of England and Wales identified as zones in the Seven Year Statement for 1997 for the purpose of specifying local Reactive Power capability and need;

**“Relevant Zone”** means in relations to any Despatch Unit, the Reactive Power Zone to which the Despatch Unit is allocated as specified in an Ancillary Services Agreement.

**“Transmission Users Group”** means the group established pursuant to paragraph 4 of Schedule 4 to this Agreement.

### **3. Variations and Review – Paragraph 2.5 of MCUSA Schedule 5**

The Parties acknowledge and agree that the Transmission Users Group shall be requested to review each of the matters described in Appendix 7 by the respective date (if any) shown opposite each therein. In carrying out such review, the Transmission Users Group shall be requested to take into account the respective applicable principles (if any) set out therein and to give due and proper consideration to any matter referred to it by the Director. For the avoidance of doubt, following each such review The Company or any User may raise a Proposed Variation with respect thereto in accordance with subparagraph 2.2(a). It is further agreed that:-

- (a) **The Company** shall consider and no later than 31<sup>st</sup> December 1999, report to the Transmission Users Group on the practicalities of establishing a unified mechanism for the provision of voltage support for **The Company** Transmission System; and

- (b) the Transmission Users Group shall be requested, no later than 31<sup>st</sup> March 2000 to invite the Grid Code Review Panel to review the provisions of the Grid Code with respect to Reactive Power in light of this Schedule.

**4. Obligatory Reactive Power Service – Default Payment Arrangements  
– Paragraph 4 of MCUSA, Schedule 5**

4.1 ---

4.2 Subject always to Paragraph 5, and notwithstanding:-

- (a) the provisions of the Works Programme for reactive power ancillary services agreed by Pool Members on 1<sup>st</sup> March 1994, as adopted from 1<sup>st</sup> August 1994; and
- (b) the provisions of any **Ancillary Services Agreement** now or hereafter in effect (but subject always to sub-Paragraph 6.2),

the payments to be made by **The Company** to **Users** for the provision of the **Obligatory Reactive Power Service** in all **Mandatory Services Agreements** under which **Users** are or will be paid for the **Obligatory Reactive Power Service** shall, subject always to sub-Paragraph 4.5 and 4.7, comprise solely payments for utilisation determined in respect of each **Settlement Period** in accordance with sub-Paragraph 4.3.

4.3 ---

4.4 The Parties acknowledge and agree that, as at the date this Schedule comes into effect:-

- (a) the totality of payments for the provision of the **Obligatory Reactive Power Service**, determined in accordance with the provisions of this Paragraph 4, reflect so far as reasonably practicable the overall variable costs (on the basis of the charging principles set out in Appendix 8) incurred across the relevant **Generating Units** of the provision of the **Obligatory Reactive Power Service** (whether or not payments are made in respect of those **Generating Units** pursuant to this Paragraph 4 or pursuant to **Market Agreements** entered into in accordance with Paragraph 5); and

- (b) without prejudice to the review of the indexation factor specified as item 4 in Appendix 7, such totality of payments will continue to reflect those overall variable costs notwithstanding all and any variations thereto reasonably anticipated at such date.

4.5 It is hereby agreed and acknowledged that nothing in this Schedule and the Appendices shall affect in any way the obligation on each **User** to comply with the provisions of the **Grid Code** insofar as they relate to **Reactive Power**. For the avoidance of doubt, and without limiting the foregoing, it is hereby agreed and acknowledged that, notwithstanding that the payments for the **Obligatory Reactive Power Service** with affect from 1<sup>st</sup> April 2000, subject always to sub-paragraph 2.5 shall comprise solely payments for utilisation, nothing in this Schedule and the Appendices shall relieve **Users** from the obligations to comply with the provisions of the **Grid Code** in relation to **Reactive Power** by virtue of Sub-Clause 9.3 of this Agreement or otherwise howsoever.

4.6 ---

4.7 ---

4.8 ---

5. **Obligatory Reactive Power Service (Default Payment Arrangements)**  
**– Appendix 1 of MCUSA, Schedule 5**

The provisions of this Appendix 1, as referred to in sub-paragraph 4.2 of this Schedule shall apply to the calculation of default payments for provision of the **Obligatory Reactive Power Service** from **BM Units**. All payments shall be expressed in pounds sterling.

1. Total Payment

Total Payment (PT) = PU+PC

Where, subject always to Paragraph 7 and 8 below:

PU = the utilisation payment in respect of a **BM Unit** for a **Settlement Period** determined in accordance with Paragraph 2 below.

PC = the capability payment in respect of **BM Unit** for a **Settlement Period** determined in accordance with paragraph 3 below.

2. Utilisation Payment

$$PU = BP_U * U \quad [\text{£ per Settlement Period per BM Unit}]$$

Where

$$BP_U = \frac{46,270,000 * I * X}{42,054,694} \quad [\text{£/Mvarh}]$$

Where

I = defined in Paragraph 5 below;

X = a factor which should be:-

- (i) in respect of any Settlement Period from (and including) 1<sup>st</sup> October, 1997 to (and including) 31<sup>st</sup> March 1998, 0.2; and
- (ii) in respect of any Settlement Period from (and including) 1<sup>st</sup> April 1998 to (and including) 31<sup>st</sup> March 1999, 0.5 (subject as provided below); and
- (iii) subject always to sub-paragraph 2.5 of this Schedule, in respect of any Settlement Period from (and including) 1<sup>st</sup> April 1999 to (and including) 31<sup>st</sup> March 2000, 0.75 (subject as provided below); and
- (iv) subject always to sub-paragraph 2.5 of this Schedule, in respect of all Settlement Periods thereafter, 1.00 (subject as provided below);

Provided always that with effect from 1<sup>st</sup> April 1998, X shall be 0.2 in all **Settlement Periods** from (and including) that in which:-

- (a) the relevant **BM Unit** (or, in relation to a **CCGT Module**, any relevant **CCGT Unit**) fails a **Reactive Test** until (and including) the **Settlement Period** in which a subsequent **Reactive Test** is passed in relation to that **BM Unit** (or **CCGT Unit** (as the case may be)); or
- (b) the **User** fails (other than pursuant to an instruction given by **The Company** or as permitted by the **Grid Code**) to set the Automatic Voltage Regulator of the **BM Unit** (or, in relation to a **CCGT Module**, any relevant **CCGT Unit**) to a voltage following mode until

(and including) the **Settlement Period** in which the **User** notifies **The Company** that the Automatic Voltage Regulator is so set; or

- (c) the **BM Unit** fails to comply with a **Reactive Despatch Instruction** due to the fact that the **BM Unit** (or, in relation to a **CCGT Module**, any relevant **CCGT Unit**) is unable to increase and/or decrease its Mvar output (other than as a direct result of variations in **System** voltage) until (and including) the **Settlement Period** in which the **User** notifies **The Company** that the **BM Unit** is so able to comply; or
- (d) the **BM Unit** fails to have a Mvar range which includes the ability to provide zero Mvar at the Commercial Boundary until (and including) the **Settlement Period** in which the **User** notifies **The Company** that the **BM Unit** has or once more has such rang; and

U = defined in Section 1 of Appendix 3

### 3. Capability Payment

$$PC = \frac{[(BP_c * ZWF_{lead} * QC_{lead} * QSF_{lead}) + (BP_c * ZWF_{lag} * QC_{lag} * QSF_{lag})] * J}{[\text{£ per Settlement Period per Despatch Unit}]}$$

Provided always that PC shall be 0 in all Settlement Periods from (and including) that in which:-

- (i) the User fails (other than pursuant to an instruction given by The Company or as permitted by the Grid Code) to set the Automatic Voltage Regulator of the Despatch Unit (or, in relation to a Centrally Despatched CCGT Module, any relevant CCGT Unit) to a voltage following mode until (and including) the Settlement Period in which the User notifies The Company that the Automatic Voltage Regulator is so set; or
- (ii) the Despatch Unit fails to comply with a Reactive Despatch Instruction due to the fact that the Despatch Unit (or in relation to a Centrally Despatched CCGT Module, any relevant CCGT Unit) is unable to increase and/or decrease its Mvar output (other than as a direct result of variations in System voltage) until (and including) the Settlement Period in which the User notifies The Company that the Despatch Unit is so able to comply; or
- (iii) the Despatch Unit fails to have a Mvar range which includes the ability to provide zero Mvar at the Commercial Boundary until (and including) the Settlement Period in which the User notifies The

Company that the Despatch Unit has or once more has such range;  
or

- (iv) a continuous period of unavailability of a Despatch Unit to be Despatched by The Company in accordance with Grid Code SDC extends beyond 75 consecutive days until (and including) the Settlement Period in which the Despatch Unit is subsequently declared available in accordance with Grid Code SDC.

where

$$BP_c = \frac{46,270,000 * 1 * Y}{0.868178624 * 16,112 * 8,760 * 2} \quad [\text{£/Mvar per Settlement Period}]$$

Where

I = defined in paragraph 5 below;

Y = a factor which shall be:-

- (i) in respect of any Settlement Period from (and including) 1<sup>st</sup> October, 1997 to (and including ) 31<sup>st</sup> March 1998, 0.8; and
- (ii) in respect of any Settlement period from (and including) 1<sup>st</sup> April, 1998 to (and including) 31<sup>st</sup> March, 1999, 0.5; and
- (iii) subject always to sub-paragraph 2.5 of this Schedule, in respect of any Settlement Period from (and including) 1<sup>st</sup> April, 1999 to (and including) 31<sup>st</sup> March, 2000, 0.25; and
- (iv) subject always to sub-paragraph 2.5 of this Schedule, in respect of all Settlement Periods thereafter, 0;

ZWF = the provisional Zonal Weighting Factor defined in paragraph 4 below (expressed to apply to both leading and lagging Mvar) subject to reconciliation in accordance with that paragraph:

QC = defined in Section 2 of Appendix 3 (expressed to apply to both leading and lagging Mvar);

QSF = the shortfall factor relating to the capability payment (expressed as either  $QSF_{lead}$  or  $QSF_{lag}$  to apply respectively to capability leading and capability lagging as applicable), being:-

$$\min \left( 1, \left( \frac{QR}{QC} \right)^2 \right)$$

where

QR = defined in Section 2 of Appendix 3 (expressed to apply to both leading and lagging Mvar); and

J = 1 in each Settlement Period in which, in relation to the Despatch Unit in question, Genset Registered Capacity is greater than 2MW, otherwise 0.

4. Zonal Weighting Factors

ZWF = the Provisional Zonal Weighting Factor (expressed as either  $ZWF_{lead}$  or  $ZWF_{lag}$  to apply respectively to the zonal weighting factor leading and the zonal weighting factor lagging) for the Despatch Unit, calculated as follows:-

(a) In respect of the period from (and including) 1<sup>st</sup> October, 1997 to (and including) 31<sup>st</sup> March, 1998 and in respect of each subsequent twelve month period ending 31<sup>st</sup> March, provisional zonal weighting factors (“the Provisional Zonal Weighting Factors”) shall be calculated by The Company in respect of both leading and lagging Reactive Power by reference to:-

(i) the leading or lagging (as the case may be) Mvar “need” for leading or lagging (as the case may be) Reactive Power for that period in each Relevant Zone, divided by

(ii) the total leading or lagging (as the case may be) Mvar capability for that period in each Relevant Zone as forecast by The Company (“the Total Forecast Capability”),

with the result of that division in each case being multiplied by an adjustment factor being:-

$$\frac{16112}{TAN}$$

Where

TAN = a figure being, for the period from (and including) 1<sup>st</sup> October, 1997 to (and including) 31<sup>st</sup> March 1998, 14,775, and for each subsequent twelve month period ending 31<sup>st</sup> March, a figure being the sum total of the leading Mvar “need” for leading Reactive Power plus the sum total of the lagging Mvar “need” for lagging Reactive Power in all Reactive Power Zones for the twelve month period in question, as given each year in the Seven Year Statement,

provided that each Provisional Zonal Weighting Factor (both leading and lagging) shall not in any event be greater than 3.000 and provided further that (for the avoidance of doubt) no determination of  $ZWF_{lead}$ ,  $ZWF_{lag}$  and TAN shall be made in respect of any such twelve month period when  $Y = 0$ .

- (b) The Provisional Zone Weighting Factors, together with the Total Forecast Capability, will be notified by The Company as soon as reasonably practicable by publication in the first practicable Seven Year Statement (or any update thereof).

### Reconciliation

As soon as reasonably practicable following the expiry of each twelve month period ending 31<sup>st</sup> March, The Company shall recalculate  $ZWF_{lead}$  and  $ZWF_{lag}$  for that twelve month period in accordance with the above provision for calculation of the Provisional Zonal Weighting Factors but substituting for the Total Forecast Capability the actual total leading or lagging (as the case may be) Mvar capability for that twelve month period in each Relevant Zone as determined by The Company (“the Total Actual Capability”). Such recalculation of  $ZWF_{lead}$  and  $ZWF_{lag}$  shall be undertaken by The Company in a manner consistent with the principles and methodologies set out in the document entitled “Methodology Document for the Recalculation of Zonal Weighting Factors” published by The Company for this purpose. Such recalculated figures for  $ZWF_{lead}$  and  $ZWF_{lag}$  (“the Final Zonal Weighting Factors”), together with the Total Actual Capability, shall be published by The Company in the Seven Year Statement. Each Final Zonal Weighting Factor (both leading and lagging) shall not in any event be greater than 3.000 and (for the avoidance of doubt) no determination of  $ZWF_{lead}$ ,  $ZWF_{lag}$  and TAN shall be made in respect of any such twelve month period when  $Y=0$ .

The Company shall derive the Total Actual Capability from the Mvar capability (required under and in accordance with the Connection Conditions of the Grid Code) of Generating Units in respect of which Ancillary Services Agreements have been or will be amended or concluded to give effect to the provisions of sub-paragraphs 4.2 and 4.3 of this Schedule. In respect of any twelve month period ending 31<sup>st</sup> March, such Mvar capability shall be reduced pro rata for all Settlement Periods in such twelve month period in respect of which no capability payments referred to in this Appendix 1 shall fall due:-

- (a) by virtue of paragraph 7 below (with effect from the commencement of the twelve month period in question ); and
- (b) by virtue of paragraph 8 below (until the end of the twelve month period in question); and
- (c) by virtue of factor J referred to in paragraph 3 above being set to zero (at any time during the twelve month period in question).

As soon as reasonably practicable following publication of the relevant Seven Year Statement, The Company shall pay to each relevant User or be paid by each relevant User such sum as will reconcile:-

- (i) capability payments made to that User and calculated in accordance with paragraph 3 above by reference to the Provisional Zonal Weighting Factors,

with

- (ii) capability payments due to or from that User and calculated in accordance with paragraph 3 above by reference to the Final Zonal Weighting Factors.

For the avoidance of doubt, such reconciliation will include the payment of interest at the Base Rate from the date of payment by The Company to that User of the capability payments referred to at (i) above.

For clarification purposes, each reference in this paragraph 4 to “need” does not imply actual Reactive Power need but is used merely to refer to the figure identified as “need” in the Seven Year Statement. Such figure shall be determined each year using the same principles and methodologies as used to determine the zonal weighting factors for the twelve month periods ended on 31<sup>st</sup> March 1996 and 31<sup>st</sup> March 1997.

## 5. Indexation

The indexation factor I used in the formulae in Paragraph 2 above shall <sup>1</sup>[, with effect from 1<sup>st</sup> October 1997 in respect of the period from (and including) that date to (and including) 31<sup>st</sup> March 1998,] with effect from 1<sup>st</sup> April in respect of each subsequent twelve month period ending 31<sup>st</sup> March, be determined as follows:-

$$I = \frac{RP1_2}{RP1_1}$$

where

For the period from (and including) 1<sup>st</sup> October, 1997 to (and including) 31<sup>st</sup> March, 1998  $RP1_2 = 155.4$ , and thereafter  $RP1_2$  is the RPI for March of the immediately preceding twelve month period ending 31<sup>st</sup> March.

$RP1_1$  is the RPI for March, 1994 (142.5).

The index used is the Retail Price Index (RPI) with 1987 = 100 base. The source of the RPI index is the monthly Department of Employment "Employment Gazette".

Subject always to sub-paragraph 2.5 of this Schedule, In respect of all periods from (and including) 1<sup>st</sup> April, 2001 the indexation factor I applicable for the period from (and including) 1<sup>st</sup> April, 2000 to (and including) 31<sup>st</sup> March 2001 shall apply.

6. ---

7. ---

8. ---

9. Reconciliation

As soon as practicable after this Schedule has taken effect and Ancillary Services Agreements have been amended so as to give effect thereto, The Company will pay to each relevant user or be paid by each relevant User such sum as will reconcile:-

- (a) payments (if any) made to such User for the provision of the Obligatory Reactive Power Service from BM Units in respect of the period from 1<sup>st</sup> October, 1997 to (and including) the date of such reconciliation by The Company

with

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- (b) payments due to or from such User pursuant to any Ancillary Services Agreement giving effect to this Schedule in respect of the period from 1<sup>st</sup> October, 1997 to the date of such reconciliation (both dates inclusive) as if such Ancillary Services Agreements had then been effective. For the avoidance of doubt, such reconciliation will include the payment of interest at Base Rate from the date of the relevant payment by The Company referred to at sub-paragraph 9(a) above.

**6. Metering – Appendix 4 of MCUSA Schedule 5**

2.4 Subject always to sub-paragraph 2.5, the appropriate factors and methodologies for each relevant **BM Unit** shall be agreed by **The Company** and each relevant **User** (both acting reasonably) in the relevant **Mandatory Services Agreement** by adoption of one or more of the factors or methodologies set out in the document entitled “Methodology Document for the Aggregation of Reactive Power Metering” (as amended from time to time) published by **The Company** for this purpose. This document shall specify the respective factors and methodologies to be applied for particular **Metering System** configurations in order to determine so far as reasonably practicable the Mvarh import value and Mvarh export value for the relevant **BM Unit** at the **Commercial Boundary** as required by this sub-paragraph 2.4.

2.5 Loss adjustment factors and aggregation methodologies need not be agreed between **The Company** and the relevant **User** in connection with any configuration described in sub-paragraph 2.4.3 in respect of periods prior to (1<sup>st</sup> April 1998).

**7. Matters for Review - Appendix 7 of MCUSA, Schedule 5**

<u>Matter</u>	<u>Date of review</u>
1. The values of X and Y referred to in Appendix 1 in respect of Settlement Periods from (and including) 1 <sup>st</sup> April 1999.	1 <sup>st</sup> October 1998

Applicable principle:

The degree and extent to which a competitive market has been established in accordance with the

- provisions of this Schedule (taking into account, inter alia, the amount of Mvar capability the subject of Market Agreements and the utilisation thereof).
2. Any payment arrangements formulated by The Company in conjunction with any unlicensed providers . 1<sup>st</sup> October 1999
- Applicable principle:  
The extent to which it is reasonably practicable to achieve consistency with the provisions of Appendix 1 or Appendices 2 and 5 (as the case may be).
3. The treatment of Trading Units for the purposes of metering and calculation of Mvar capability in connection with this Schedule. 1<sup>st</sup> October 1999
- Applicable principle:  
None
4. The indexation factor referred to in Appendix 1 to apply in respect of all periods from (and including) 1<sup>st</sup> April 2001. 1<sup>st</sup> October 2000
- Applicable principles:  
Those charging principles set out in Appendix 8.
5. (a) The extent of any change in the nature of, or extent of recovery under the Balancing and Settlement Code of, variable costs incurred or to be incurred by Generating Units providing the Obligatory Reactive Power Service; Not applicable

and

- (b) the extent to which such changes should lead to a change in the specific costs identified in paragraph 1 of Appendix 8 upon which the totality of payments referred to therein is based and founded.

Applicable principle:

That, to the extent innovation in the development of the default payment arrangements or the giving of appropriate economic signals is not thereby stifled, the specific costs from time to time identified in paragraph 1 of Appendix 8 (and upon which the totality of payments referred to therein is based and founded) should continue to comprise the totality of variable costs (actual or estimated) incurred or to be incurred in respect of, and aggregated across, all Generating Units providing the Obligatory Reactive Power Service, provided always that each of those specific costs from time to time identified shall only be a variable cost not recovered under the Balancing and Settlement Code which:-

- (i) is not being incurred at the date this Schedule comes into effect; or
- (ii) is being incurred at the date

this Schedule comes into effect and as at that date is either identified as a specific cost in paragraph 1 of Appendix 8 or is being recovered under the Balancing and Settlement Code.

**8. Charging Principles - Appendix 8 of MCUSA Schedule 5**

In accordance with the relevant provisions of this Part I, the following principles are intended to form the basis of the default payment arrangements for the provision of the **Obligatory Reactive Power Service** set out in this Schedule I and are intended to be taken into account in any review of the indexation factor referred to in Appendix 1. However, they are not intended to stifle innovation in the development of the default payment arrangements or the giving of appropriate economic signals. It is therefore the Parties' intention that, upon any change in the nature of, or extent of recovery under the Balancing and Settlement Code of, variable costs (actual or estimated) incurred or to be incurred by Generating Units providing the Obligatory Reactive Power Service, the specific costs identified in paragraph 1 below shall be a matter for review by the Transmission Users Group as more particularly referred to as item 5 of Appendix 7.

CUSC v1.7

**Part II**

Not Used