Transmission Reliability Margin Implementation Document

For NERC Standard MOD-008-1
1.0 Purpose

The California Independent System Operator Corporation (CAISO), as a registered Transmission Operator (TOP)\(^1\) with the North American Electric Reliability Corporation (NERC), must comply with NERC reliability standards applicable to that function. MOD-008-1 requires each TOP that maintains Transmission Reliability Margin (TRM) to prepare and keep current a TRM Implementation Document (TRMID) that identifies each component of uncertainty the TOP considers in establishing TRM and describes how TRM is calculated and allocated for each component for each applicable time period. This TRM ID was developed to comply with NERC standard MOD-008-1.

This TRMID shall be available on the CAISO website under Rules > Requirements and guidelines > NERC Compliance > NERC modeling, data and analysis (MOD) reliability standards. (MOD-008-1 R2)

2.0 Identification of Components of Uncertainty in TRM (MOD-008-1 R1.1)

The CAISO considers the following components of uncertainty in establishing TRM values for ATC Paths located at interties between the CAISO Balancing Authority Area (BAA) and its adjacent BAAs:

- Forecast uncertainty in Transmission system topology (including, but not limited to, forced or unplanned outages and maintenance outages)
- Allowances for parallel path (loop flow) impacts
- Allowances for simultaneous path interactions

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\(^1\) Unless otherwise noted, capitalized terms have the meaning set forth in the current NERC Glossary of Terms. This Glossary is located on NERC's website.
3.0 **Description of Method Used to Calculate and Allocate TRM for Each Component of Uncertainty (MOD-008-1 R1.2)**

The CAISO uses the following methods to calculate and allocate TRM values for each of the components of uncertainty identified in Section 2.0 of this TRMID:

3.1 **Forecast uncertainty in Transmission system topology (including, but not limited to, forced or unplanned outages and maintenance outages).**

In the event that there is uncertainty about the availability in Real-Time\(^2\) of certain Transmission system resources due to potential forced outages, the CAISO would utilize TRM to manage risk and reliability, using a TRM value up to the amount of the expected path limit reduction (the potential additional ATC Path derate) for the impacted intertie ATC Paths.

**Example:** If an intertie ATC Path is rated at 1000 MW during system intact, and, as a result of approaching fires, there is an uncertainty of full availability due to a potential Forced Outage that may derate the ATC path by 200 MW to a new rating of 800 MW, then the CAISO would utilize a TRM value of up to 200 MW for the time period during which that uncertainty exists.

3.2 **Allowances for parallel path (loop flow) impacts.**

In the event that the CAISO forecasts, based on currently observed parallel path (loop flow) conditions and projected scheduled flow for an upcoming Operating Hour,\(^3\) that parallel path (loop flow) impacts will be realized in Real-Time over a qualified intertie ATC Path in amounts sufficient to trigger Step 2 or higher of the Western Interconnection Unscheduled Flow Mitigation Plan (WIUFMP)\(^4\) for that Path, the CAISO may establish for that Path a TRM value up to the amount that would be required to be curtailed in Real-Time under the applicable Step of the WIUFMP.

**Example:** An intertie ATC Path has a TTC value of 1000 MW, the path is a qualified path for the WIUFMP, and the following conditions exist:

- Unscheduled flow + Real-Time flow is forecasted to be above 95% of Path TTC, and
- It is expected based on the forecast that WIUFMP Step 2 will need to be invoked in Real-Time absent application of a TRM.

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\(^2\) “Real-Time” is defined in Appendix A of the CAISO Tariff.

\(^3\) “Operating Hour” is defined in Appendix A of the CAISO Tariff.

\(^4\) The WIUFMP Procedure followed by the CAISO is set forth in CAISO Operating Procedure 3510, which is available on the CAISO’s public website.
Then
  o The CAISO may utilize up to 5% of Path TTC as the TRM value for the impacted Path for the next available run of the CAISO’s Hour-Ahead Scheduling Process (HASP).\(^5\)

When it is expected based on the forecast that WIUFMP Step 3 or 4 will need to be invoked in Real-Time absent application of a TRM, the CAISO will utilize up to 7% of Path TTC as the TRM value for the impacted Path for the next available HASP run.

### 3.3 Allowances for simultaneous path interactions.

The CAISO generally does not limit the TTC of an intertie ATC Path due to the simultaneous interaction with another path in the form of a nomogram that is enforced prior to Real-Time. Rather, the impact of the interaction between multiple ATC Paths is accounted for with nomograms enforced in Real-Time, either in an automated manner through market systems or manually through monitoring by operations staff, to ensure there are no violations of the System Operating Limit.

There are, however, a number of CAISO intertie ATC Paths that have simultaneous interactions with non-CAISO ATC Paths. In the event that one or more CAISO ATC Paths become constrained due to interactions with another non-CAISO ATC Path, TRM may be utilized to ensure there are no violations of the System Operating Limit in the CAISO ATC Path. The amount of TRM value assigned will be set to be no greater than the impact of its interaction with the non-CAISO ATC Path.

\(^5\) The “Hour Ahead Scheduling Process (HASP)” is defined in Appendix A of the CAISO Tariff.
Example: If an ATC Path within the CAISO is found to be dependent with other ATC Paths as seen in the figure immediately below:

![Diagram showing Path 1 TTC and Path 2 Flow with TRM values from 1000 MW to 900 MW.]

In the example above, the CAISO may utilize up to 100 MW of TRM value in Path 1 if the CAISO forecasts that Path 2 flow would be at its maximum.

4.0 Identification of TRM Calculation for Different Time Periods and its calculation frequency (MOD-008-1 R1.3 and R4)

For the day-ahead and pre-schedule time period (as referenced in R.1.3.2 of NERC’s MOD-008-1), the CAISO sets its TRM values for intertie ATC Paths at 0 MW at all times.

For the beyond day-ahead and pre-schedule, up to thirteen months ahead, time period (as referenced in R.1.3.3 of NERC’s MOD-008-1), the CAISO also sets its TRM values for intertie ATC Paths at 0 MW at all times.

The hourly TRM values for Real-Time and same day (as referenced in R.1.3.1 of NERC’s MOD-008-1) are established on the day of dispatch, no earlier than 2 hours in advance of dispatch. Whenever a TRM value greater than zero is established due to the existence of one or more of the components of uncertainty identified in Section 2.0 above, the hourly TRM values will be set for the duration of the periods during which the applicable component of uncertainty is expected to occur, in accordance with the methodology set forth in Section 3.1-3.3 above.
5.0 Using Components of Uncertainty (MOD-008-1 R2)

The CAISO does not maintain Capacity Benefit Margin (CBM). Therefore, the CAISO does not include any of the components of CBM in establishing its TRM values.

The only components of uncertainty included in TRM are those listed in Section 2.0 of this document.

6.0 TRM Reference Materials

- Additional CAISO documentation associated with TRM can be found in the CAISO Tariff, Appendix L. The CAISO Tariff is available on the CAISO’s public website.

7.0 Posting TRM Values (MOD-008 R5)

The TRM values established by the CAISO and the reason for the TRM for each of the ATC Path will be made public and posted in the OASIS.

8.0 Revisions to TRMID

This document reflects the CAISO’s current TRMID. In the event that the CAISO determines that it is necessary to revise any aspect of the process or methodology covered by this document, the CAISO will issue a revised TRMID, which will be made publicly available and posted on OASIS.

Version History

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<tr>
<th>Version</th>
<th>Change</th>
<th>Date</th>
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<tr>
<td>3.1</td>
<td>Periodic Review: Added TRMID location to Purpose section. Updated all instances of ISO to CAISO. Added Version History table. Minor formatting and grammar updates.</td>
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