CONSULTATION PAPER

PROPOSED MODIFICATIONS TO TRANSMISSION CODE

Closing date for submissions of comments and feedback:
29 Sep 2006
Note: There will be no extension of deadline beyond 29 Sep 2006, 5 pm

28 AUG 2006

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The information in this Consultation Paper is not to be treated by any person as any kind of advice. The Energy Market Authority shall not be liable for any damage or loss suffered as a result of the use of or reliance on the information given in this Consultation Paper.

1 Introduction

1.1 The Transmission Code sets the minimum conditions that the Transmission Licensee must meet in carrying out its obligation to provide transmission services and to provide non-discriminatory access to the Transmission Licensee's transmission system. The Transmission Code also describes the rights and obligations of the Transmission Licensee in respect of the provision of transmission services, together with the rights and obligations of the users of transmission services.

1.2 The Transmission Code also sets out the technical requirements to be met by those which are connected to the Transmission Licensee's transmission system.

2 Proposed Modifications

2.1 Pursuant to Section 1.6 of the Transmission Code, EMA is seeking feedback and comments on the proposed modifications as set out in Appendix 1.

2.2 One of the key modifications proposed is to stipulate that a generation facility that operates on natural gas as its primary fuel must be capable of on-load changeover to alternate fuel that can be stockpiled on-site, as well as to require all Generation Licensees with such generation facilities to comply with a system level standing operating procedure (SOP). These requirements are necessary to ensure the security and continuity of electricity supply in the event of natural gas supply disruption.

2.3 Another key modification proposed is to stipulate the additional requirements to be complied with by a generation licensee seeking to register a *Combined-Cycle Plant* with multi-shaft configuration as multiple independent *generation facilities*.

3 Request for comments and feedback

3.1 EMA invites comments and feedback on the proposed modifications to the Transmission Code as set out in Appendix 1.

3.2 Please send your submission by e-mail to:

lim_mui_nah@ema.gov.sg and ye_luyan@ema.gov.sg

Alternatively, you may send your submission by post/fax to the following address:

Standards Branch
Regulation Division
Energy Market Authority
111 Somerset Road, #15-05
Singapore 238164.
Fax: (65) 6 835 8084

Please use the form given in Appendix 2 for your submission.

3.3 Anonymous submission will not be considered.

3.4 Clarifications, if any, with regard to the proposed modifications should reach EMA by 5pm on 4 Sep 2006.

3.5 All comments and feedback must reach EMA by 5 pm on 29 Sep 2006.

3.6 EMA will acknowledge receipt of all submissions electronically. Please contact Ms Ye Luyan or Ms Lim Mui Nah if you have not received an acknowledgement of your submission within two business days.

3.7 EMA reserves the right to make public all or parts of any written submissions made in response to this Consultation Paper and to disclose the identity of the source. Any part of the submission, which is considered by respondents to be confidential, should be clearly marked and placed as an annex. EMA will take this into account regarding disclosure of the information submitted.

~ End ~

APPENDIX 1
PROPOSED MODIFICATIONS TO THE TRANSMISSION CODE

Proposed Modifications to the Transmission Code

Modification Ref. No.	Section[1]	**Original Text**	**Modification**	Reasons
TC/2006/1	1.3.1	"Certificate of Compliance" means a document issued by an *authorised person* as required under Section 5(2) of the Electricity (Electrical Workers And Installation) Regulations 2002; "Statement of Turn-On" means a document issued by an *authorised person* as required under Section 5(3) of the Electricity (Electrical Workers And Installation) Regulations 2002;	"Certificate of Compliance" means a document issued by an *authorised person* as required under Section 5(2) of the Electricity (Electrical Installations) Regulations 2002; "Statement of Turn-On" means a document issued by an *authorised person* as required under Section 5(4) of the Electricity (Electrical Installations) Regulations 2002;	To correct typo error.
TC/2006/2	6.2	Standards	Standards and Standing Operating Procedures	To amend the heading to include Standing Operating Procedures.

[1] Reference to the section of the code where change is to be made in the version dated on August 2002 as published on the web.

Modification Ref. No.	Section[1]	**Original Text**	**Modification**	Reasons
TC/2006/3	6.2.2	None as this is an inserted section.	The *Power System Operator* shall develop a system level Standing Operating Procedure (SOP) for ensuring the secure operation of the power system in the event of natural gas supply disruption and revise the SOP from time to time, if necessary. The SOP shall be developed and revised by the *Power System Operator* in consultation with the *generation licensees* and gas transporter. *Generation Licensees* with *generation facility* that uses natural gas as the primary fuel shall comply with this SOP.	The amendment is to require all *Generation Licensees* with *generation facility* that uses natural gas as the primary fuel to comply with a system level SOP to ensure the secure operation of the power system in the event of natural gas supply disruption. The system level SOP shall be developed by *Power System Operator,* in consultation with the relevant parties.

Modification Ref. No.	Section[1]	**Original Text**	**Modification**	Reasons
TC/2006/4	6.11.2 (f)	None as this is an inserted section.	Each *generation facility* that uses natural gas as the primary fuel shall be designed with the capability of initiating on-load changeover either automatically through gas pressure setting or manually to alternate fuel that is stockpiled on-site. The fuel changeover trigger setting shall have sufficient margin above that of the *generation facility*'s low gas pressure trip setting to ensure that the *generation facility* remains connected to the power system and operates at or above its minimum stable loading level during the entire process of fuel changeover operation. The *generation facility* shall continue to supply electricity to the power system after completion of the fuel changeover process.	The amendment is to include an additional requirement for a generation facility that operates on natural gas as its primary fuel. This requirement is necessary to ensure in the event of natural gas supply disruption, the generation facility is able to switch to alternate fuel that can be stockpiled on-site (usually diesel), while on-load, to ensure continuity of electricity supply to the grid.
TC/2006/5	6.12.3	The Transmission Licensee and Generation Licensee shall provide all the equipment at their site, including the communication equipment and the communication lines up to the surge arrestors located in the *Power System Operator's* Control Centres.	The Transmission Licensee and Generation Licensee shall provide all the equipment at their site, including the communication equipment and the communication lines up to the surge arrestors located in the *Power System Operator's* Control Centres. All the equipment at the site shall be equipped with battery backup of at least 4-hour operation time. In addition, the ac power shall also be backup by the site's standby generator, if the site is equipped with such a facility.	To add the requirement for UPS and standby genset.

Modification Ref. No.	Section[1]	**Original Text**	**Modification**	Reasons
TC/2006/6	6.12.6	None as this is an inserted section.	The Interruptible Load Provider shall provide the *Power System Operator* with real-time status and measurements at its interruptible load facility. The information includes the status of circuit breakers and contactors, status of UFR armed/unarmed and the status of any other devices as specified by the *Power System Operator*. Measurements of power and frequency for the incoming feeders from the grid and for the designated loads within the load facility, and measurements of any other quantities as specified by the *Power System Operator* are also required.	To add the requirement for interruptible loads facility for remote monitoring purposes.
TC/2006/7	6.13	Performance Monitoring Facilities for 230kV and 400kV Substations	Performance Monitoring Facilities for 230kV and 400kV Substations/Switchhouses	To amend the heading to include the 230kV and 400kV Switchhouses
TC/2006/8	6.13.1	The Transmission Licensee shall provide, install and maintain at its own cost, the performance monitoring facilities/transient recorders at its 230kV and 400kV substations. The performance monitoring facilities shall be capable to monitor and record the dynamic performance of its equipment during system disturbances. The Transmission Licensee shall provide such information to *Power System Operator* upon request. The recorder shall be capable of capturing, but not limited to the following :- (a) substation busbar voltage, current and *frequency*; and (b) *circuit breaker* and *protection devices* status	The Transmission Licensee and Generation Licensee shall provide, install and maintain at its own cost, the performance monitoring facilities/transient recorders at its 230kV and 400kV substations/switchhouses. The performance monitoring facilities shall be capable of monitoring and recording the dynamic performance of its equipment during system disturbances. The Transmission Licensee and Generation Licensee shall provide such information to the *Power System Operator* upon request. The recorder shall be capable of capturing, but not limited to the following :- (a) substation/switchhouse busbar voltage, current and *frequency*; and (b) *circuit breaker* and *protection devices* status	This amendment is to explicitly differentiate between switchhouse and substation owned by different Licensees.

Modification Ref. No.	Section[1]	**Original Text**	**Modification**	Reasons
TC/2006/9	6.14	None as this is an inserted section.	Performance Monitoring Facilities for Interruptible Load Facilities	To add a new Section Heading for the requirement for interruptible loads.
TC/2006/10	6.14.1	None as this is an inserted section.	The Interruptible Load Provider shall provide the *Power System Operator* with status and measurements before and after activation of its interruptible load facility. The records include the status of circuit breakers and contactors, status of UFR armed/unarmed and the status of other devices as specified by the *Power System Operator*. Records of power and frequency for the incoming feeders from the grid and for the designated loads within the load facility, and measurements of any other quantities as specified by the Power System Operator are also required.	To add the requirement on performance monitoring for interruptible loads.
TC/2006/11	C6	None as this is an inserted section	Additional Requirements for A Combined-Cycle Plant With Multi-shaft Configuration For Consideration As Multiple Independent *Generation Facilities*	To add requirements for a combined-cycle plant with multi-shaft configuration for consideration as multiple independent generation facilities.

Modification Ref. No.	Section[1]	**Original Text**	**Modification**	Reasons
TC/2006/12	C6.1	None as this is an inserted section	This Appendix states the additional requirements for a *Combined-Cycle Plant* with multi-shaft configuration seeking to register as multiple independent *generation facilities*. A *Combined-Cycle Plant* with multi-shaft (n+n+1) configuration comprises n gas turbines (GTs), n heat recovery steam generators (HRSGs) and one steam turbine (ST), may seek to register as multiple independent *generation facilities*. Where each *Generation Facility* may comprise of either i. only one *Generating Unit;* or ii. more than one *Generating Unit.*	To add requirements for a combined-cycle plant with multi-shaft configuration for consideration as multiple independent generation facilities.
TC/2006/13	C6.2	None as this is an inserted section	The *Generation Licensee* shall at its own cost, engage an independent specialist consultant other than its Owners Engineers and Engineering, Procurement & Construction (EPC) contractors, to conduct detail design review, witness site verification tests, and certify that the *Combined-Cycle Plant* is in compliance with Appendix C6.3.	To add requirements for a combined-cycle plant with multi-shaft configuration for consideration as multiple independent generation facilities.
TC/2006/14	C6.3	None as this is an inserted section	The verification tests shall be conducted and meet the acceptance criteria stipulated in the System Operation Manual.	To add requirements for a combined-cycle plant with multi-shaft configuration for consideration as multiple independent generation facilities.

Modification Ref. No.	Section[1]	**Original Text**	**Modification**	Reasons
TC/2006/15	C6.4	None as this is an inserted section	The independent specialist consultant shall ensure a detailed test plan is prepared based on its detailed knowledge of the *Combined-Cycle Plant* from the design review conducted. Where the *Generation Licensee* wishes to use a new technology or additional tests, it may request discussion in respect of revising the existing testing methods or procedures to demonstrate meeting the performance requirements stipulated in Appendix C 6.3.	To add requirements for a combined-cycle plant with multi-shaft configuration for consideration as multiple independent generation facilities.
TC/2006/16	C6.5	None as this is an inserted section	The *Generation Licensee* is required to submit to *PSO* the design review report together with the proposed test plan at least six months before the site verification tests.	To add requirements for a combined-cycle plant with multi-shaft configuration for consideration as multiple independent generation facilities.
TC/2006/17	C6.6	None as this is an inserted section	*Generation Licensee* is required to conduct additional tests identified by *PSO, if any*, to demonstrate compliance with the requirement stipulated in Appendix C6.3.	To add requirements for a combined-cycle plant with multi-shaft configuration for consideration as multiple independent generation facilities.

Modification Ref. No.	Section[1]	**Original Text**	**Modification**	Reasons
TC/2006/18	C6.7	None as this is an inserted section	The *Generation Licensee* is required to submit to *PSO*, a final report duly certified by its independent specialist consultant and the *Generation Licensee*. The report shall state all site test results recorded, and conclude whether the *Combined-Cycle Plant* is compliance with the requirements stipulated in Appendix C6.3. In addition, the report shall also include details of any improvements recommended by the independent specialist consultant in the course of its review for the *Combined-Cycle Plant* to comply with the requirements.	To add requirements for a combined-cycle plant with multi-shaft configuration for consideration as multiple independent generation facilities.
TC/2006/19	C6.8	None as this is an inserted section	Upon receipt of the report, *PSO* shall use its best endeavours to review the final report submitted for consideration to register the *Combined-Cycle Plant* as multiple independent *Generation Registered Facilities* (GRF), within 20 business days.	To add requirements for a combined-cycle plant with multi-shaft configuration for consideration as multiple independent generation facilities.

Modification Ref. No.	Section[1]	**Original Text**	**Modification**	Reasons
TC/2006/20	C6.9	None as this is an inserted section	However, during normal operation, if outage of any single element/functional system of the *Combined-Cycle Plant* causes any of the following: (i) tripping of more than one *generation facility*; or (ii) loss in generation of more than the active output power of largest *generation facility* of the *Combined-Cycle Plant;* the *Generation Licensee* shall submit its revised standing capability data of the *Combined-Cycle Plant* to *PSO*, to register as a single *Generation Registered Facility* (GRF), within 24 hours from the outage incident. The *Generation Licensee* shall identify the cause of tripping, take necessary remedial actions and re-test to verify its compliance to the requirements stipulated in Appendix C6.3. A detailed report shall be submitted to *PSO*. Upon acceptance of the report submitted by *PSO*, the *Generation Licensee* shall re-submit the revised standing capability data to *PSO* for approval for consideration as multiple independent *Generation Registered Facilities*.	To add requirements for a combined-cycle plant with multi-shaft configuration for consideration as multiple independent generation facilities.
TC/2006/21	H2.2	None as this is an inserted section.	Each dedicated *RTU* shall be equipped with a Global Position Satellite (GPS) equipment for time synchronization and shall have a minimum resolution of 1 msec.	To add the requirement for clock synchronizing.
TC/2006/22	H4.2	(d) Other quantities, as required	(d) Emergency Shutdown Valve (ESDV) and valve status of Onshore Receiving Facility (ORF) and natural gas transmission pipeline supplying natural gas to the generation facility.	To add the requirement for monitoring of natural gas supply.

Modification Ref. No.	Section[1]	**Original Text**	**Modification**	Reasons
TC/2006/23	H4.2	None as this is an inserted section.	(e) pressure and gas flow at ORF and natural gas transmission pipeline supplying natural gas to the generation facility.	To add the requirement for monitoring of natural gas supply.
TC/2006/24	H4.2	None as this is an inserted section.	(f) Other quantities, as required	
TC/2006/25	H5.1	The status such as all *circuit breakers*, isolators, *earthing* switches and local/remote indications are 2-bit representations:	The status such as all *circuit breakers*, isolators, and local/remote indications are 2-bit representations:	Earthing switches are 1-bit representations.
TC/2006/26	H5.2	The statuses of all alarms are 1-bit representation:	The statuses of all *earthing* switches and alarms are 1-bit representation:	Earthing switches are 1-bit representations.
TC/2006/27	H6 (f)	Transformer raise/lower uses *IEC* type 46.	Transformer raise/lower uses *IEC* type 47	To correct typo error.
TC/2006/28	I1.4	Switchboard 400kV / 230kV / 66kV 1) Switchboard configuration: One and half breakers for switchhouse and 400kV substation. / One and half breakers for switchhouse and 230kV portion of 400/230kV substation. Conventional double busbar for all others. / Conventional double busbar for all substations.	Switchboard 400kV / 230kV / 66kV 1) Switchboard configuration: One and half breakers for switchhouse and 400kV substation. / One and half breakers for switchhouse and 230kV portion of 400/230kV substation. Conventional double busbar for all others. / Conventional double busbar for switchhouse and substation.	This amendment is to state explicitly the requirement for 66kV switchhouse, the requirement will be same as 66kV substations.

Appendix 2

Industry Comments on the Proposed Modification to the Transmission Code

Name: _____ Designation: _____

Company: _____ Email: _____

Role (Generation Licensee/ Retailer/ Consumer):

_____

Submission Date: _____ (dd/mm/yy)

Modification Ref. No.	Section*	Industry Comments

* Reference to the section of the code where change is to be made in the version dated on August 2002 as published on the web.