MANUAL

ieso
Power to Ontario.
On Demand.

Transmission Reliability Margin Implementation Document

Issue 1.0

This manual supports the consistent and reliable calculation, verification, presentation, and use of Transmission Reliability Margins (TRMs) to support analysis and system operations.

Disclaimer

The posting of documents on this Web site is done for the convenience of *market participants* and other interested visitors to the *IESO* Web site. Please be advised that, while the *IESO* attempts to have all posted documents conform to the original, changes can result from the original, including changes resulting from the programs used to format the documents for posting on the Web site as well as from the programs used by the viewer to download and read the documents. The *IESO* makes no representation or warranty, express or implied, that the documents on this Web site are exact reproductions of the original documents listed. In addition, the documents and information posted on this Web site are subject to change. The *IESO* may revise, withdraw or make final these materials at any time at its sole discretion without further notice. It is solely your responsibility to ensure that you are using up-to-date documents and information.

This document may contain a summary of a particular *market rule*. Where provided, the summary has been used because of the length of the *market rule* itself. The reader should be aware, however, that where a *market rule* is applicable, the obligation that needs to be met is as stated in the "Market Rules". To the extent of any discrepancy or inconsistency between the provisions of a particular *market rule* and the summary, the provision of the *market rule* shall govern.

Document ID	MAN-4
Document Name	Transmission Reliability Margin Implementation Document
Issue	Issue 1.0
Reason for Issue	Issue released for Baseline 29.0
Effective Date	March 6, 2013

Document Change History

Issue	Reason for Issue	Date
1.0	Initial release for Baseline 29.0, superseding IESO_PRO_0729, Market Manual 7.11, Transmission Reliability Margin Implementation Document	March 6, 2013

Related Documents

Document ID	Document Title
MAN-1	Available Transfer Capability Implementation Document (ATCID)
MDP_PRO_0029	Market Manual 4.4: Transmission Rights Auction

Table of Contents

List of Tables

Table of Changes

Reference (Section and Paragraph)	Description of Change
All	This manual supersedes IESO_PRO_0729, Market Manual 7.11, Transmission Reliability Margin Implementation Document. The changes listed below are the changes since version 2.0 of IESO_PRO_0729.
Section 2	• Added information for compliance with NERC standard MOD-008-1, requirements R1.3 and R2 • Revised TRMs for Minnesota
Section 2.1	Added new 'Establishing TRM Values' section for compliance with MOD-008-1, requirement R4
Section 2.2	Added new 'Publishing and Maintaining the TRMID' section for compliance with MOD-008-1, requirement R3
Section 3	Removed section 3 'Transmission Rights'. Transmission rights information is now included in Market Manual 4.4: Transmission Rights Auction.

1. Introduction

The Transmission Reliability Margin Implementation Document (TRMID) supports the consistent and reliable calculation, verification, presentation, and use of Transmission Reliability Margins (TRMs) to support analysis and system operations.

Section 2 of this document describes the TRMs applied to the Ontario interties. The TRMs are used to calculate the Available Transfer Capability (ATC) and intertie scheduling limits.

1.1 Reliability Standards Addressed in this Manual

TRMs are applied to the Ontario interties in accordance with the requirements of NERC standard MOD-008-1.

Table 1-1: NERC Standards Applicable to Transmission Reliability Margin

Standard ID	Title
MOD-008-1	Transmission Reliability Margin Calculation Methodology

1.2 Acronyms Used in this Manual

Table 1-2: List of Acronyms

Acronym	Definition
ATC	Available Transfer Capability
DSO	Dispatch Scheduling and Optimization
I/S	In-service
MW	Megawatt
O/S	Out-of-service
PAR	Phase Angle Regulator
TRM	Transmission Reliability Margin
TRMID	Transmission Reliability Margin Implementation Document
TTC	Total Transfer Capability

– End of Section –

2. Transmission Reliability Margin

NERC Standard	**MOD-008-1**: Transmission Reliability Margin Calculation Methodology

Transmission Reliability Margin (TRM) is defined by NERC as:

> "The amount of transmission transfer capability necessary to provide reasonable assurance that the interconnected transmission network will be secure. TRM accounts for the inherent uncertainty in system conditions and the need for operating flexibility to ensure reliable system operation as system conditions change."

TRMs are applied to the interties to determine the ATC and scheduling limits. They consider the granularity of the phase shifter controls, regulation buffers, and factors that determine the IESO's ability to control active power flows on an interface. TRMs also take into account observations made by the IESO in its real-time operations, and are computed on an interface-to-interface basis. In Ontario, the scheduling ATC limit for each intertie is determined by decrementing the TRM from the Total Transfer Capability (TTC). The IESO does not calculate or use Capacity Benefit Margin (CBM), and it is not included in the calculation of TRM[1].

The values for the TRM are listed in Table 2-1. When Michigan-Ontario phase shifters are out-of-service, TRM values do not include adjustments for loop flow, which may be applied in real-time.

Table 2-1: Transmission Reliability Margins

Transmission Reliability Margins			
Intertie	**Export**	**Import**	**Reliability Reason**
Michigan	100/200	100/200	• Load distribution uncertainty and variations in generation dispatch requiring regulation margin of 100 MW. • Allowance for loop flow impacts requiring phase shift control band margin of 100 MW with PARs I/S. • (PARs O/S / PARs I/S)
Manitoba	13/25	13/25	Allowance for simultaneous path interactions. Margin to account for granularity of active power control using phase angle taps (one / two PARs I/S)
Minnesota	20	20	Allowance for simultaneous path interactions. Margin to account for granularity of active power control using phase angle taps.
New York	100/200	100/200	• Load distribution uncertainty and variations in generation dispatch requiring regulation margin of 100 MW. • Allowance for loop flow impacts requiring phase shift control band margin of 100 MW with Michigan PARs I/S. • (PARs O/S / PARs I/S)
PQBEAU	0	10	Inertial Response and Frequency Bias

[1] MOD-008-1, requirement R2.

Transmission Reliability Margins			
Intertie	**Export**	**Import**	**Reliability Reason**
PQD5A	10	10	Inertial Response and Frequency Bias
PQP33C	0	10	Inertial Response and Frequency Bias
PQH4Z	10	0	Inertial Response and Frequency Bias
PQD4Z	0	10	Inertial Response and Frequency Bias
PQAT	10/20	10/20	Inertial Response and Frequency Bias (one / two HVDC converters I/S)

The TRM values are updated based on observed operating conditions as well as for changes to facilities and equipment. The IESO only computes a single set of TRM values that are applicable for both real time operations and long-term transmission studies. These values are used for:[2]

- Same day and real-time.
- Day-ahead and pre-schedule (i.e., pre-dispatch).
- Beyond day-ahead and pre-schedule, up to 13 months ahead.

A portion of scheduled flows to Michigan appear on the New York interties and vice versa. When Michigan phase shifters are out of service, the TTC is published without taking this coupling into account. The TTC for each of these paths (with flows in either direction) is the capability of the interface based on voltage, stability, and thermal requirements.

The coupling between the Ontario-New York and the Ontario-Michigan interties is factored into the scheduling limit when the Dispatch Scheduling and Optimization (DSO) tool is determining the real-time schedules on both interfaces. Due to the dynamic nature of loop flows, their corresponding values are only considered in real time operations and do not affect the ATC or TTC limits that are published. The Michigan and New York TTCs will not be coupled in the DSO when all Michigan ties have operating phase shifters.

When the Michigan-Ontario phase shifters are in-service, an additional 100 MW will be added to TRMs for Michigan and New York to account for the phase shift control band margin.

2.1 Establishing TRM Values

The IESO establishes TRM values using long-term evaluations of observed operating conditions made by the IESO during real-time operations. As part of the transmission rights process, the IESO reviews the TRM values prior to publishing each monthly short-term auction. Any changes to the TRM values will be published in this manual as described in section 2.2[3].

[2] MOD-008-1, requirement R1.3.
[3] MOD-008-1, requirement R4.

2.2 Publishing and Maintaining the TRMID

The IESO will revise and re-publish the TRMID whenever changes are made to TRM values. The TRMID is available to market participants and adjacent Planning Coordinators, Transmission Planners, Transmission Operators, Reliability Coordinators and Transmission Service Providers on the IESO public website. There is no underlying supporting documentation used to determine TRM[4].

– End of Section –

[4] As per MOD-008-1, requirement R3.

References

Document ID	Document Title
	Glossary of Terms Used in NERC Reliability Standards http://www.nerc.com/files/Glossary_of_Terms.pdf
	NERC Standard MOD-008-1: Transmission Reliability Margin Calculation Methodology http://www.nerc.com/files/MOD-008-1.pdf

– End of Document –