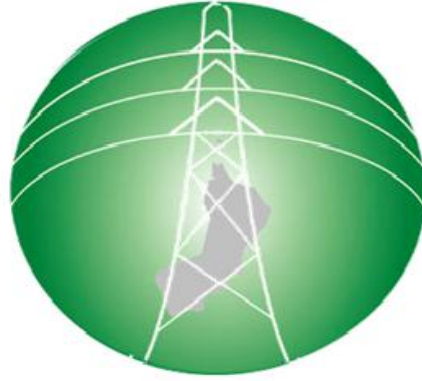


SULTANATE OF OMAN



الشركة العُمانية لنقل الكهرباء ش.م.ع.م
OMAN ELECTRICITY TRANSMISSION COMPANY S.A.O.C

**LICENCE CONDITION (26):
TRANSMISSION SECURITY STANDARDS**



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1. Introduction

Role and Scope

This document sets out the Transmission Security Standards that the Oman Electricity Transmission Company SAOC (OETC) will implement for the planning and operation of its licensed transmission system. The Transmission Security Standards have been prepared in accordance with Condition 26 of OETC's Transmission and Dispatch Licence ("the Licence").

Throughout this document the terms defined in Section 6 Definitions are shown in *italics*.

For ease of use, the component element of the Transmission Security Standards are presented according to the functional parts of the system to which they primarily apply, including the *Main Interconnected Transmission System* ("MITS") (see below for definition), the generation points of connection at which *Power Stations* feed into the MITS and the *Grid Supply Points* ("GSP") where demand is connected.

For the purpose of these Transmission Security Standards, the MITS is that part of OETC's licensed transmission system that is interconnected at 220 kV or 132 kV but does not include radially connected *Generators* and/or radially connected *Grid Supply Points* (GSPs). For ease of understanding Figure 1.1 below shows the MITS: Figure 1.1 will be updated from time to time as OETC's licensed transmission system develops.

The Transmission Security Standards for radially connected generation and demand are consistent with the Standards applied to the MITS but are conditioned by the amount of Generation and/or Demand connected.

The criteria presented in the Transmission Security Standards represent normal requirements for the planning and operation of OETC's licensed transmission system. Any departure from the recommended normal standard shall be subject to detailed risk and economic studies including consideration of the costs

associated with the use and/or introduction of out of merit generation as an alternative to network reinforcement.

Additional criteria, for example covering more detailed and other aspects of quality of supply, are contained in the Grid Code and Distribution Code, which should be read in conjunction with this document.

External Interconnections between OETC's licensed transmission system and *External Systems* are covered by separate agreements, which will normally be consistent with the Transmission Security Standards. The Transmission Security Standards may be specifically referenced in the relevant agreements and shall apply to the extent of such references.

The Transmission Security Standards contain technical terms and phrases specific to electricity transmission systems and the electricity sector that may differ from their common usage. For this reason 'Terms and Definitions' has been included as Section 6 to this document.

As described above and illustrated in Figure 1.2, there will be many parts of OETC's licensed transmission system where more than one set of criteria apply. In such places the requirements of all relevant criteria must be met

Application of these Transmission Security Standards may identify the need for investment in OETC's licensed transmission system. The planning criteria also require consideration to be given to the operation and maintenance and so refer to the associated operational criteria.

While it is a requirement for *Transmission Capacity* to meet the planning criteria, it does not follow that the *Transmission Capacity* should be reduced so that it only meets the minimum requirement of those criteria. For example, it may not be beneficial to reduce the ratings of lines to reflect lower loading levels which have arisen due to changes in the generation or demand patterns.

Application of the Transmission Security Standards may lead to the identification of inadequate capability of equipment or systems not owned or operated by the OETC (for example, the overloading of lower voltage connections between *Grid Supply Points*). In such cases OETC will notify the Users affected. Reinforcement

or alternative operation of OETC's licensed transmission system to alleviate inadequacies of equipment or systems not owned or operated by the OETC would be undertaken where it is agreed by the Users affected and the OETC.

Document Structure

Section 2 presents the Transmission Security Standards for the *Main Interconnected Transmission System*.

The generation connection criteria in Section 3 cover the connections that extend from the generation points of connection and reach into the MITS. The criteria also cover the risks affecting OETC's licensed transmission system arising from the *Generation Circuits*.

The demand connection criteria in Section 4 cover connections that extend from the lower voltage side of the GSP transformers and that reach into the MITS.

Section 5 presents criteria applicable to the operation of OETC's licensed transmission system. The operational criteria are used in real time and in the development of plans for using OETC's licensed transmission system to permit satisfactory operation.

A final section, Section 6, lists defined terms used throughout this document. Definitions are, where applicable, consistent with definitions in the Sector Law, the Licence and the Grid Code.



Figure 1.1 The Main Interconnected Transmission System

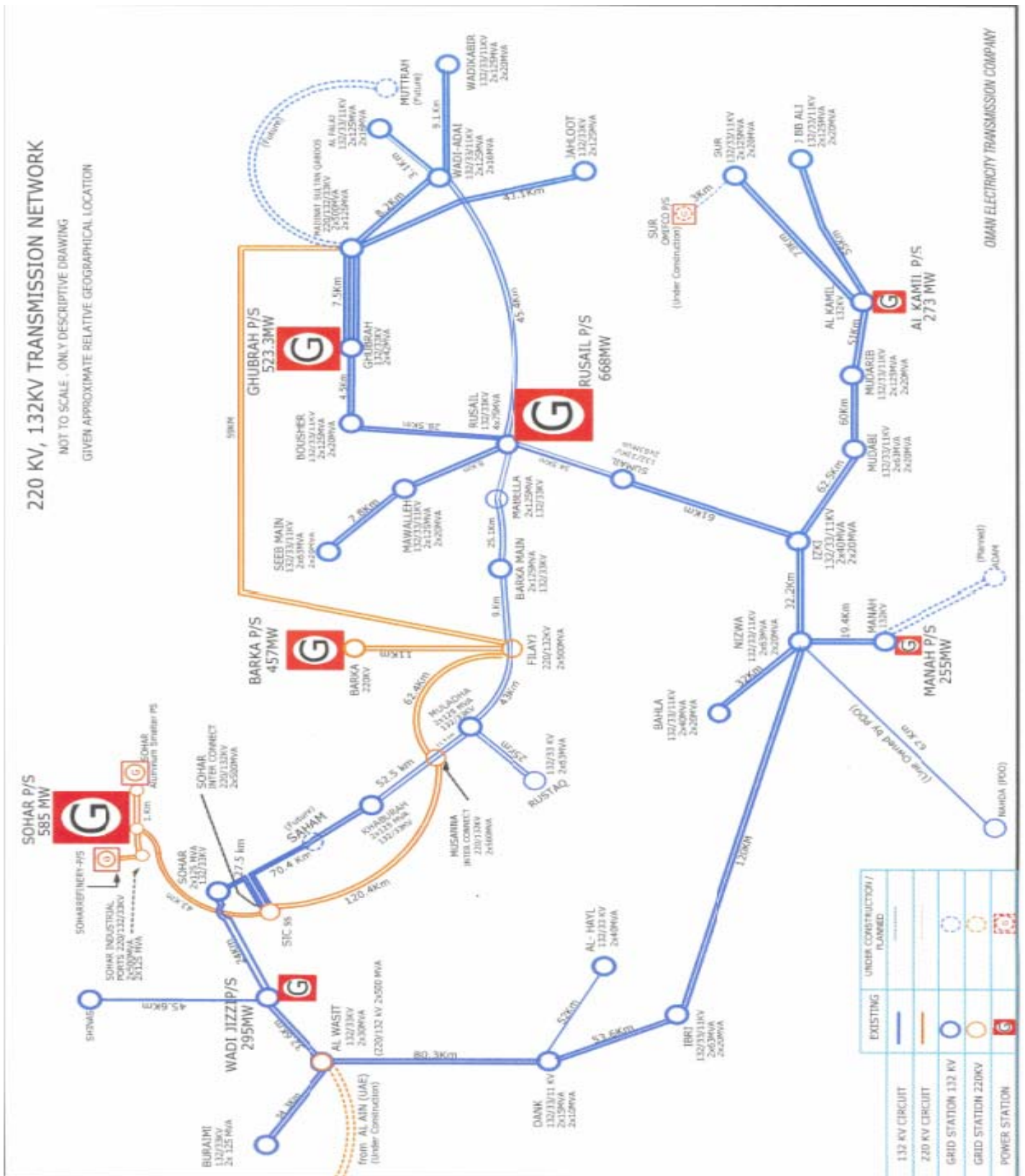
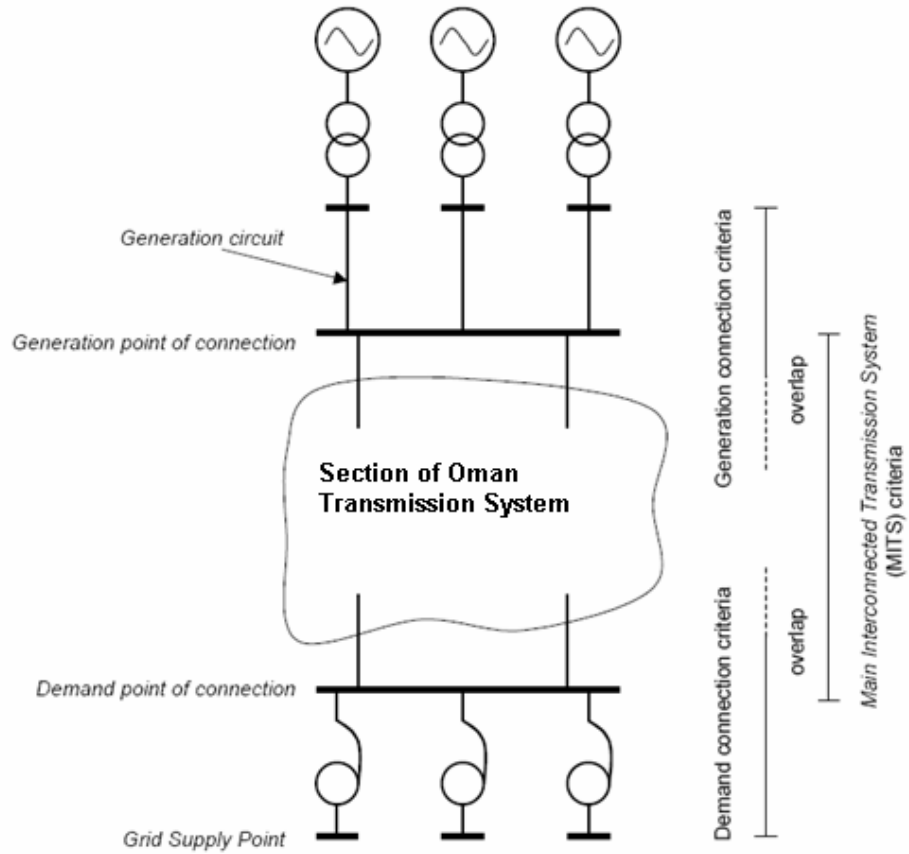


Figure 1.2 Oman Transmission System with directly connected Generation and Demand



2. Transmission Security Standards of the Main Interconnected Transmission System

The minimum *Transmission Capacity* of the *Main Interconnected Transmission System (MITS)* shall be planned such that, prior to any fault, there shall not be;

- equipment loadings exceeding the pre-fault rating;
- voltages outside the *Pre-Fault Planning Voltage Limits* or insufficient voltage performance margins; or
- *System Instability*.

The MITS shall be so designed such that in the event of the *fault outage* of a single *Transmission Circuit* or section of *Busbar* there shall not be:

loss of supply;

Unacceptable Overloading of any primary transmission equipment;

unacceptable voltage conditions or insufficient voltage performance margins; or

System Instability.

The above design criteria for the MITS shall be met for two generation/demand scenarios:

Scenario 1: During the System *Peak Demand* period with an *Intact System*, and

Scenario 2: During the *Maintenance Period* with the *Planned Outage* of a single *Transmission Circuit* or section of *Busbar*.

The *Transmission Capacity* of the MITS shall also be planned such that, for the background conditions described above, the operational security criteria set out in Section 5 can be met.

Where necessary to satisfy the above criteria during the *Maintenance Period*, investment should be made in *Transmission Capacity* except where operational measures suffice to meet the criteria provided that maintenance access for each

Transmission Circuit can be achieved and provided that such measures are economically justified. The operational measures to be considered include rearrangement of transmission outages and appropriate reselection of *Generation Units* from those expected to be available, for example through rescheduling.

3. Design of Generation Connections

3.1 This section presents the Transmission Security Standards to be applied for the direct connection of one or more *Power Stations* to OETC's licensed transmission system. The criteria in this section will also apply to the connections from a GSP to OETC's licensed transmission system by which *Power Stations* embedded within a User's network (e.g. distribution network) are connected to OETC's licensed transmission system.

3.2 In those parts of OETC's licensed transmission system where the criteria of Section 2 and/or Section 4 also apply, those criteria must also be met.

3.3 In designing Generation Connections to meet these Transmission Security Standards, there are two aspects to consider;

the *Loss of Power Infeed* resulting from contingencies on the Generation Connections themselves;

the effects of contingencies on the MITS.

Limits to Loss of Power Infeed Risks

3.4 For the purpose of applying the Transmission Security Standards, the *Loss of Power Infeed* resulting from a *Secured event* shall be calculated as follows:

the sum of the registered capacities of the *Generation Units* disconnected from the system by a *Secured event*; plus

the planned import from any *External Systems* disconnected from the system by the same event; less

the *Forecast Minimum Demand* disconnected from the system by the same event but excluding (from the deduction) any demand forming part of the *Forecast Minimum Demand* that may be automatically tripped for system frequency control purposes.

3.5 Generation connections shall be planned such that, starting with an *Intact System*, the consequences of *Secured events* shall be as follows: -

following a *Fault outage* of any single *Transmission Circuit*, no *Loss of Power Infeed* shall occur;

following the *Planned Outage* of any single section of *Busbar*, no *Loss of Power Infeed* shall occur;

following a *Fault outage* of any single *Generation Circuit* or single section of *Busbar*, the *Loss of Power Infeed* shall not exceed the *Normal Infeed Loss Risk*;

following the *Fault outage* of any single *Busbar* coupler circuit breaker or *Busbar* section circuit breaker, the *Loss of Power Infeed* shall not exceed the *Infrequent Infeed Loss Risk*;

following the *Fault outage* of any single *Transmission Circuit* or single section of *Busbar*, during the *Planned Outage* of any other single *Transmission Circuit* or single section of *Busbar*, the *Loss of Power Infeed* shall not exceed the *Infrequent Infeed Loss Risk*;

following the *Fault outage* of any single *Busbar* coupler circuit breaker or *Busbar* section circuit breaker, during the *Planned Outage* of any single section of *Busbar*, the *Loss of Power Infeed* shall not exceed the *Infrequent Infeed Loss Risk*.

Pre-fault criteria

3.6 The *Transmission Capacity* for the connection of a *Power Station* shall be planned such that, for the background conditions described in Section 2.3, prior to any fault there shall not be any of the following:

equipment loadings exceeding the pre-fault rating;

voltages outside the *Pre-Fault Planning Voltage Limits* or insufficient voltage performance margins; or

System Instability.

Post-fault criteria

3.7 The *Transmission Capacity* for the connection of a *Power Station* shall also be planned such that for the background conditions described in paragraph 3.6 and for the *Secured event* of a *Fault outage* of any of the following:

a single *Transmission Circuit*;

a single *Transmission Circuit* with the prior outage of another *Transmission Circuit*;

a section of *Busbar*; or

a single *Transmission Circuit* with the prior outage of a generation unit,

there shall not be any of the following:

a *Loss of Supply Capacity* except as permitted by the demand connection criteria detailed in Section 3;

Unacceptable Overloading of any primary transmission equipment;

unacceptable voltage conditions or insufficient voltage performance margins; or

System Instability.

3.8 Where necessary to satisfy the criteria set out in paragraph 3.7, investment should be made in *Transmission Capacity* except where operational measures suffice to meet the criteria set out above provided that maintenance access for each *Transmission Circuit* can be achieved and provided that such measures are economically justified. The operational measures to be considered include rearrangement of transmission outages and appropriate reselection of *Generation Units* from those expected to be available, for example through rescheduling.

Variations to Connection Designs

3.9 Variations, arising from a generation User's request, to the generation connection design necessary to meet the requirements of the Main Interconnected System Standards (as defined in Section 2) shall also satisfy the requirements of Section 3 provided that the varied design satisfies the conditions set out in paragraphs 3.6

and 3.7. For example, such a generation connection design variation may be used to take account of the particular characteristics of a *Power Station*.

3.10 Any generation connection design variation must not, other than in respect of the generation User requesting the variation, either immediately or in the foreseeable future:

- reduce the security of the MITS to below the minimum planning criteria specified in Section 2; or
- result in additional investment or operational costs to any particular User or overall, or a reduction in the security and quality of supply of the affected Users' connections to below the planning criteria in this section or Section 3, unless specific agreements are reached with affected Users; or
- compromise OETC's ability to meet other statutory or licence obligations.

3.11 Should system conditions subsequently change, for example due to the proposed connection of a new User, such that either immediately or in the foreseeable future, the conditions set out in paragraphs 3.9 and 3.10 are no longer satisfied, then alternative arrangements and/or agreements must be put in place such that this Standard continues to be satisfied.

3.12 The additional operational costs referred to in paragraph 3.10 and/or any potential reliability implications shall be calculated by simulating the expected operation of OETC's licensed transmission system in accordance with the operational criteria set out in Section 5.

4. Design of Demand Connections

This section presents the planning criteria for the connection of *Demand groups* to OETC's licensed transmission system.

In those parts of OETC's licensed transmission system where the criteria of Section 2 and/or Section 3 also apply, those criteria must also be met.

In planning demand connections, this Standard is met if the connection design either:

satisfies the deterministic criteria detailed in paragraphs 4.5 to 4.9 below; or
varies from the design above in a manner which satisfies the conditions detailed in paragraph 4.10.

Demand Connection Capacity Requirements

The connection of a particular *Demand group* shall meet the criteria set out in paragraphs 4.6 to 4.9 under the following background conditions:

when there are no planned outages, the demand of the *Demand group* shall be set equal to *Group Demand* at the time of *System Peak Demand* ;

when there is a *Planned Outage* local to the *Demand group*, the demand of the *Demand group* shall be set equal to *Maintenance Period Demand*;

any *Transfer Capacity* (i.e. the ability to transfer demand from one *Demand group* to another) declared by Distribution Licencees shall be represented taking account of any restrictions on the timescales in which the *Transfer Capacity* applies. Any *Transfer Capacity* declared by the Distribution Licencees for use in planning timescales must be available for use in operational timescales; and

any generation available within the group, represented as to 67% of its *Registered Capacity* at the time of *System Peak Demand* and 50% during the *Maintenance Period*.

The *Transmission Capacity* for the connection of a *Demand group* shall be planned such that, for the background conditions described in paragraph 4.5, under *Intact System* conditions there shall not be any of the following:

equipment loadings exceeding the pre-fault rating;
voltages outside the *Pre-Fault Planning Voltage Limits* or insufficient voltage performance margins; or
System Instability.

The *Transmission Capacity* for the connection of a *Demand group* shall also be planned such that for the background conditions described in paragraph 4.5 and for the *Planned Outage* of a single *Transmission Circuit* or a single section of *Busbar*, there shall not be any of the following:

- a *Loss of Supply Capacity* for a *Group Demand* of greater than 1 MW;
- Unacceptable Overloading* of any primary transmission equipment;
- voltages outside the *Pre-Fault Planning Voltage Limits* or insufficient voltage performance margins; or
- System Instability*.

The *Transmission Capacity* for the connection of a *Demand group* shall also be planned such that for the background conditions described in 4.5 and the initial conditions of

- an *Intact System* condition; or
 - the single *Planned Outage* of another *Transmission Circuit*, or a generation unit,
- for the *Secured event* of a *Fault outage* of

- a single *Transmission Circuit*,

there shall not be any of the following:

- a *Loss of Supply Capacity* such that the provisions set out in Table 4.1 are not met;
- *Unacceptable Overloading* of any primary transmission equipment;
- unacceptable voltage conditions or insufficient voltage performance margins; or
- *System Instability*.

In addition to the requirements of paragraphs 4.6 to 4.8, for the background conditions described in paragraph 4.5, the system shall also be planned such that operational switching does not cause unacceptable voltage conditions.

The design of Demand Connections shall take into account the nature of the demand with respect to harmonic content, flicker etc. and shall ensure that the Connection Conditions of the Grid Code shall be met.

Table 4.1 Minimum Planning Supply Capacity following Secured events

DEMAND CLASS		Initial System Conditions	
		First Outage (forced outage)	Second Outage * (Planned Outage + forced outage)
A	Less than 1 MW	Repair time	No requirement
B	1 to 6 MW	3 Hours	No requirement
C	6 to 20 MW	Within 15 minutes	Restoration time of planned outage
D	20 to 100 MW	Immediately	Restoration time of planned outage
E	Greater than 100 MW	Immediately	Immediately, 2/3rds of demand *

* Planned outages are assumed to be restricted to the Maintenance Period when due to lower ambient temperatures demand is reduced and equipment ratings enhanced.

Variations to Connection Designs

Variations, arising from a demand User's request, to the demand connection design shall also satisfy the requirements of this Standard provided that the varied design satisfies the conditions set out in paragraphs 4.6 to 4.8. For example, such a demand connection design variation may be used to reflect the nature of connection of embedded generation or particular load cycles.

Any demand connection design variation must not, other than in respect of the demand User requesting the variation, either immediately or in the foreseeable future:

reduce the security of the MITS to below the minimum planning criteria specified in Section 2; or

result in additional investment or operational costs to any particular User or overall, or a reduction in the security and quality of supply of the affected Users' connections to below the planning criteria in this section or Section 2, unless specific agreements are reached with affected Users; or

compromise OETC's ability to meet other statutory or licence obligations.

Should system conditions change, for example due to the proposed connection of a new User, such that either immediately or in the foreseeable future, the conditions set out in paragraphs 4.6 to 4.8 are no longer satisfied, then alternative arrangements and/or agreements must be put in place such that this Standard continues to be satisfied.

The additional operational costs referred to in paragraph 4.11 and/or any potential reliability implications shall be calculated by simulating the expected operation of OETC's licensed transmission system in accordance with the operational criteria set out in Section 5.

5. Transmission System Operational Criteria

Normal Operational Criteria

OETC's licensed transmission system shall be operated under *Prevailing System Conditions* so that for the *Secured event* of a *Fault outage* of any of the following:

a single *Transmission Circuit*, or

the most onerous *Loss of Power Infeed*; or

where the system is designed to be secure against a *Fault outage* of a section of *Busbar* under *Planned Outage* conditions,

there shall not be any of the following:

a *Loss of Supply Capacity* except as specified in Table 4.1

Unacceptable Frequency Conditions;

Unacceptable Overloading of any primary transmission equipment;

unacceptable voltage conditions; or

System Instability.

OETC's licensed transmission system shall be operated under *Prevailing System Conditions* so that for the *Secured event* of a *Fault outage* of:

a single circuit overhead line; or

a section of *Busbar*,

there shall not be any of the following:

a *Loss of Supply Capacity* greater than 40 MW;

Unacceptable Frequency Conditions; or

unacceptable voltage conditions affecting one or more *Grid Supply Points* for which the total *Group Demand* is greater than 60 MW; or

System Instability of one or more *Generation Units* connected to the MITS.

Conditional Further Operational Criteria

During periods of *Major System Risk*, OETC may implement measures to mitigate the consequences of this risk. Such measures may include: providing additional reserve, securing as far as possible appropriate two-circuit combinations, or reducing system transfers, for example through redispatching of *Generators*.

In the case that neither of the conditions in paragraphs 5.1 and 5.3 is met, it is acceptable to utilise short-term post fault actions to avoid *Unacceptable Overloading* of *Primary Transmission Equipment* which may include a requirement for demand reduction; however, this will not be used as a method of increasing reserve to cover abnormal post fault generation reduction. Where possible these post fault actions shall be notified to the appropriate User. Normally the provisions of the Grid Code, in respect of Emergency Manual Demand Disconnection and/or, for example through redispatching of generation, will be applied. Additional post fault actions beyond the Grid Code provisions may be applied, but only where they have been agreed in advance with the appropriate Distribution Licensee or *Generator*.

Post-fault Restoration of System Security

Following the occurrence of a *Secured event*, measures shall be taken to resecure the system to the above operational criteria as soon as reasonably practicable. To this end, it is permissible to put operational measures in place pre-fault to facilitate the speedy restoration of system security.

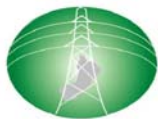
Authorised Variations from the Operational Criteria

Provided it is in accordance with the appropriate requirements of the demand connection criteria in Section 4, there may be associated *Loss of Supply Capacity* due to a *Secured event*, for example by virtue of the design of the generation connections and/or the designed switching arrangements at the substations concerned.

The principles of these operational criteria shall be applied at all times except in special circumstances where OETC, following consultation with the appropriate User, may need to give instructions to the contrary to preserve overall system integrity.

6. Definitions

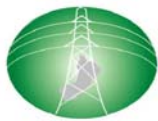
Busbar	The common connection point of two or more Transmission Circuits.
Corrective Action	Manual and automatic action taken after an outage or switching action to assist recovery of satisfactory system conditions; for example, tap changing or switching of plant.
Demand group	A site or group of sites which collectively take power from the remainder of OETC's licensed transmission system.
External Interconnection	Apparatus for the transmission of electricity to or from OETC's licensed transmission system into or out of an external system.
External Systems	A transmission or distribution system located outside the Sultanate of Oman, which is electrically connected to OETC's licensed transmission system by an <i>External Interconnection</i> .
Fault outage	An outage of one or more items of primary transmission apparatus and/or generation plant initiated by automatic action unplanned at that time, which may or may not involve the passage of fault current.
Forecast Minimum Demand	This is the minimum demand level expected at a GSP or a group of GSPs. Unless more specific data are available, this is the expected demand at the time of the annual minimum OMAN demand as provided under the Grid Code. In the case of a group of GSPs, the demand diversity within the group should be taken into account.
Generation Circuit	The sole electrical connection between one or more <i>Generation Units</i> and the Main Interconnected Transmission System, i.e. a radial circuit which if removed



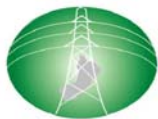
	would disconnect the <i>Generation Units</i> .
Generation Units	Means any plant or apparatus for the Generation of electricity including a facility comprising one or more <i>Generation Units</i> ;
Generator	Means a Person authorised by a licence or an Exemption issued pursuant to the Sector Law to Generate electricity;
Grid Supply Point (GSP)	A point of supply from OETC's licensed transmission system to Distribution Licencees or Non-embedded Customers.
Group Demand	For a single GSP: The forecast maximum demand for the GSP provided in accordance with the requirements of the Grid Code by the Distribution Licencees or non embedded customers taking demand from OETC's licensed transmission system. For multiple GSPs: The sum of the forecast maximum demands for the GSPs as provided by the Distribution Licencees or Non-embedded Customers taking demand from OETC's licensed transmission system.
Infrequent Infeed Loss Risk	That level of Loss of Power Infeed risk which is covered over long periods operationally by frequency response to avoid a deviation of system frequency outside the range 49.5Hz to 50.5Hz for more than 60 seconds. Until reviewed this is 300 MW at system demands above 2000 MW falling to 100 MW at system demands below 1000 MW.
Intact System	This is OETC's licensed transmission system with no system outages i.e. with no planned outages (e.g. for maintenance) and no <i>unplanned outages</i> (e.g. subsequent to a fault).
Loss of Power Infeed	The output of a <i>generation unit</i> or a group of <i>Generation Units</i> or the import from <i>External Systems</i> disconnected from the system by a Secured event, less the demand disconnected from the system by the same Secured event. For the avoidance of doubt if, following such a Secured event, demand associated with the normal operation of the affected generation unit or <i>Generation Units</i> is automatically transferred to a supply point which is not disconnected from the system, e.g. the station board, then this shall not be deducted from the total Loss of Power Infeed to the system. For the purpose of the operational criteria, the Loss of Power Infeed, includes the output of a single generation unit, CCGT Module, or boiler lost as a result of an event.



<p>Loss of Supply Capacity</p>	<p>This is the reduction in the supply capacity at a <i>Grid Supply Point</i> as a result of OETC's failure to maintain the potential to provide the supply capacity in full. For the avoidance of doubt, where OETC does maintain the potential to provide a supply but, following an outage, demand is lost because of circuit configurations not under the control of OETC, that lost supply does not constitute <i>Loss of Supply Capacity</i>.</p>
<p>Main Interconnected Transmission System (MITS)</p>	<p>The MITS is that part of OETC's licensed transmission system that is interconnected at 220 kV or 132 kV but does not include radially connected Generators and/or <i>Grid Supply Points</i> (GSPs).</p>
<p>Maintenance Period</p>	<p>This is the period of the year corresponding to system <i>Peak Demands</i> of 67% of the summer <i>Peak Demand</i>. It broadly corresponds to the months of October to March inclusive.</p>
<p>Maintenance Period Demand</p>	<p>This is the demand level experienced at a GSP and is the maximum demand level expected during the normal <i>Maintenance Period</i>. This level is such that the period in which maintenance could be undertaken is not unduly limited. Unless better data are available this should be 67% of the <i>Group Demand</i>.</p>
<p>Major System Risk</p>	<p>A period of Major System Risk is one in which Secured events are judged to be significantly more likely than under the circumstances addressed by the normal criteria of this Standard, or they are judged to have a significantly greater impact than normal, or events not normally secured against are judged to be significantly more likely than normal such that measures should be taken to mitigate their impact.</p>
<p>Non-embedded Customer</p>	<p>A customer, except for a Distribution Licensee acting in its capacity as such, receiving electricity direct from OETC's licensed transmission system irrespective of from whom it is supplied.</p>
<p>Normal Infeed Loss Risk</p>	<p>That level of Loss of Power Infeed risk which is covered over long periods operationally by frequency response to avoid a deviation of system frequency by more than 0.5Hz. Until reviewed this is 100 MW at system demands above 2000 MW falling to 50 MW at system demands below 1000 MW.</p>
<p>Operational Intertripping</p>	<p>The automatic tripping of circuit breakers to remove <i>Generation Units</i> and/or demand. It does not provide</p>



	additional Transmission Capacity and must not lead to Unacceptable Frequency Conditions for any Secured event.
Peak Demand	The estimated summer <i>Peak Demand</i> (MW and MVar) on OETC's licensed transmission system. This includes both transmission and distribution losses and represents the demand to be met by Power Stations (directly connected or embedded) which are connected to OETC's licensed transmission system and by electricity imported into OETC's licensed transmission system from <i>External Systems</i> across <i>External Interconnections</i> .
Planned Outage	An outage planned at least seven days in advance of the event.
Power Station	An installation comprising one or more <i>Generation Units</i> (even where sited separately) owned and/or controlled by the same <i>Generator</i> , which may reasonably be considered as being managed as one Power Station.
Pre-Fault Planning Voltage Limits	The voltage limits for use in planning timescales for circumstances before a fault.
Pre-fault Rating	The specified pre-fault capability of transmission equipment. Due allowance shall be made for specific conditions (e.g. ambient/seasonal temperature), agreed time-dependent loading cycles of equipment and any additional relevant procedures.
Prevailing System Conditions	These are conditions on OETC's licensed transmission system prevailing at any given time and will therefore normally include planned outages and <i>unplanned outages</i> .
Primary Transmission Equipment	Any equipment installed on OETC's licensed transmission system to enable bulk transfer of power. This will include Transmission Circuits, <i>Busbars</i> , and switchgear.
Registered Capacity	In relation to a Genset the Production Capacity of that Genset taking into account changes due to site rating as registered with OETC and as amended from time to time in accordance with the Grid Code. In the case of a CCGT Module the Production Capacity of the CCGT Module taking into account changes due to site rating as declared by the Power Producer and amended from time to time in accordance with the Grid Code



Secured event	A contingency which would be considered for the purposes of assessing system security and which must not result in the remaining parts of OETC's licensed transmission system being in breach of the Transmission Security Standards. Secured events are individually specified throughout the text of these Transmission Security Standards. It is recognised that more onerous un Secured events may occur and additional operational measures within the requirements of the Grid Code may be utilised to maintain overall OTS integrity of OETC's licensed transmission system.
Steady State	A condition of a power system in which all automatic and manual <i>Corrective Actions</i> have taken place and all of the operating quantities that characterise it can be considered constant for the purpose of analysis.
System Instability	<p>i) poor damping - where electromechanical oscillations of <i>Generation Units</i> are such that the resultant peak deviations in machine rotor angle and/or speed at the end of a 20 second period remain in excess of 15% of the peak deviations at the outset (i.e. the time constant of the slowest mode of oscillation exceeds 12 seconds); or</p> <p>ii) pole slipping - where one or more transmission connected synchronous <i>Generation Units</i> lose synchronism with the remainder of the system to which it is connected;</p> <p>For the purpose of assessing the existence of System Instability, a <i>Fault outage</i> is taken to include a solid three phase to earth fault (or faults) anywhere on the transmission system with an appropriate clearance time. Clearance times used should be consistent with the fault location and appropriate to the actual protection, signalling equipment, trip and interposing relays, and circuit breakers involved in clearing the fault.</p>
Transfer Capacity	That circuit capacity from adjacent <i>Demand groups</i> which can be made available within the times stated in Table 4.1.
Transmission Capacity	The ability of a network to transmit electricity. It does not include the use of Operational Intertripping except in respect of paragraph 2.13 in Section 2 and paragraph 4.10 in Section 4.
Transmission Circuit	Part of OETC's licensed transmission system between two or more circuit-breakers which includes, for example, transformers, reactors, cables and overhead lines but excludes <i>Busbars</i> and <i>Generation Circuits</i> .



Unacceptable Overloading	The overloading of any Primary Transmission Equipment beyond its specified time-related capability. Due allowance shall be made for specific conditions (e.g. ambient/seasonal temperature), pre-fault loading, agreed time-dependent loading cycles of equipment and any additional relevant procedures.
Unacceptable Frequency Conditions	These are conditions where: i) the Steady State frequency falls outside the statutory limits of 49.5Hz to 50.5Hz; or ii) a transient frequency deviation on the MITS persists outside the above statutory limits and does not recover to within 49.5Hz to 50.5Hz within 60 seconds. Transient frequency deviations outside the limits of 49.5Hz and 50.5Hz shall only occur at intervals which ought reasonably be considered as infrequent. It is not possible to be prescriptive with regard to the type of Secured event which could lead to transient deviations since this will depend on the extant frequency response characteristics of the system which OETC shall adjust from time to time to meet the security and quality requirements of this Standard.
Unplanned Outage	An outage of one or more items of primary transmission apparatus and/or generation plant, initiated by manually instructed action which has not been subject to the recognised outage planning process of the Grid Code.