Transmission Reliability Margin Issue Paper and Straw Proposal

Jim Price  Senior Advisor Engineering Specialist, Market Analysis & Development
Dede Subakti  Manager, Operations Planning
Burt Gross  Senior Counsel

Transmission Reliability Margin Stakeholder Conference Call
January 10, 2012
ISO Stakeholder Initiative Process

We Are Here
## Stakeholder Conference Call Agenda – 1/10/12

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00 – 1:10</td>
<td>Introduction &amp; Meeting Objective</td>
<td>ISO</td>
</tr>
<tr>
<td>1:10 – 2:00</td>
<td>Review of Issue Paper and Straw Proposal</td>
<td>ISO</td>
</tr>
<tr>
<td>2:00 – 3:45</td>
<td>Stakeholder questions and comments</td>
<td>ISO</td>
</tr>
<tr>
<td>3:45 – 4:00</td>
<td>Wrap-up &amp; Next Steps – Stakeholder comments, prepare Draft Final Proposal</td>
<td>ISO</td>
</tr>
</tbody>
</table>

*Note: For the March presentation.*
Problem Statement: Existing authority of TRM = 0 results in cut schedules after HASP Awards

- Transmission Reliability Margin (TRM) is defined in the ISO Tariff and detailed in Appendix L.1.6:
  
  “The CAISO does not use TRMs. The TRM value is set at zero.”

- Current Challenges:
  - Unscheduled Flow on COI results in real-time curtailment of import schedules after HASP awards are published
  - Occasional curtailment in real-time when there is posted positive Available Transfer Capability (ATC) during certain conditions, such as:
    - Uncertainty of transmission system availability due to threatened or actual fires
    - Simultaneous interaction between different paths that may result in reduction of System Operating Limit (SOL) for the ISO Path

- Potential Opportunity:
  - Increase transparency of true ATC in the system, and relieve market participant frustrations, through narrow application of TRM
• TRM is defined 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.**”

• The following components of uncertainty may establish TRM:
  • Allowances for parallel path (loop flow) impacts.
  • Forecast uncertainty in Transmission system topology (including, but not limited to, forced or unplanned outages and maintenance outages).
  • Allowances for simultaneous path interactions.
  • Aggregate Load forecast.
  • Load distribution uncertainty.
  • Variations in generation dispatch (including, but not limited to, forced or unplanned outages, maintenance outages and location of future generation).
  • Short-term System Operator response (Operating Reserve actions).
  • Reserve sharing requirements.
  • Inertial response and frequency bias.

• ISO proposes to implement TRM for the above **three highlighted items**
Proposed Changes

- Implement TRM to avoid unnecessary real-time schedule curtailments
- TRM will be implemented only in real-time market, prior to HASP run
- TRM components may include any or all of the following component:
  1. Allowances for parallel path (loop flow) impacts
  2. Forecast uncertainty in transmission system topology (including, but not limited to, forced or unplanned outages and maintenance outages)
  3. Allowances for simultaneous path interactions
TRM Component #1 – Loop Flow

• Unscheduled flow on COI results in schedule curtailment
  – In the event that the ISO forecasts that parallel path (loop flow) impacts will be realized in real-time in amounts sufficient to trigger Step 2 or higher of the WECC Unscheduled Flow Mitigation Procedure (USFMP) on a particular ATC Path, the ISO will establish a TRM value for that ATC Path that is up to the amounts needed to be accommodated under the applicable Step of the WECC USF Procedure.
If:

• An ATC Path is a qualified path for WECC USF procedure,
• Unscheduled flow + scheduled flow is forecasted to be above Path TTC,
• Unscheduled flow is forecasted to be > 5% of the Path’s applicable limit, and
• ISO forecasts that WECC USF procedure Step 2 will need to be invoked in real-time absent application of a TRM.

Then:

The ISO will utilize up to 5% of Path TTC as the TRM value for the impacted Path for the next available run of the ISO’s Hour-Ahead Scheduling Process (HASP).

When the ISO forecasts that WECC USF procedure Step 6 or 7 will need to be invoked in real-time absent application of a TRM, the ISO will utilize up to 6% of Path TTC as the TRM value for the impacted Path for the next available HASP run.

When it is expected based on the forecast that WECC USF Procedure Step 8 or 9 will need to be invoked in Real Time absent application of a TRM, the ISO will utilize up to 7% of Path TTC as the TRM value for the impacted Path for the next available HASP run.
In the event that there is uncertainty of availability of transmission system due to potential forced outages realized in the Real Time, the ISO would utilize TRM to manage risk and reliability up to the amount of Path limit reduction (the potential additional ATC Path derate) as the TRM value of the impacted ATC Paths.

**Example:** If an ATC Path is rated at 1000 MW when the system is intact, and there is uncertainty of potential forced outage that would derate the ATC path by 200 MW to a new rating of 800 MW, then the ISO would utilize up to 200 MW of TRM values for the time period that uncertainty exists.
TRM Component #3 – Simultaneous Path Interaction

Nomogram enforcement principles:

• When actual flow on a constraint can be modeled accurately (generally, internal constraints), the ISO can enforce a nomogram.

• When actual flow on a constraint is uncertain (impacted by external sources & sinks), nomogram is enforced in real-time, but not day-ahead.

• When ATC on an ISO ATC Path is limited by flow on a non-ISO ATC Path, and flow on non-ISO Path can be reasonably anticipated, the ISO proposes to use TRM to limit ATC on the ISO’s Path in HASP.

Currently, 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 SOL violations.

Some ISO ATC Paths have simultaneous interactions with non-ISO ATC Paths. If one or more ISO Paths are constrained due to interactions with a non-ISO Path, the ISO will set the TRM value to no greater than the impact of its interaction with the non-ISO ATC Path, to avoid SOL violations on the ISO Path.
**Example:** If an ATC Path within ISO is found to be dependant with other ATC Paths as shown:

![Graph showing simultaneous path interaction](image)

the ISO may utilize up to 100 MW of TRM value in Path 1 if it the ISO forecasts that Path 2 flow would be at its maximum.
Attachments provide drafts of implementation documents

• TRM Implementation Document (TRMID)
  • NERC standards (particularly MOD-008-1) require posting TRMID on OASIS
  • Content is as described in Issue Paper and Straw Proposal

• Revisions to ISO Tariff
  • Appendix L: Method to Assess Available Transfer Capability
  • Sections of main tariff
  • Appendix A: Master Definitions Supplement
Other ISO’s utilization for TRM

- **MISO**:
  - TRM has two components: uncertainty and reserve sharing
    - The uncertainty component is to account for parallel path flow, load forecast error, load distribution variability and variation of generation dispatch.
    - The uncertainty component is set at 2% of flowgate capacity
  - TRM can be released

- **NEISO**:
  - TRM is set to account for inertial impact from loss of the HVDC line import

- **PJM**:
  - TRM has two components: load forecast error and allowance for parallel path flow (loop flow)
    - For load forecast error: the % of difference in flow on the flowgates with changes in load is taken and applied to flowgates as % of rating to account for TRM
    - For loop flow: The % of difference in flow on the flowgates is applied to flowgates as % of rating to account for TRM

- **SPP**:
  - TRM is utilized for reserve sharing
Milestones

- Modify Appendix L of the Tariff
- Create TRM Implementation Document for OASIS posting
- Modify ATC Implementation Document currently posted on OASIS
- Enhance OASIS to post TRM data

Schedule:

- Dec 7, 2011  Market Performance and Planning Forum
- Dec 21, 2011 Publish issue paper and straw proposal
  - Including proposed tariff language and ATC implementation document for stakeholder review
- Jan 10, 2012 First stakeholder call to address details and tariff revision
- Jan 18, 2012 Stakeholder comments on issue paper/ straw proposal, ATC ID and draft tariff revision
- Feb 7, 2012  Publish draft final proposal
- Feb 14, 2012 Stakeholder comments on draft final tariff revision
- Feb 21, 2012 Stakeholder call on draft final proposal and tariff revision
- Feb 28, 2012 Stakeholder comments on draft final proposal and tariff revision
- March 2012  Present proposal to Board and if approved, file at FERC