AGREED TESTING AND MONITORING PROCEDURE NO. 1
OPERATING RESERVE[1]

APPROVED 16 JUNE 2011

1. SCOPE AND INTERPRETATION

1.1 This **Agreed Testing and Monitoring Procedure** applies to the **TSO** and to **Generators** with non-**PPA CDGUs.** It sets out the methodologies and procedures for **Testing** under OC11.11 and **Monitoring** under OC11.10 of compliance by non-**PPA CDGUs** with their Declared Maximum capability for the provision of POR, SOR and/or TOR1 and, for relevant **Steam Turbine Units** only, the methodology and procedure for **Testing** of **Governor Droop**. This **Agreed Testing and Monitoring Procedure** applies for the purposes of assessing compliance with the **Grid Code**; separate arrangements apply under the **SSS Agreements** for the purposes of applying charges in respect of POR, SOR and TOR1.

1.2 The other categories of **Operating Reserve**, namely TOR2 and **Replacement Reserve**, are not covered by this **Agreed Testing and Monitoring Procedure** but the **TSO** will **Monitor** the **Generator's** compliance with **Dispatch Instructions** in connection with TOR2 and/or **Replacement Reserve** in accordance with OC11.10.2 and **Test** the **Generator's** compliance with **Dispatch Instructions** in connection with TOR2 and/or **Replacement Reserve** in accordance with OC11.11. **Testing** of **Governor Droop** for **Generating Units** other than relevant **Steam Turbine Units** will be undertaken in accordance with the general provisions relating to **Testing** set out in OC11.11

1.3 Providers of POR, SOR and TOR1 will be **Monitored** by the **TSO** and assessed during a Frequency Event and/or **Tested** in accordance with this **Agreed Testing and Monitoring Procedure.**

1.4 This **Agreed Testing and Monitoring Procedure** forms part of the **Grid Code** and words and expressions defined in the **Glossary & Definitions** section of the **Grid Code** shall have the same meanings where used herein. Additionally, words and expressions defined in the appendix hereto shall have the same meanings where used in this **Agreed Testing and Monitoring Procedure.**

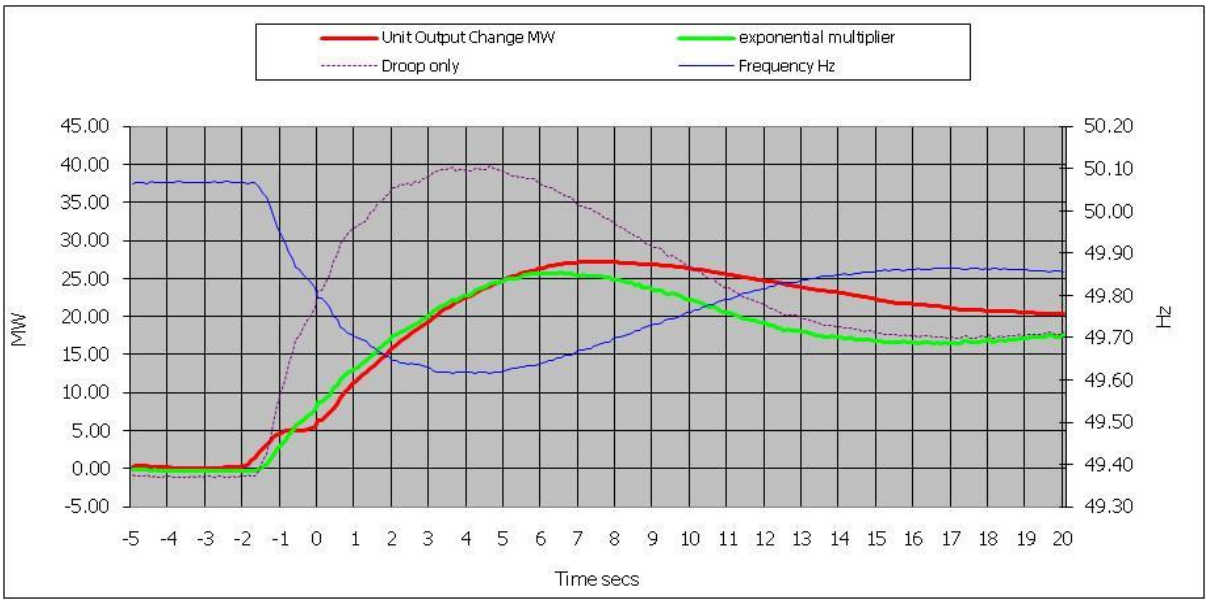
[1] Note: only terms defined in the G&D have been bolded. Terms to be defined in the Appendix to this Agreed Procedure have been capitalised but not bolded.

2. TECHNICAL BACKGROUND

2.1 The assessment for the purposes of **Testing** and **Monitoring** a **Generating Unit's** reaction to a change in **System Frequency** is based on the governor controlled response of the **Generating Unit** taking account of any physical time delays inherent in the type of **Generating Unit** and the maximum reserve values derived from the **Sustained Load Diagrams** (which term is defined in the **Glossary & Definitions** by reference to the HAS Reserve Curves contained in the **SSS Agreements**). The maximum reserve value for each reserve category is the change in **Output** that the **Generating Unit** can achieve and sustain in the reserve category time period. The assessment requires the **TSO** to obtain values for the **Pre-Event Output** of the **Generating Unit** and **Pre-Event System Frequency** to determine the expected reserve provision during a Frequency Event. The difference between the expected and achieved response (subject to a tolerance) will determine the outcome of the assessment. The **TSO** will use **Event Recorder** data for the assessment.

Governor Droop multipliers

2.2 The physical time delays in the reaction of some types of **Generating Unit** to **Frequency** changes, during the POR Period, has lead to the development of **Governor Droop** multipliers to provide a methodology to assess the **Output** change of a **Generating Unit**. The maximum **Output** change of a **Generating Unit** in the POR Period is limited to the POR value derived from the applicable **Sustained Load Diagram**. The **Governor Droop** multiplier is applicable to **Steam Turbine Units** (other than a **Steam Turbine Unit** comprised in a **CCGT Module**) (referred to in this **Agreed Testing and Monitoring** procedure as a "relevant **Steam Turbine Unit**") because these have significant inherent physical delays in responding to **Frequency** changes or have **Unit Load Controllers** fitted that interfere with the initial free governor action response of the **Generating Unit**.



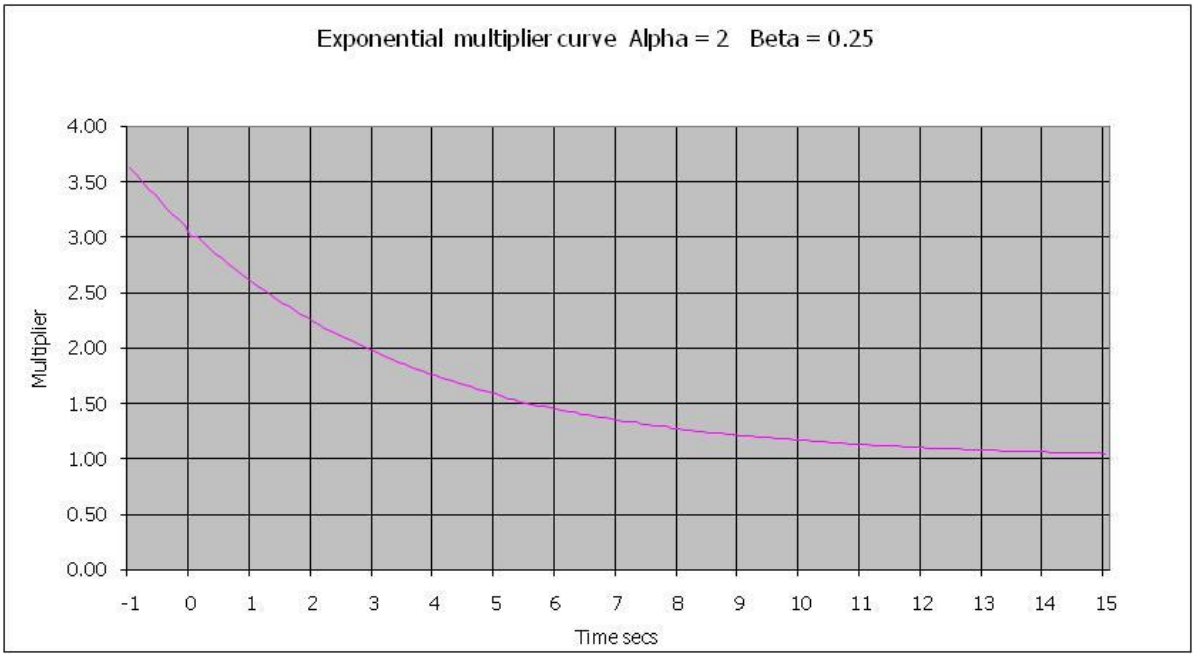
2.3 The chart above indicates the actual **Output** change of a relevant **Steam Turbine Unit** when experiencing a **Frequency** change. The line "Unit Output Change MW" is the **Generating Unit Output** change (expressed in MW) from the Pre-Event Output **(**left hand

vertical axis)**.** The line "Frequency Hz" is the **System Frequency** (right hand vertical axis). The line "Droop only" indicates the expected **Output** (expressed in MW) change for a **Governor Droop** response at 4% droop. The line "exponential multiplier "indicates the expected **Generating Unit Output** change (expressed in MW) for a droop response at 4% droop multiplied by the exponential droop multiplier function. The inherent physical time delay is demonstrated by the difference between the actual change in **Output** (expressed in MW) and the droop only response. The multiplying of the droop only response by a factor that decays in time towards one provides compensation for the inherent time delays as a steady state situation approaches.

2.4 The exponential **Governor Droop** multiplier function has two variables alpha and beta; the function takes the form -

Governor Droop multiplier = 1 + (POR **Governor Droop** multiplier $\alpha \times e^{(\text{-POR Governor Droop multiplier } \beta \times \text{ time secs})}$)

(Where e is the exponential function and time secs is the elapsed time from the start of the Frequency Event)



The exponential function for values of Alpha 2 and Beta 0.25 is graphically represented above as an example.

Governor Droop multipliers are not used for **CCGT Modules** and open cycle **Gas Turbine Units** which have short physical time delays.

The alpha and beta values for the POR Governor Droop Multiplier will be determined for new **Generating Units** during **Commissioning/Acceptance Testing**.[2]

[2] For each Generating Unit that is already connected to the Transmission System, the alpha and beta values for the POR Governor Droop Multiplier will be determined by the TSO in conjunction with the Generator following

Timescales

2.5 **Generating Units** that are **Synchronised** to the **Transmission System** and providing POR, SOR and TOR1 will be assessed during Frequency Events within the relevant timescales.

2.6 The timescales for each category of **Operating Reserve** are:

Category of **Operating Reserve**	Time from **Event** start to be fully available	Time to which response is to be sustained
Primary Operating Reserve	5 seconds	15 seconds from **Event** start
Secondary Operating Reserve	15 seconds	90 seconds from **Event** start
Tertiary Operating Reserve band 1	90 seconds	5 minutes from **Event** start
Tertiary Operating Reserve band 2	5 minutes	20 minutes from **Event** start

Initial Conditions

2.7 For the purposes of this **Agreed Testing and Monitoring Procedure**, a "Frequency Event" is an **Event** where the **System Frequency** falls through 49.8 Hz and then continues to fall through 49.5 Hz. The start of the Frequency Event is referred to as time zero (T=0 seconds) and is timed from the **Frequency** falling through 49.8 Hz. The Frequency Event ends when the **Frequency** rises back above 49.8 Hz. The average **Output** of a **Generating Unit** for the period 60 seconds to 30 seconds before the start of a Frequency Event is the **"**Pre-Event Output"**.** The average **Frequency** of the **Transmission System** for the period 60 seconds to 30 seconds before the start of a Frequency Event is the "Pre-Event System Frequency".

Event Considerations

2.8 The **TSO** will when analysing the POR, SOR and/or TOR1 Capability of a **Generating Unit** following a Frequency Event, take into account such factors as it considers necessary including:

(a) if, in the **TSO's** opinion, the Pre-Event Output or Pre-Event System Frequency are unrepresentative of initial conditions immediately prior to the event due to **System** disturbances the **TSO** may use figures that it considers to be more representative for the assessment;

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analysis of the performance of the Generating Unit and shall apply for the purposes of this Agreed Testing Monitoring Procedure and all other relevant provisions of the Grid Code. For Plant with Unit Load Controllers, Governor Droop Multiplier values will be specified for operation both with and without the Unit Load Controller in service.

(b) whether any **Dispatch Instructions** issued just prior to or during a Frequency Event might have interfered with the free governor action or **Unit Load Controller** action of the **Generating Unit** during the Frequency Event;

(c) in circumstances where there have been 2 **Frequency** drops within the one Frequency Event, the **TSO** will consider and determine which **Frequency** drop should be considered to be the start point of the Frequency Event; and/or

(d) if the **Generating Unit** being **Tested** or **Monitored** experiences oscillations in **Output** caused by the interaction with the **System** during the Frequency Event, the **TSO** will, if it considers it to be appropriate, smooth the **Event Recorder** values of the **Generating Unit Output** by the application of a moving point average.

Changes in **Transmission System** Dynamics

2.9 If the **TSO** or the **Generator**, acting reasonably, notifies the other in writing that it considers that any failure by a **Generating Unit** to achieve Expected POR is the direct consequence of a change in the **Transmission System** dynamics and outside the control of the **Generator**, the parties shall meet to discuss in good faith whether any changes should be made to the values of the POR Governor Droop Multiplier Alpha and/or the POR Governor Droop Multiplier Beta in order to reflect more accurately the **Generating Unit's** interaction with the **Transmission System**. In the event that any such change is agreed to be necessary, the parties shall give effect to the change by varying the terms of the applicable **System Support Services Agreement**.

3. **MONITORING**

3.1 Assessment of POR Performance

3.1.1 POR Period

The assessment of POR performance is carried out at one point in time corresponding to the time of the **Frequency** nadir during the POR time range of T+5 seconds to T+15 seconds (the "POR Period"). The basis for calculating the Expected POR is the anticipated **Generating Unit** response to the **Frequency** reduction. The increase in the **Generating Unit Output** is driven by the governor response and is limited by the sustained loading ability of the **Generating Unit**. In the initial phase of the POR Period it is recognised that the **Generating Unit Output** may lag behind the theoretical droop determined response due to the physical reaction of the unit to a **System Frequency** change, the variation depending on **Generating Unit** type or **Unit Load Controller** action. To compensate for this, the **TSO** will for the purposes of assessing POR Capability use the POR Governor Droop Multiplier which decays to a value of one over time, the value during the POR Period determined from the POR Governor Droop Multiplier Alpha and the POR Governor Droop Multiplier Beta. If the Achieved POR is less than the Expected POR after the application of the Applicable Tolerance a POR failure will be recorded.

Where a Frequency Event has occurred while the **Generating Unit** was **Synchronised** to the **System**, the **Generating Unit** response to any further **Frequency Event** occurring within 5 minutes after the end of the **Frequency Event** will not be assessed.

3.1.2 Calculation of Expected POR

The Expected POR following a Frequency Event will be derived by the **TSO** from:

1. the Pre-Event Output of the **Generating Unit**;
2. the Pre-Event System Frequency**;**
3. the Nadir Frequency, being the minimum **Frequency** during the POR Period;
4. the Nadir Time, being the time at which the minimum **Frequency** occurs during the POR Period with reference to the start of the Frequency Event at T=0;
5. the Nadir Frequency Delta, being the difference between the Pre-Event System Frequency and the minimum **Frequency** during the POR Period;
6. the Generating Unit Output Delta, being the change in the **Generating Unit Output** from the Pre-Event Output to the **Generating Unit Output** at the Nadir Time;
7. the **Output** of the **Generating Unit** (expressed in MW) at the Nadir Time;
8. the declared **Availability** of the **Generating Unit** (expressed in MW) at the start of a Frequency Event;
9. the **Sustained Load Diagram** relating to POR;
10. the Declared Maximum POR;
11. the declared **Governor Droop**;
12. the Generating Unit Frequency / Capacity Function (if applicable);
13. the **Unit Load Controller** settings, if applicable. If a **Unit Load Controller** is in service during the Frequency Event, the Pre-Event System Frequency and Pre-Event Output

of the **Generating Unit** will be determined using the **Unit Load Controller** settings. Any other pre agreed **Unit Load Controller** actions will be taken into account for the assessment; and

14. if the POR Capability being assessed is that of a relevant **Steam Turbine Unit** the declared **Governor Droop** will be multiplied by a factor of 3 if the **Output** of the **Generating Unit** is greater than 90% of the Governor Droop Generating Unit Related Capacity

3.1.3 The "POR Governor Droop Multiplier".

The POR Governor Droop Multiplier, where applicable, is calculated as:

$$\text{POR Governor Droop Multiplier} = 1 + (\text{POR Governor Droop Multiplier } \alpha \times e^{(\text{-POR Governor droop multiplier } \beta \times \text{nadir time})})$$

(Where e is the exponential function)

3.1.4 The Governor Droop Demanded POR

The Governor Droop Demanded POR is calculated as the product of:

the Governor Droop Generating Unit Related Capacity (expressed in MW) and the Nadir Frequency Delta (expressed in Hz) divided by the declared **Governor Droop** (PU) times the POR Governor Droop Multiplier (PU) times the nominal **Frequency** (50 Hz).
The Expected POR is the increase from the Pre-Event Output from the **Generating Unit** at the Nadir Frequency and is calculated as the minimum of:-

(a) the POR value determined from the **Sustained Load Diagram** relating to POR in conjunction with:
  (i) the **Generating Unit** Pre-Event Output; and
  (ii) the **Generating Unit** declared **Availability**;

(b) the difference between the **Generating Unit** Pre-Event Output and the declared **Availability**. This value will be adjusted by the Generating Unit Frequency / Capacity Function at the Nadir Frequency in accordance with the **Connection Conditions**, if applicable;

(c) the Governor Droop Demanded POR; and

(d) the Declared Maximum POR.

3.1.5 Calculation of Achieved POR

The Achieved POR following a Frequency Event is equal to the Generating Unit Output Delta. The response of the **Generating Unit** will be considered successful if the Achieved POR plus the Applicable Tolerance is greater than or equal to the Expected POR.

3.1.6 Consequences of Non-Compliance

If the **TSO** considers, on the basis of paragraph 3.1.5, that the **Generating Unit** has failed to achieve the Expected POR, the **TSO** may re-register the maximum POR Capability of the **Generating Unit** so that it is consistent with the Achieved POR. If the **Generator** subsequently redeclares the maximum POR Capability of the **Generating Unit**, the **TSO** may within 48 hours of such redeclaration, **Test** the **Generating Unit's** POR performance and/or undertake a **Governor Droop Test** and, if the **Test** is failed, the **TSO** may re-register the maximum POR Capability or the **Governor Droop** values of the **Generating Unit**, such re-registration to take effect from the **Trading Period** in which the **Generator's** redeclaration was expressed to be effective.

3.2 Assessment of SOR Performance

3.2.1 SOR Period

The assessment of SOR performance is carried out during the entire SOR time range of T+15 seconds to T+90 seconds (the "SOR Period"). The Expected SOR will be determined by the **TSO** for each sample point during the SOR Period and compared to the Achieved SOR. If the Achieved SOR is less than the Expected SOR, the deficit is summated for all the **Event Recorder** sample points and an average deficit calculated. If a deficit remains after the application of the Applicable Tolerance a SOR failure will be recorded.

Where a Frequency Event has occurred while the **Generating Unit** was **Synchronised** to the **System**, the **Generating Unit's** response to any further Frequency Event occurring within 5 minutes after the end of the Frequency Event will not be taken into account.

3.2.2 Calculation of Expected Provision of SOR

The Expected SOR following a Frequency Event will be derived by the **TSO** from:

1. the Pre-Event Output of the **Generating Unit**;
2. the Pre-Event System Frequency;
3. the declared **Availability** of the **Generating Unit** (expressed in MW) at the start of a Frequency Event;
4. the **Sustained Load Diagram** relating to SOR;
5. the Declared Maximum SOR;
6. the declared **Governor Droop**;

7. the Governor Droop Demanded SOR;
8. the Generating Unit Frequency /Capacity Function (if applicable);
9. the **Unit Load Controller** settings, if applicable. If a **Unit Load Controller** is in service during the Frequency Event the Pre-Event System Frequency and Pre-Event Output of the **Generating Unit** will be determined using the **Unit Load Controller** settings; and
10. if the SOR performance being assessed is that of a relevant **Steam Turbine Unit**, the declared **Governor Droop** will be multiplied by a factor of 3 if the **Generating Unit Output** is greater than 90% of the Governor Droop Generating Unit Related Capacity.

The Governor Droop Demanded SOR is calculated by reference to each sample point during the SOR Period, as the product of the Governor Droop Generating Unit Related Capacity (expressed in MW) and the sample point **Frequency** delta (expressed in Hz) divided by the declared **Governor Droop** (PU) times the nominal **Frequency** (50 Hz).

The Expected SOR is the increase from the Pre-Event Output from the **Generating Unit** at each sample point during the SOR Period and will be calculated by the **TSO** as the minimum of:

(a) the SOR value determined from the **Sustained Load Diagram** relating to SOR in conjunction with (i) the **Generating Unit** Pre–Event Output and (ii) the declared **Availability**;
(b) the difference between the **Generating Unit** Pre–Event Output and the declared **Availability**. In the case of a **CCGT Module** only, this value will be adjusted by the Generating Unit Frequency/Capacity Function at the each sample point **Frequency**, if applicable;
(c) the Governor Droop Demanded SOR; and
(d) the Declared Maximum SOR.

The sample point Expected SOR values are averaged over the SOR Period to give the "Average SOR Requirement".

3.2.3 Calculation of Achieved Provision of SOR

The Achieved SOR following a Frequency Event will be calculated by the **TSO** for each sample point during the SOR Period as the **Generating Unit Output** minus the **Generating Unit** Pre-Event Output. If the Achieved SOR is less than the Expected SOR, at a sample point, a deficit of SOR will be recorded. SOR deficits averaged over the SOR Period produce the "Average SOR Deficit".

The response of the **Generating Unit** will be considered successful if the Average SOR Deficit is less than the Applicable Tolerance**.**

3.2.4 Consequences of Non-Compliance

If the **TSO** considers, on the basis of paragraph 3.2.3, that the **Generating Unit** has failed to achieve the Expected SOR, the **TSO** may re-register the maximum SOR Capability of the **Generating Unit** so that it is consistent with the Achieved SOR. If the **Generator** subsequently redeclares the maximum SOR Capability of the **Generating Unit**, the **TSO** may within 48 hours of such redeclaration, **Test** the **Generating Unit's** SOR performance and/or undertake a **Governor Droop Test** and, if the **Test** is failed, the **TSO** may re-register the maximum SOR Capability or the **Governor Droop** values of the **Generating Unit**, such re-registration to take effect from the **Trading Period** in which the **Generator's** redeclaration was expressed to be effective.

3.3 **Assessment of TOR1 Performance**

3.3.1 TOR1 Period

The assessment of TOR1 performance is carried out during the entire TOR1 time range of T+90 seconds to T+300 seconds (the "TOR1 Period"). The Expected TOR1 is determined for each sample point during the TOR1 Period and compared to the Achieved TOR1. If the Achieved TOR1 is less than the Expected TOR1, the deficit is summated for all the **Event Recorder** sample points and an average deficit produced. Where a Frequency Event has occurred while the **Generating Unit** was **Synchronised** to the **System**, the **Generating Unit** response to any further Frequency Event occurring within 5 minutes after the end of the Frequency Event will not be taken into account

3.3.2 Calculation of Expected Provision of TOR1

The Expected TOR1 following a Frequency Event will be derived by the **TSO** from:

1. the Pre-Event Output of the **Generating Unit**;
2. the Pre-Event System Frequency;
3. the declared **Availability** of the **Generating Unit** (expressed in MW) at the start of a Frequency Event;
4. the **Sustained Load Diagram** relating to TOR1;
5. the Declared Maximum TOR1;
6. the declared **Governor Droop**;
7. the Governor Droop Demanded TOR1;
8. the Generating Unit Frequency / Capacity Function (if applicable);
9. the **Unit Load Controller** settings, if applicable. If a **Unit Load Controller** is in service during the Frequency Event the Pre-Event System **Frequency** and Pre-Event Output of the **Generating Unit** will be determined using the **Unit Load Controller** settings; and
10. if the TOR1 performance being assessed is that of a relevant **Steam Turbine Unit** the declared **Governor Droop** will be multiplied by a factor of 3 if the **Generating Unit Output** is greater than 90% of the Governor Droop Generating Unit Related Capacity.

The Governor Droop Demanded TOR1 is calculated by reference to each sample point during the TOR1 Period, as the product of the Governor Droop Generating Unit Related Capacity (expressed in MW) and the sample point **Frequency** delta (expressed in Hz) divided by the declared **Governor Droop** (PU) times the nominal **Frequency** (50 Hz).

The Expected TOR1 following a Frequency Event is the increase from the Pre-Event Output from the **Generating Unit** at each sample point during the TOR1 Period and will be calculated by the **TSO** as the minimum of:

(a) the **TOR1** value determined from the **Sustained Load Diagram** relating to TOR1 in conjunction with (i) the **Generating Unit** Pre–Event Output and (ii) the declared **Availability**;
(b) the difference between the **Generating Unit** Pre-Event Output and the declared **Availability**. In the case of a **CCGT Module** only, this value will be adjusted by the Generating Unit Frequency/Capacity Function at each sample point **Frequency**, if applicable;
(c) the Governor Droop Demanded TOR1; and
(d) the Declared Maximum TOR1.

The sample point Expected TOR1 values are averaged over the TOR1 Period to give the "Average TOR1 Requirement".

3.3.3 Calculation of Achieved Provision of TOR1

The Achieved TOR1 will be calculated by the **TSO** for each sample point during the TOR1 Period as the **Generating Unit Output** minus the **Generating Unit** Pre-Event Output.
If the Achieved TOR1 is less than the Expected TOR1, at a sample point, a deficit of TOR1 is recorded. TOR1 deficits averaged over the TOR1 Period produce the "Average TOR1 Deficit".

The response of the **Generating Unit** will be considered successful if the Average TOR1 Deficit is less than the Applicable Tolerance.

3.3.4 Consequences of Non-Compliance

If the **TSO** considers, on the basis of paragraph 3.3.3, that the **Generating Unit** has failed to achieve the Expected TOR1, the **TSO** may re-register the maximum TOR1 Capability of the **Generating Unit** so that it is consistent with the Achieved TOR1. If the **Generator** subsequently redeclares the maximum TOR1 Capability of the **Generating Unit**, the **TSO** may within 48 hours of such redeclaration, **Test** the **Generating Unit's** TOR1 performance and/or undertake a **Governor Droop Test** and, if the **Test** is failed, the **TSO** may re-register the maximum TOR1 Capability or the **Governor Droop** values of the **Generating Unit**, such re-registration to take effect from the **Trading Period** in which the **Generator's** redeclaration was expressed to be effective.

4. **TESTING**

4.1 The Right to Call for a **Test**

4.1.1 A **Test** in respect of the POR, SOR, and/or TOR1 Capability and/or in respect of the **Governor Droop** of a **Generating Unit** may be requested in the following circumstances:

(a) by the **Generator**, at any time; in which case the **TSO** will by the same time on the second Business Day thereafter specify the time (within 3 days) for the **Test** which shall be as soon as reasonably practicable having regard to **System** constraints (but in any event within 3 days); or

(b) by the **TSO**, on not less than 24 hours notice of the start of the **Test**:

(i) at any time, if the **TSO** has reasonable grounds to believe that the maximum POR**,** SOR and/or TOR1 Capability of a **Generating Unit** is impaired; or

(ii) within 48 hours (the **Test** to start within 72 hours) after the **Generator** re-declared up the value of the maximum POR, SOR and/or TOR1 Capability either:

(1) where the maximum POR, SOR and/or TOR1 Capability had earlier been re-registered by the **TSO** at a lower level than previously declared by the **Generator** following a Frequency Event; or

(2) where following a previous **Test** the maximum POR, SOR and/or TOR1 Capability had been re-registered by the **TSO** at a level lower than previously declared by the **Generator**.

4.2 **Tests** of POR, SOR and/or TOR1 Capability

4.2.1 If the **TSO** requests a **Test** in respect of POR, SOR and/or TOR1 Capability and the maximum POR, SOR and/or TOR1 Capability determined pursuant to such **Test** is lower than the value which had been re-registered (as described in (1) or (2) above) by the **TSO**, the value determined pursuant to such **Test** shall be applied retrospectively (from the **Trading Period** in which the **TSO** re-registered the maximum POR, SOR and/or TOR1 Capability).

4.2.2 The **Test** for maximum POR, SOR or TOR1 Capability compares Achieved POR, SOR and/or TOR1 against Expected POR, SOR and/or TOR1. The **Test** is carried out using the **Generating Unit** output control or injection of signals into the output control system to achieve fast **Output** increases of various magnitudes at up to 3 different initial **Outputs** nominated by the party which called for the **Test**. During the **Test** the **Event Recorder** is used to monitor relevant parameters.

4.2.3 The Achieved POR, SOR and TOR1 will be calculated by the **TSO** on the same basis as set out in paragraphs 3.1.5, 3.2.3 and 3.3.3 for the purposes of **Monitoring** POR, SOR and TOR1 Capability respectively. If the response of the **Generating Unit** is considered on that basis to have been unsuccessful, the party which called for the **Test** may (in the case of the **Generator**) redeclare or (in the case of the **TSO**) re-register the value of the maximum POR, SOR and/or TOR1 Capability (but subject to the right of the **Generator** subsequently to redeclare) at a value equal to the Achieved POR, SOR and/or TOR1.

4.3 **Governor Droop Testing**

4.3.1 The following provisions apply to **Testing** of a relevant **Steam Turbine Unit's Governor Droop** (**Governor Droop** may be tested in relation to other types of **Generating Unit** under the general **Testing** provisions of OC11.11):

(a) "Specified Governor Droop" means the highest incremental **Governor Droop** at any **Output** below 90% of Governor Droop Generating Unit Related Capacity. If the **Output** of the relevant **Steam Turbine Unit** is greater than 90% of the Governor Droop Generating Unit Related Capacity, the declared **Governor Droop** will be multiplied by a factor of 3.

(b) A **Test** of **Governor Droop** may be requested by the **TSO**, on not less than 24 hours notice, at any time if the **TSO** has reasonable grounds to believe that the Specified Governor Droop of the **CDGU** in relation to its relevant **Steam Turbine Units** is different to its declared value. The **Test** is carried out with the turbine at speed but with the **CDGU** not **Synchronised**, and determines the relationship between governor hydraulic output and turbine speed, as turbine speed is decreased, from several speeder set points. Incremental **Governor Droop** values are calculated for the turbine **Output** range from the recorded results of the **Test**.

(c) The **TSO** may then re-register the value of Specified Governor Droop to the value determined according to such **Test** (to the extent that it is higher than the value previously declared by the **Generator**).

4.4 Disputes

4.4.1 To the extent that the **TSO** and a **Generator** are unable to agree on any further details or procedures for carrying out a **Test** of maximum POR, SOR and/or TOR1 Capability or testing of **Governor Droop**, the matter may be referred for determination under the dispute resolution provisions of the **Connection Agreement**.

4.4.2 Any dispute as to the result of **Test** of POR, SOR and/or TOR1 Capability or a **Test** of **Governor Droop** may be referred for determination under the dispute resolution provisions of the **Connection Agreement**.

APPENDIX - DEFINITIONS

"Achieved"	means, in relation to POR, SOR or TOR1, the level of POR, SOR or TOR1 provision achieved by the Generating Unit as calculated under paragraphs 3.1.5, 3.2.3 and 3.3.3 respectively;
"Applicable Tolerance"	means, in relation to the assessment of Achieved POR, Achieved SOR, or Achieved TOR1, the lesser of (i) 10% of Expected POR, Expected SOR or Expected TOR1 (as the context requires) and (ii) 1MW);
"Capability"	means, in relation to POR, SOR or TOR1, the capability of the Generating Unit (expressed in MW at the **Connection Point**) to provide POR, SOR or TOR1, to the power system;
"Declared"	means, in relation to POR, SOR and TOR1, and in relation to a **Trading Period**, the lowest value for the Capability of the **Generating Unit** to provide POR, SOR and TOR1, during that **Trading Period** as notified by the **Generator** in accordance with the **Grid Code**;
"Declared Maximum"	means, in relation to POR, SOR and TOR1, declared values for POR Capability, SOR Capability and TOR1 Capability, as notified under the **Grid Code**;
"Event Frequency Threshold"	means 49.5 Hz;
"Expected"	means, in relation to POR, SOR or TOR1, the level of POR, SOR or TOR1 that the **Generating Unit** is expected to provide as calculated in accordance with paragraphs 3.1.2, 3.2.2 and 3.3.2 respectively;
"Frequency Event"	means an occasion when the power system **Frequency** falls through the Event Frequency Threshold. The start of the Frequency Event is referred to as time zero (T=0 seconds) and is timed from the

Frequency falling through 49.8 Hz. The Frequency Event ends when the **Frequency** rises back above 49.8 Hz;

"Generating Unit Frequency/Capacity Function" the decrease in **Output** of a **Generating Unit** below its **Registered Capacity** during a period in which the system **Frequency** is below 49.5 Hz, such decrease being no more than pro rata with any decrease below nominal frequency in accordance with CC.S1.3.4 of the **Grid Code**;

"Generating Unit Output Delta" has the meaning given to it in paragraph 3.1.2;

"Governor Droop Demanded" means, in relation to POR, SOR or TOR1, the level of provision of POR, SOR or TOR1 expected to be achieved by the **Generating Unit** governor action calculated in accordance with paragraphs 3.1.4, 3.2.2 and 3.3.2 respectively;

"Governor Droop Generating Unit Related Capacity" means the machine capacity relating to the operation of the **Frequency** control system of the **Generating Unit**;

"HAS Reserve Curve" means in relation to POR, SOR and TOR1, the diagrams set out in Schedule 9 to the relevant **SSS Agreement**;

"Nadir Frequency" has the meaning given to it in paragraph 3.1.2;

"Nadir Frequency Delta" has the meaning given to it in paragraph 3.1.2;

"Nadir Time" has the meaning given to it in paragraph 3.1.2;

"Period"	means, in relation to POR, SOR or TOR1, the period in which POR, SOR or TOR1 is required to be provided as further defined in paragraphs 3.1.1, 3.2.1 and 3.3.1 respectively;
"Per Unit" or "PU"	means, in relation to any quantity, the ratio of the quantity to its base or reference value;
"POR Governor Droop Multiplier"	means, in relation to POR, the multiplier calculated in accordance with paragraph 3.1.3;
"POR Governor Droop Multiplier Alpha"	means, in relation to POR, the **Operating Parameter** set out in Schedule 9 of the relevant **SSS Agreement**;
"POR Governor Droop Multiplier Beta"	means, in relation to POR, the **Operating Parameter** set out in Schedule 9 of the relevant **SSS Agreement**;
"Pre-Event Output"	means, in relation to the assessment of POR, SOR and TOR1 performance by a **Generating Unit**, the average **Output** of that **Generating Unit** for the period 60 seconds to 30 seconds before the start of a **Frequency Event**;
"Pre-Event System Frequency"	means the average **Frequency** of the power **System** for the period 60 seconds to 30 seconds before the start of a **Frequency Event**;
"POR"	means **Primary Operating Reserve**;
"SOR"	means **Secondary Operating Reserve**;
"TOR1"	means **Tertiary Operating Reserve band 1**;
"TOR2"	means **Tertiary Operating Reserve band 2**.