California Independent
System Operator Corporation

April 10, 2012

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: California Independent System Operator Corporation
Docket No. ER12-____- 000
Tariff Amendment Regarding Transmission Reliability Margin

Dear Secretary Bose:

The California Independent System Operator Corporation (ISO) submits this filing to revise certain portions of its tariff governing the calculation of available transfer capability (ATC) on ISO Intertie scheduling paths.[1] The tariff amendment will allow the ISO, in certain narrowly defined circumstances, to use a transmission reliability margin (TRM) to reduce the ATC on a particular Intertie scheduling path. As discussed below, the ISO will use this authority only if one or more of three specifically identified conditions is expected to constrain the Intertie's capacity in real time, and the amount of the TRM will be limited to the forecasted impact of the applicable condition. The ISO will establish TRM values, when applicable, on an hourly basis not more than two hours in advance of dispatch. Those values will be publicly posted before the close of the ISO's Hour Ahead Scheduling Process (HASP) for the impacted scheduling hour.

This amendment is designed to address operational difficulties that arise, both for the ISO and for market participants, when certain conditions cause the transfer capacity on an ISO Intertie path to be reduced after HASP schedules have already been awarded, resulting in cuts to awarded HASP schedules shortly prior to or within the operating hour. Such cuts to awarded schedules are frustrating for market participants because they occur shortly before dispatch, leaving the affected parties with little opportunity to find an alternative sink or source of energy. These cuts also increase the manual work of ISO operators, who may need to procure imbalance energy or make other adjustments shortly

[1] The ISO submits this tariff amendment pursuant to Section 205 of the Federal Power Act, 16 U.S.C. § 824d, and Part 35 of the Commission's regulations, 18 C.F.R. Part 35. Capitalized terms not otherwise defined herein have the meanings set forth in Appendix A to the ISO tariff.

before or within the operating hour in order to deal with the impact of the curtailed schedules. By imposing a transparent TRM value that reserves capacity to account for such conditions shortly before HASP schedules are awarded, the ISO will be able to reduce the frequency of such schedule cutting and thereby mitigate the operational difficulties that such cuts produce.

As discussed below, the Commission and the North American Electric Reliability Corporation (NERC) have identified nine conditions of uncertainty that transmission providers are permitted to use TRM values to address. The ISO's amendment will allow it to use TRM to address three of those conditions: (1) forecast uncertainty in transmission topology (e.g., unplanned outages); (2) parallel path (loop flow) impacts; and (3) simultaneous path interactions. The ISO's proposed tariff amendment and a related implementation document required by NERC describe the specific circumstances under which a TRM value will be imposed and set forth the methodology the ISO will follow in establishing the TRM value. Both the amended tariff provision and the NERC-mandated implementation document are attached as Exhibits to this filing.

The tariff amendment also includes several other revisions to the provisions of the tariff relating to ATC that correct typographical errors, update outdated provisions, and revise certain terms and definitions to better track the terminology currently used by NERC.

This proposal should be adopted because it will enhance transparency in the Intertie scheduling process, improve the Intertie scheduling process for market participants by reducing the need to curtail awarded HASP schedules, and improve the ability of ISO operators to reliably operate the system. As discussed below, these benefits have been recognized by market participants during the stakeholder process, during which the ISO has received broad support for its proposal.

The ISO requests that the Commission accept this filing effective June 10, 2012, which is 61 days from the date of this filing.

I. BACKGROUND

In two major orders, the Commission has established a set of overarching principles governing how transmission providers, including ISOs and RTOs, should calculate and document the amount of transfer capability available on their systems for sale to third parties. The Commission first addressed this issue in 2007 in Order No. 890, which established certain basic requirements that a transmission provider must follow in establishing ATC values for contract paths or flowgates.[2] Order No. 890 also held that more detailed methodological

[2] *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, 118 FERC ¶ 61,119 (2007); order on reh'g and clarification, Order No. 890-A,

requirements would be established by NERC in reliability standards that were then under development. NERC subsequently addressed those issues in a set of modeling reliability standards, and the Commission approved those standards in Order No. 729.[3]

In Order No. 890, the Commission concluded that, in order to avoid the potential for undue discrimination, greater consistency and transparency was required with respect to how transmission providers calculate their ATC values.[4] The Commission rejected proposals to establish a single, industry-wide calculation methodology that all transmission providers would be required to employ. Instead, it held that there should be industry-wide consistency regarding the specific "components" that transmission providers are permitted to use in calculating ATC values, as well greater consistency in certain of the data inputs and modeling assumptions used to calculate each component.[5]

Although the Commission deferred some of the specifics to the NERC reliability standards process, Order No. 890 identified the permitted components of ATC and established certain basic rules and guidelines for the calculation and documentation of each component. The Commission held that ATC calculation should begin with the Total Transfer Capability (TTC) for a contract path or flowgate, which may then be reduced by existing transmission commitments (ETC), a transmission reliability margin (TRM) that may account for certain uncertainties with transfer capacity, and a capacity benefit margin (CBM) to allow for meeting certain generation reliability criteria.[6]

On the issue of the permitted uses for TRM, Order No. 890 held that:

> "Transmission providers may set aside TRM for (1) load forecast and load distribution error, (2) variations in facility loadings, (3) uncertainty in transmission system topology, (4) loop flow impact, (5) variations in generation dispatch, (6)

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121 FERC ¶ 61,297 (2007); order on reh'g and clarification, Order No. 890-B, 123 FERC ¶ 61299 (2008).

[3] *Mandatory Reliability Standards for the Calculation of Available Transfer Capability, Capacity Benefit Margins, Transmission Reliability Margins, Total Transfer Capability, and Existing Transmission Commitments and Mandatory Reliability Standards for the Bulk-Power System*, Order No. 729, 129 FERC ¶ 61,155 (2009); order on clarification, Order No. 729-A, 131 FERC ¶ 61,109 (2010); order on reh'g and recon., Order No. 729-B, 132 FERC ¶ 61,027 (2010).

[4] Order No. 890 at PP 68-69, 207-213.

[5] *Id.* at PP 208-210.

[6] *Id.* at PP 209-210.

> automatic sharing of reserves, and (7) other uncertainties as identified through the NERC reliability standards development process."[7]

The Commission expressed its expectation that TRM values be supported and fully transparent and directed transmission providers to update their open access tariffs to include a definition of TRM and a description of the transmission provider's TRM calculation methodology, any databases used in assessing TRM, and the conditions under which the transmission provider uses TRM.[8] The Commission further directed that a transmission provider that chooses not to use TRM to set aside transfer capacity in calculating ATC should state this in its tariff.[9]

In Order No. 729, the Commission approved NERC reliability standards that further addressed methodological and other issues concerning the calculation of ATC and its components, including TRM. Most relevant here, the Commission approved reliability standard MOD-008-1, which addresses TRM.[10] In MOD-008-1, NERC built upon the guidance provided in Order No. 890 by identifying the following nine "components of uncertainty" that transmission providers are permitted to address through the use of a TRM value:

> (1) Aggregate load forecast.
>
> (2) Load distribution uncertainty.
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> (3) Forecast uncertainty in Transmission system topology (including, but not limited to, forced or unplanned outages and maintenance outages).
>
> (4) Allowances for parallel path (loop flow) impacts.
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> (5) Allowances for simultaneous path interactions.
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> (6) Variations in generation dispatch (including, but not limited to, forced or unplanned outages, maintenance outages and location of future generation.

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[7] *Id.* at P 273.

[8] *Id.* at PP 276, 313, 323 & Appendix C (Pro Forma Open Access Transmission Tariff) at sample sheet nos. 153-154.

[9] *Id.*, Appendix C at sample sheet no. 154.

[10] *See* Order No. 729 at PP 41-50, 87, 223-225.

(7) Short-term System Operator response (Operating Reserve actions).

(8) Reserve sharing requirements.

(9) Inertial response and frequency bias.[11]

MOD-008-1 states that transmission providers may use TRM only for these identified purposes.[12] The standard further requires the transmission operator to prepare, keep current, and make available a TRM implementation document (TRMID) that describes how that entity uses and calculates the TRM value for each of the components of uncertainty for which that entity chooses to use TRM.[13] The description of calculation methodology, moreover, must identify the calculation methodology used, if applicable, for each of the following three time periods: (1) same-day and real-time, (2) day-ahead and preschedule, and (3) beyond day-ahead and pre-schedule, up to thirteen months ahead.[14]

The ISO does not currently use TRM in calculating ATC. Thus, after the issuance of Order No. 890, the ISO revised Appendix L of its tariff, which is the appendix addressing its ATC calculation methodology, to include a section on TRM stating that the ISO does not use TRM values and therefore sets the value for TRM at zero in calculating ATC.[15]

II. PROPOSED TARIFF AMENDMENT

A. Overview of the TRM Proposal

The ISO proposes to amend its tariff to allow it to establish and use TRM values in a limited set of circumstances. Specifically, the tariff amendment would allow the ISO employ a TRM when calculating ATC for Intertie scheduling paths in order to address only the following three of the conditions identified in MOD-008-1:

(1) Forecast uncertainty in transmission system topology (including, but not limited to, forced or unplanned outages and maintenance outages);

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[11] NERC Reliability Standard MOD-008-1 at R.1-R.1.1.

[12] *Id.* at R.2.

[13] *Id.* at R.1-R.1.3, R.3.

[14] *Id.* at R.1.3-1.3.3.

[15] *See* current tariff, Appendix L at section L.1.6.

(2) Allowances for parallel path (loop flow) impacts; and

(3) Allowances for simultaneous path interactions.

The ISO has decided to limit its TRM usage to these three conditions because these are the three permitted uses under NERC MOD-008-1 that, based on the ISO's past experience, can be expected in the absence of a TRM to give rise to occasional cuts in awarded HASP schedules at the Interties in order to avoid exceeding transfer limits in real time. The other six conditions permitted by MOD-008 are either currently inapplicable to the ISO or are conditions under which the ISO has other options to address the condition besides cutting already awarded HASP schedules.

The ISO has also decided to limit its use of TRM only to the "same day/real-time" time frame identified by NERC.[16] Specifically, the ISO would establish any TRM value for a given Intertie scheduling path shortly before the close of the HASP market and no earlier than two hours in advance of dispatch. The ISO does not propose to use TRM for the day-ahead or earlier time frames because the conditions for which the ISO proposes to use TRM would be more speculative and thus more difficult to forecast in those time frames. By limiting the use of TRM to the period shortly before HASP, the ISO can make more accurate and reasonable predictions about the amount of margin that needs to be reserved in order to account for the three identified conditions, thereby avoiding potentially unwarranted reservations.

The ISO seeks authority to impose a TRM in these limited circumstances in order to reduce the need to make potentially disruptive cuts to already awarded HASP schedules when one or more of the identified conditions comes to pass. By allowing the ISO to use TRM to reserve some capacity before HASP schedules are awarded specifically when these conditions are forecasted to occur, the amendment will allow the ISO to anticipate such issues and address them proactively, in a transparent manner that reduces operating uncertainty for all parties and minimizes disruption to market participants.

The ISO has set forth in the revised tariff and in the TRMID each of the three specific circumstances under which it will impose a TRM and, for each circumstance, the method the ISO will use to calculate the TRM value.[17] The

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[16] Put another way, the TRM value will be permanently set at zero for the day-ahead and earlier time frames.

[17] *See* ISO Tariff, Appendix L, proposed § L.1.5. Clean and black-lined versions of the ISO's proposed revisions to Appendix L and other related tariff sections are attached to this transmittal letter as Attachments A and B, respectively.

following is a summary of the circumstances that would give rise to the use of TRM for each condition and the method used to calculate the value.

1. TRM Allowance for Uncertainty in Transmission System Topology

The first condition for which the ISO proposes to use TRM is to address an uncertainty in transmission system topology. The ISO's proposal will allow it to establish such a TRM value only when an emerging event, such as an approaching wildfire, threatens the transfer capacity that is expected to be available at an Intertie scheduling point. In such a circumstance, the ISO would be permitted to establish a TRM value for the affected Intertie in an amount up to, but no greater than, the amount by which the ISO expects the impacted facilities to be de-rated based on available information.[18] Thus, for example, when a fire is approaching transmission facilities that may impact Intertie capacity and, based on available information, the ISO expects a de-rate of 200 MW to occur in real-time, the ISO would be allowed to establish a TRM value for the impacted Intertie of up to 200 MW.[19]

As is the case for the other types of TRM values covered in the ISO's tariff amendment, the ISO proposes to establish and apply any TRM value for transmission topology on an hourly basis during the hour before the close of HASP. This will allow the ISO to base its application of TRM on the most up-to-date information available and will help to ensure that TRM is used only when needed and in amounts that are based on a valid forecast of the expected impact of the emerging event.

2. TRM Allowance for Parallel Path (Loop Flow) Impacts

The second condition for which the ISO proposes to use TRM is parallel path (i.e., loop flow) impacts. As the Commission is aware, such loop flow impacts can result in unscheduled flows across transfer paths that impact the amount of capacity that is available on a given path. The ISO's TRM proposal would, under certain narrowly defined circumstances, reserve a margin for such potential unscheduled loop flow impacts specifically where needed to avoid having to cut already awarded HASP schedules in real time.

Under the proposed tariff amendment, the ISO's authority to use a TRM for unscheduled loop flow, and the amount of capacity it is permitted to reserve, will be tied directly to the policy that the Western Electricity Coordinating Council

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[18] *See* proposed tariff § L.1.5.

[19] *See* TRMID, § 3.1.

(WECC) has established for handling unscheduled loop flow.[20] This policy is set forth in a Commission-approved plan called the WECC Unscheduled Flow Mitigation Plan (WECC USF Plan).[21]

The WECC USF Plan establishes a multi-step protocol for its members to follow in dealing with the impacts of unscheduled loop flow over transfer paths that are used to schedule energy between two transmission systems. This protocol specifically applies to Qualified Transfer Paths, which are transfer paths that are qualified by WECC as having experienced both: (1) actual flow (scheduled flow plus unscheduled loop flow) in excess of 97 percent of the path's maximum transfer limit in a given direction for at least 100 hours in the most recent 36 months, and (2) the curtailment of energy schedules during that period due to unscheduled loop flow.[22] Currently, the only Qualified Transfer Path that is on an Intertie into the ISO's Balancing Authority Area is the California-Oregon Intertie (COI), which is also known as Path 66.[23] Thus, the ISO's TRM authority for unscheduled loop flow currently will be limited to that path.[24] If, over time, any

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[20] As a transmission operator within the Western Interconnection, the ISO is subject to WECC's policy governing the treatment of unscheduled loop flow across the ISO's Intertie scheduling paths.

[21] The WECC USF Plan is available on WECC's website at the following link: http://www.wecc.biz/committees/StandingCommittees/OC/UFAS/Shared%20Documents/UFAS%20Mitigation%20Plan.pdf. The title refers to the document as the "WSCC" plan. WECC, however, is the successor entity to the WSCC.

[22] *See* WECC USF Plan, §§ 2.13, 4.11, 8, and Attachment 1 (WECC Unscheduled Flow Reduction Procedure) at § 1.

[23] WECC Qualified Transfer Paths are qualified only in the direction (or directions) in which requirements have been met. Path 66 is a Qualified Transfer Path only in the North-to-South direction – i.e., for imports into California.

[24] The COI consists of two 500 kV lines from Malin to Round Mountain (in the ISO's Balancing Authority Area) and one 500 kV line from Captain Jack to Olinda (in the Balancing Authority Area Administered by the Balancing Authority of Northern California). The operation the COI, including the allocation of its capacity, is governed by Second Amended Owners Coordinated Operation Agreement (OCOA) for the COI. Pursuant to the Second Amended COI Path Operating Agreement, the owners of the COI have designated the ISO as the Path Operator for the COI and, in that role, the ISO allocates the total capacity of the COI among the various owners. The ISO's TRM proposal applies only to the allocated portion of the COI capacity subject to administration by the ISO as a Balancing Authority Area. The ISO thus would not apply a TRM value to any of the COI capacity that is subject to the administration of another Balancing Authority Area, such as the Balancing Authority of Northern California.

other ISO Intertie scheduling paths become WECC Qualified Transfer Paths, the TRM authority would apply those paths as well.

The WECC USF Plan establishes a series of "action steps" for path operators and other WECC members to follow when scheduled flow and unscheduled loop flow together threaten to exceed the transfer limits of a Qualified Transfer Path.[25] The steps involve a mixture of the use of controllable devices (typically phase shifters) to divert unscheduled loop flow away from the impacted transfer path, the reduction of scheduled flow over the impacted transfer path, and the reduction in scheduled flows occurring on other paths besides the impacted transfer path that are contributing to the unscheduled flow on the impacted transfer path. Each step is set forth in the WECC Unscheduled Flow Reduction Procedure, which is a part of the WECC USF Plan.[26] A copy of the current WECC Unscheduled Flow Reduction Procedure is attached to this filing as Attachment F.[27]

The second, sixth, and eighth steps in the current WECC Unscheduled Flow Reduction Procedure are the steps that require the path operator to "accommo date" unscheduled flow over the Qualified Transfer Path by making reductions in the amount of scheduled flow that will be permitted to take place over the impacted Qualified Transfer Path. Step two requires the path operator to reduce scheduled flow by up to the greater of 50 MW or 5% of the path transfer limit. Step six requires the path operator to reduce scheduled flow by up to the greater of 75 MW or 6% of the path transfer limit. And step eight requires the path operator to reduce scheduled flow by up to the greater of 100 MW or 7% of the path transfer limit.[28]

On Path 66, the ISO's current practice given the absence of TRM authority is to wait until within the operating hour when the flow is scheduled to occur and

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[25] As noted, the ISO is the path operator for Path 66.

[26] The WECC Unscheduled Flow Reduction Procedure is Attachment 1 to the WECC USF Plan. Although WECC is currently in the process of revising the WECC Unscheduled Flow Reduction Procedure, the ISO understands that the revised procedure is not likely to become effective until 2014. When the revised WECC Unscheduled Flow Reduction Procedure goes into effect, the ISO will update its TRMID, as appropriate, to reflect changes in WECC's curtailment procedures. The ISO does not anticipate that any revisions to the proposed tariff language will be necessary as a result of WECC's proposed revisions to its Unscheduled Flow Reduction Procedure.

[27] The action steps are set forth in section 10 of the WECC Unscheduled Flow Reduction Procedure and are summarized in chart on the last page of the Procedure. *See* Attachment F at pp. 8-12.

[28] *Id.*

then impose reductions to already awarded HASP import schedules to meet its WECC unscheduled loop flow accommodation requirement under steps two, six, and eight of the WECC Unscheduled Flow Reduction Procedure. This practice causes disruption to the market participants involved in scheduling the awarded imports that are cut. It also imposes an impact on ISO operations when the reduced imports must be replaced with other sources within the operating hour.

The ISO's tariff amendment mitigates these impacts by allowing the ISO to establish a TRM value in the hour immediately before HASP closes when the actual flow (scheduled flow plus unscheduled loop flow) is forecasted to reach a level for the ISO's portion of Path 66 that would trigger steps two, six, or eight of the WECC Unscheduled Flow Reduction Procedure. [29] The ISO will be permitted to impose this TRM only when, based on currently observed unscheduled loop flow conditions and projected scheduled flow for the upcoming operating hour, the ISO forecasts that one or more of these steps will be reached. The amount of the TRM, moreover, will be limited to the amount of transfer capacity that is required to be reserved for unscheduled flow under the applicable step – i.e., up to 5% of transfer capacity for step 2, 6% of transfer capacity for step six, and 7% of transfer capacity for step eight.[30] Finally, as discussed above the TRM will apply only for the ISO's allocated portion of the COI.

Although conditions can vary significantly over time, the frequency with which the ISO has needed in the past to cut HASP import schedules over Path 66 to accommodate unscheduled flow under the WECC USF Plan may provide a broad indication of the likely frequency with which the TRM value for USF may be expected to be used. Over the twelve-month period from March 2011 through February 2012, the ISO made such reductions on approximately 21 days, for a total of approximately 42 scheduling hours.

As noted, by anticipating and reserving an appropriate TRM margin for unscheduled flow in the manner set forth in the ISO's tariff amendment, the ISO can improve the transparency of its practices for market participants and reduce the need to cut HASP schedules to meet its accommodation obligations under the WECC USF Plan. It bears mention, however, that while the ISO's proposal is designed to proactively address potential HASP scheduling cuts that otherwise may be dictated by the WECC USF Plan, the ISO will continue to honor its WECC USF Plan accommodation obligations in real time whenever they are applicable. Thus, if the TRM value proves to be insufficient to avoid triggering one of the WECC action steps that requires the ISO to accommodate by cutting awarded HASP schedules, the ISO will make the required accommodation in real time as required by the WECC Unscheduled Flow Reduction Procedure.

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29 *See* proposed tariff § L.1.5; TRMID, § 3.2.

30 *Id.*

3. TRM Allowance for Simultaneous Path Interactions

The third condition for which the ISO proposes to use TRM is to address the impact of simultaneous path interactions between an Intertie scheduling path and another transmission path that is outside the ISO's Balancing Authority Area (BAA). The ISO manages several Interties that have simultaneous interactions with paths outside the ISO. In such cases, the ISO currently accounts for such constraints in real-time, either in an automated manner through market systems or through monitoring by operations staff, to ensure that there are no violations of total transfer capability. When such path interactions threaten to cause the total transfer capability to be exceeded, HASP schedules at the Intertie may be reduced.

The ISO's proposal will allow it to establish a TRM value during the hour preceding the close of HASP in order to account for such circumstances. Specifically, the tariff amendment will allow the ISO to establish a TRM value to account for the simultaneous path interaction at a level up to, but not greater than, the forecasted impact on the Intertie path's capacity caused by expected flow on the non-ISO path.[31]

4. Publication of TRM Values and ATC Impacts

Under the ISO's proposal, any TRM value the ISO establishes for a given hour for a given Intertie scheduling path will be publicly posted on OASIS in advance of the affected scheduling hour. The ISO will identify, for each scheduling hour, the TRM value, the affected Intertie path, and which of the three permitted reasons for using TRM is applicable in that instance.

The ISO will ultimately convey these TRM values in a separate field of its existing OASIS tables, which also set forth, among other information, the total transfer capability and available transfer capability for each Intertie path. Including a field for TRM in these tables will allow the corresponding ATC value to be automatically updated in the table upon the entry of a TRM value. Changing the fields in the ISO's existing OASIS tables to accommodate the TRM values will involve significant software programming and will require testing and market simulation exercises with market participants before it can be implemented. Based on existing schedules, the ISO expects that these processes will not be completed until the Fall of 2012.

In order to have the TRM functionality available in the market in time for the summer months, when such values are expected to be most useful, the ISO has developed an interim approach for posting TRM that does not require

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[31] *See* proposed tariff § L.1.5. An illustrative example of the use of TRM for this purpose is set forth in § 3.3 of the draft TRMID, which is attached hereto as Attachment C.

significant software programming, testing, and market simulation. In that regard, upon Commission approval of the tariff amendment, the ISO will convey TRM values to market participants through market messages that will be posted on OASIS. The messages will be posted whenever a TRM value is established for an Intertie path for a given hour. The message will be sent out during the hour prior to the close of HASP and will identify the affected path, the TRM value established for the upcoming hour, and which of the three permitted TRM conditions is at issue. Because there will not yet be a working field for the TRM values in the OASIS tables, the ATC values posted in those tables on OASIS will not automatically update to reflect the TRM. To address this issue, the notice will also inform market participants that the resulting ATC value for that Intertie path for the affected hour is the value set forth in the posted OASIS table minus the TRM value identified in the notice.

The ISO proposed this interim approach to posting TRM values during the stakeholder process, explaining that, if acceptable to market participants, this approach would be a viable means to achieve the benefits of using TRM in the near term while OASIS updates are pending. No stakeholders expressed any objection to this interim approach during the stakeholder process. The ISO thus intends to implement posting of TRM in this manner on an interim basis upon approval of the tariff amendment, while moving forward with efforts to accomplish the full OASIS update later in the year.

B. Summary of Revisions to the Tariff

As described above, the ISO's TRM proposal is embodied primarily in proposed section L.1.5 of Appendix L of the tariff. This provision defines TRM, identifies the three specific conditions under which it will be used, sets forth the methodology used to calculate TRM for each condition, and identifies the databases the ISO will rely upon in establishing TRM. In addition to this primary provision, the ISO's tariff amendment updates section L.3, which is the ISO's process flowchart identifying the steps and process for calculating ATC values, to account for the use of TRM. Specifically, this flowchart has been revised to set forth the step at the bottom of the chart in which TRM values are applied in connection with the HASP process to establish a revised ATC value prior to the close of HASP.[32]

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[32] Because the ISO's proposal permits it to set positive TRM values in the identified circumstances, the tariff amendment also removes a reference in section L.1.1 to the ISO's policy of setting TRM at zero. The ISO has also updated a reference at the end of section L.2 than refers to links where the ISO's ATC calculation methodology is discussed. NERC MOD-001-1a requires the ISO to maintain an Available Transfer Capacity Implementation Document (ATCID) that sets forth in one place detailed information about the transmission provider's ATC calculation methodology. The ISO maintains its ATCID on OASIS. Because the ATCID brings together ATC calculation

Moreover, because the tariff amendment relies on the use of TRM to account for simultaneous path interactions, the ISO has removed section L.4.3.2, which is a provision that contemplated establishing an alternative TTC value in such circumstances. This provision should be removed because it is duplicative in light of the proposed TRM authority.

In addition to the foregoing revisions, the tariff amendment includes certain updates regarding ATC calculation that are intended to conform the tariff more precisely to the terminology used by the Commission in Order No. 890 and by NERC in the modeling reliability standards approved in Order No. 729. In the current version of Appendix L, the ISO uses two terms – Total Transfer Capacity and Operating Transfer Capacity – to distinguish between the total amount of rated capacity for a transfer path (without considering existing system conditions) and the total amount of capacity available when specific system conditions such as Outages are considered.[33] Order No. 890 and the NERC modeling standards approved in Order No. 729 do not use the term Operating Transfer Capacity. Instead, the term Total Transfer Capability is defined to include the impact of such existing system conditions on the rated capacity. Specifically, in its Glossary of Terms Used in NERC Reliability Standards, NERC defines Total Transfer Capability as follows:

> "The amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission systems by way of all transmission lines (or paths) between those areas under specified system conditions."[34]

To better conform to this definition, the ISO is revising its definition of Total Transfer Capability in section L.1.2 to include the underscored language from NERC's definition. Because this revision renders the term Operating Transfer Capability unnecessary, the ISO is removing this term from Appendix L.[35] To ensure consistency, the ISO is also replacing all references to Operating

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information from multiple sources, including the procedures currently cross-referenced at the end of section L.2, the ISO has revised the cross-reference in the tariff to specifically indentify the ATCID as the source for further information.

[33] *See* current tariff, Appendix L at sections L.1.2-L.1.3.

[34] Glossary of Terms Used in NERC Reliability Standards, at p. 44 (emphasis added).

[35] The ISO also removes the definition of OTC from the Master Definitions Supplement set forth at Appendix A of the tariff and revises the definition of TTC contained therein to conform to the revised definition in Appendix L.

Transfer Capability (or OTC) in Appendix L and elsewhere in the tariff with the term Total Transfer Capability (or TTC).

Finally, the ISO seeks to update the section of Appendix L regarding development of power flow base cases to correct a typographical error in section L.5.1 and to revise a reference in section L.5.2 to splitting standard base cases into five specifically identified geographical regions. The revision to section L.5.2 retains a reference to the use of geographical regions, but removes the names of the five specific regions currently identified because, over time, differing system conditions may require different analyses and may necessitate the use of more or fewer base cases..

III. THE STAKEHOLDER PROCESS

The ISO has held three stakeholder conference calls on its TRM proposal. The first two calls, which took place on January 10 and February 15, 2012, considered the substance of the ISO's TRM proposal, along with the ISO's proposed draft tariff language and draft TRMID. The third call, which took place on March 20, 2012, focused more narrowly on the ISO's near-term implementation proposal to communicate TRM values through market messages posted on OASIS during an initial period before full-scale OASIS implementation can be implemented later in 2012.[36]

Stakeholder response to the ISO's proposal has been favorable. None of the stakeholders has stated any opposition to the ISO's proposal, and most of the commenting parties, including Powerex, Pacific Gas & Electric Company, Southern California Edison Company, and NRG Energy Inc., stated affirmative support for the ISO's proposal in their written comments.[37]

NRG Energy Inc. (NRG) commented positively about the increased transparency provided by the ISO's proposal. It also urged the ISO to consider adding similar improvements to transparency with respect to the separate issue of the ISO's practice of conforming flow-based limits for transmission paths that are internal to the ISO to meet certain operational constraints. That issue is

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[36] As noted above, the interim implementation proposal was discussed in detail during the March 20, 2012 stakeholder call, and no party raised any issues or concerns regarding the proposal.

[37] The ISO received comments from four parties in connection with the first stakeholder call. For reference, a matrix summarizing of those comments, along with the ISO's responses, is set forth at the end of the ISO's Draft Final Proposal that is attached to this filing as Attachment E. The ISO received two sets of comments in connection with the second stakeholder call and received no comments in connection with the third and final call.

separate and distinct from the proposal at issue here, which focuses only on the use of TRM values for ATC paths located at the Interties. The Commission has, moreover, very recently considered and addressed the transparency issue raised by NRC in a decision issued in 2011 that adopted tariff amendments proposed by the ISO "to provide greater transparency for the CAISO's transmission constraint management practices."[38] In light of this recent decision, it would be inappropriate to revisit those issues here in connection with a proposal covering a different topic.

The Transmission Agency of Northern California (TANC) stated in its comments that it supports the implementation of measures by the ISO that improve system reliability, but sought confirmation that the ISO does not intend to apply TRM values to the portion of the COI capacity that is allocated to TANC pursuant to the Second Amended COI Path Operating Agreement and the Second Amended Owners Coordinated Operations Agreement. As discussed above, the ISO's TRM proposal applies only to the ISO's allocated portion of the COI capacity and would not be applied to the capacity allocated to TANC pursuant to those agreements.

IV. EFFECTIVE DATE

The ISO respectfully requests that the Commission accept the tariff changes contained in this filing effective as of June 10, 2012, 61 days from the date of this filing.

V. COMMUNICATIONS

Communications regarding this filing should be addressed to the following individuals. The individual identified with an asterisk is the person whose name should be placed on the official service list established by the Secretary with respect to this submittal:

[38] *California Independent System Operator Corp.*, 137 FERC ¶ 61,025 (2011), at P 1.

Nancy Saracino
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*Individual designated for service
pursuant to 18 C.F.R. § 385.203(b)(3).

VI. SERVICE

The ISO has served copies of this transmittal letter, and all attachments, on the California Public Utilities Commission, the California Energy Commission, and all parties with effective scheduling coordinator service agreements under the ISO tariff. In addition, the ISO is posting this transmittal letter and all attachments on the ISO website.

VII. ATTACHMENTS

The following documents, in addition to this transmittal letter, support the instant filing:

Attachment A Revised ISO tariff sheets – clean

Attachment B Revised ISO tariff sheets – blackline

Attachment C Draft Transmission Reliability Margin Implementation Document

Attachment D Memorandum to ISO Board of Governors and Board Resolution

Attachment E Draft Final Proposal for Transmission Reliability Margin (posted for stakeholder review on Feb. 8, 2012)

Attachment F WECC Unscheduled Flow Reduction Procedure

VIII. CONCLUSION

For the foregoing reasons, the Commission should accept the proposed tariff revisions contained in the instant filing without modification, effective June 10, 2012. Please contact the undersigned with any questions regarding this matter.

Respectfully submitted,

By: */s/ Burton Gross*

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Counsel for the California Independent
System Operator Corporation

Attachment A - Clean Tariff

California Independent System Operator Corporation

Fifth Replacement FERC Electric Tariff

Transmission Reliability Margin Amendment to Tariff

April 10, 2012

6.5.2.1 Communications Regarding the State of the CAISO Controlled Grid

The CAISO shall use OASIS to provide public information to Market Participants regarding the CAISO Controlled Grid or facilities that affect the CAISO Controlled Grid. Such information may include but is not limited to:

(a) Future planned Outages of transmission facilities;

(b) Total Transfer Capability (TTC); and

(c) Available Transfer Capability (ATC) for WECC paths and Transmission Interfaces with external Balancing Authority Areas.

* * *

6.5.2.3.2 Network and System Conditions

By 6:00 p.m. the day prior to the target Day-Ahead Market, the CAISO will publish known network and system conditions, including but not limited to TTC and ATC, the total capacity of inter-Balancing Authority Area Transmission Interfaces, and the available capacity.

* * *

23 Categories Of Transmission Capacity

References to new firm uses shall mean any use of CAISO transmission service, except for uses associated with Existing Rights or TORs. Prior to the start of the Day-Ahead Market, for each Balancing Authority Area Transmission Interface, the CAISO will allocate the forecasted Total Transfer Capability of the Transmission Interface to four categories. This allocation will represent the CAISO's best estimates at the time, and is not intended to affect any rights provided under Existing Contracts or TORs. The CAISO's forecast of Total Transfer Capability for each Balancing Authority Area Transmission Interface will depend on prevailing conditions for the relevant Trading Day, including limiting operational conditions. This information will be posted on OASIS in accordance with this CAISO Tariff. The four categories are as follows:

(a) transmission capacity that must be reserved for firm Existing Rights;

(b) transmission capacity that may be allocated for use as CAISO transmission service (i.e., "new firm uses");

(c) transmission capacity that may be allocated by the CAISO for conditional firm Existing Rights; and

(d) transmission capacity that may remain for any other uses, such as non-firm Existing Rights for which the Responsible PTO has no discretion over whether or not to provide such non-firm service.

* * *

30.8 Bids On Out-Of-Service Paths At Scheduling Points Prohibited

Scheduling Coordinators shall not submit any Bids or ETC Self-Schedules at Scheduling Points using a transmission path for any Settlement Period for which the Total Transfer Capability for that path is zero (0) MW. The CAISO shall reject Bids or ETC Self-Schedules submitted at Scheduling Points where the Total Transfer Capability on the transmission path is zero (0) MW. If the Total Transfer Capability of a transmission path at the relevant Scheduling Point is reduced to zero (0) after Day-Ahead Schedules have been issued, then, if time permits, the CAISO shall direct the responsible Scheduling Coordinators to reduce all MWh associated with the Bids on such zero-rated transmission paths to zero (0) in the HASP. As necessary to comply with Applicable Reliability Criteria, the CAISO shall reduce any non-zero (0) HASP Bids across zero-rated transmission paths to zero after the Market Close for the HASP.

* * *

36.4 FNM For CRR Allocation And CRR Auction

When the CAISO conducts its CRR Allocation and CRR Auction, the CAISO shall use the most up-to-date DC FNM which is based on the AC FNM used in the Day-Ahead Market. The Seasonal Available CRR Capacity shall be based on the DC FNM, taking into consideration the following, all of which are discussed in the applicable Business Practice Manual: (i) any long-term scheduled transmission Outages, (ii) TTC adjusted for any long-term scheduled derates, (iii) a downward adjustment due to TOR or ETC as determined by the CAISO, and (iv) the impact on transmission elements used in the annual CRR Allocation and Auction of (a) transmission Outage or derates that are not scheduled at the time the CAISO conducts the Seasonal CRR Allocation or Auction determined through a methodology that calculates the breakeven point for revenue adequacy based on historical Outages and derates, and (b) known system topology changes, both as further defined in the Business Practice Manuals. The Monthly

Available CRR Capacity shall be based on the DC FNM, taking into consideration: (i) any scheduled transmission Outages known at least thirty (30) days in advance of the start of that month as submitted for approval consistent with the criteria specified in Section 36.4.3, (ii) adjustments to compensate for the expected impact of Outages that are not required to be scheduled thirty (30) days in advance, including unplanned transmission Outages, (iii) adjustments to restore Outages or derates that were applied for use in calculating Seasonal Available CRR Capacity but are not applicable for the current month, (iv) any new transmission facilities added to the CAISO Controlled Grid that were not part of the DC FNM used to determine the prior Seasonal Available CRR Capacity and that have already been placed in-service and energized at the time the CAISO starts the applicable monthly process, (v) TTC adjusted for any scheduled derates or Outages for that month, and (vi) a downward adjustment due to TOR or ETC as determined by the CAISO. For the first monthly CRR Allocation and CRR Auction for CRR Year One, to account for any planned or unplanned Outages that may occur for the first month of CRR Year One, the CAISO will derate all flow limits, including Transmission Interface limits and normal thermal limits, based on statistical factors determined as provided in the Business Practice Manuals.

* * *

Appendix A
Master Definitions Supplement

*** * ***

- Available Transfer Capability (ATC)
The available capacity of a given transmission path, in MW, after subtraction from that path's Total Transfer Capability of capacity associated with Existing Contracts and Transmission Ownership Rights and any Transmission Reliability Margin, as established consistent with CAISO and WECC transmission capacity rating guidelines, as further described in Appendix L.

* * *

- Monthly Available CRR Capacity
The upper limit of network capacity that will be used in the monthly CRR Allocation and monthly CRR Auctions calculated by using TTC adjusted for Outages, derates, and Transmission Ownership Rights for the relevant month in accordance with Section 36.4.

* * *

* * *

- Seasonal Available CRR Capacity
The upper limit of network capacity that will be used in the annual CRR Allocation and annual CRR Auction calculated by effectively reducing TTC for Transmission Ownership Rights as if all lines will be in service for the relevant year in accordance with Section 36.4.

* * *

- Total Transfer Capability (TTC)
The amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission systems by way of all transmission lines or (paths) between those areas under specified system conditions.

* * *

Appendix L
Method To Assess Available Transfer Capability

L.1.1 **Available Transfer Capability (ATC)** is a measure of the transfer capability in the physical transmission network resulting from system conditions and that remains available for further commercial activity over and above already committed uses.

ATC is defined as the Total Transfer Capability (TTC) less applicable operating Transmission Constraints due to system conditions and Outages (i.e., OTC), less the Transmission Reliability Margin (TRM), less the sum of any unused existing transmission commitments (ETComm) (i.e., transmission rights capacity for ETC or TOR), less the Capacity Benefit Margin (CBM) (which value is set at zero), less the Scheduled Net Energy from Imports/Exports, less Ancillary Service capacity from Imports.

L.1.2 **Total Transfer Capability (TTC)** is defined as the amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission system by way of all transmission lines (or paths) between those areas, under specified system conditions. In collaboration with owners of rated paths and the WECC Operating Transfer Capability Policy Committee (OTCPC), the CAISO utilizes rated path methodology to establish the TTC of CAISO Transmission Interfaces.

L.1.3 **Existing Transmission Commitments (ETComm)** include Existing Contracts and Transmission Ownership Rights (TOR). The CAISO reserves transmission capacity for each ETC and TOR based on TRTC Instructions the responsible Participating Transmission Owner or Non-Participating Transmission Owner submits to the CAISO as to the amount of firm transmission capacity that should be reserved on each Transmission Interface for each hour of the Trading Day in accordance with Sections 16 and 17 of the CAISO Tariff. The types of TRTC Instructions the CAISO receives generally fall into three basic categories:

- The ETC or TOR reservation is a fixed percentage of the TTC on a line, which decreases as the TTC is derated (ex. TTC = 300 MW, ETC fixed percentage = 2%, ETC = 6 MWs. TTC derated to 200 MWs, ETC = 4 MWs);

- The ETC or TOR reservation is a fixed amount of capacity, which decreases if the line's TTC is derated below the reservation level (ex. ETC = 80 MWs, TTC declines to 60 MW, ETC = TTC or 60 MWs; or

- The ETC or TOR reservation is determined by an algorithm that changes at various levels of TTC for the line (ex. Intertie TTC = 3,000 MWs, when line is operating greater than 2,000 MWs to full capacity ETC = 400 MWs, when capacity is below 2000 MWs ETC = TTC/2000* ETC).

Existing Contract capacity reservations remain reserved during the Day-Ahead Market and Hour-Ahead Scheduling Process (HASP). To the extent that the reservations are unused, they are released in real-time operations for use in the Real-Time Market.

Transmissions Ownership Rights capacity reservations remain reserved during the Day-Ahead Market and HASP, as well as through real-time operations. This capacity is under the control of the Non-Participating Transmission Owner and is not released to the CAISO for use in the markets.

L.1.4 ETC Reservations Calculator (ETCC). The ETCC calculates the amount of firm transmission capacity reserved (in MW) for each ETC or TOR on each Transmission Interface for each hour of the Trading Day.

- **CAISO Updates to ETCC Reservations Table.** The CAISO updates the ETC and TOR reservations table (if required) prior to running the Day-Ahead Market and HASP. The amount of transmission capacity reservation for ETC and TOR rights is determined based on the TTC of each Transmission Interface and in accordance with the curtailment procedures stipulated in the existing agreements and provided to the CAISO by the responsible Participating Transmission Owner or Non-Participating Transmission Owner.

- **Market Notification.** ETC and TOR allocation (MW) information is published for all Scheduling Coordinators which have ETC or TOR scheduling responsibility in advance of the Day-Ahead Market and HASP. This information is posted on the Open Access Same-Time Information System (OASIS).

- For further information, see CAISO Operating Procedure M-423, Scheduling of Existing Transmission Contract and Transmission Ownership Rights, which is publicly available on the CAISO Website.

L.1.5 Transmission Reliability Margin (TRM) is an amount of transmission transfer capability reserved at a CAISO Intertie point that is 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 CAISO uses TRM at Intertie points to account for the following NERC-approved components of uncertainty:

- Forecast uncertainty in transmission system topology, including forced or unplanned outages or maintenance outages.
- Allowances for parallel path (loop flow) impacts, including unscheduled loop flow.
- Allowances for simultaneous path interactions.

The CAISO establishes hourly TRM values for each of the applicable components of uncertainty prior to the Market Close of the HASP. The CAISO does not use TRM (i.e., TRM values for Intertie points are set at zero) during the beyond day-ahead and pre-schedule (i.e., planning) time frame indentified in R.1.3.3 of NERC Reliability Standard MOD-008-1. A positive TRM value for a given hour is set only if one or

more of the conditions set forth below exists for a particular Intertie point. Where none of these conditions exist, the TRM value for a given hour is set at zero.

The methodology the CAISO uses to establish each component of uncertainty is as follows:

The CAISO uses the transmission system topology component of uncertainty to address a potential ATC path limit reduction at an Intertie resulting from an emerging event, such as an approaching wildfire, that is expected to cause a derate of one or more transmission facilities comprising the ATC path. When the CAISO, based on existing circumstances, forecasts that such a derate is expected to occur, the CAISO may establish a TRM value for the affected ATC path in an amount up to, but no greater than, the amount of the expected derate.

The CAISO uses the parallel path component of uncertainty to address the impact of unscheduled flow (USF) over an ATC path that is expected, in the absence of the TRM, to result in curtailment of Intertie Schedules in Real Time as a result of the requirements established in WECC's applicable USF mitigation policies and procedures (WECC USF Policy). When the CAISO forecasts, based on currently observed USF conditions and projected scheduled flow for an upcoming Operating Hour(s), that in the absence of a TRM, scheduled flow will need to be curtailed in Real Time under the applicable WECC USF Policy, the CAISO may establish a TRM for the ATC path for the applicable hour(s) in an amount up to, but no greater than, the forecasted amount that is expected to be curtailed in Real Time pursuant to the WECC USF Policy.

The CAISO uses the simultaneous path interactions component of uncertainty to address the impact that transmission flows on an ATC path located outside the CAISO's Balancing Authority Area may have on the transmission transfer capability of an ATC path located at an Intertie. In the event of such path interactions, the CAISO uses a TRM value to prevent the risk of a system operating limit violation in Real Time for the CAISO ATC path. The amount of the TRM value may be set at a level up to, but not greater than, the forecasted impact on the CAISO ATC path's capacity imposed by expected flow on the non-CAISO ATC path.

The CAISO uses the following databases or information systems, or their successors, in connection with establishing TRM values: SLIC, Existing Transmission Contract Calculator (ETCC), PI, EMS, and CAS.

L.1.6 Capacity Benefit Margin (CBM) is that amount of transmission transfer capability reserved for Load Serving Entities (LSEs) to ensure access to Generation from interconnected systems to meet generation reliability requirements. In the Day-Ahead Market, CBM may be used to provide reliable delivery of Energy to CAISO Balancing Authority Area Loads and to meet CAISO responsibility for resource reliability requirements in Real-Time. The purpose of this DAM implementation is to avoid Real-Time Schedule curtailments and firm Load interruptions that would otherwise be necessary. CBM may be used to reestablish Operating Reserves. CBM is not available for non-firm transmission in the CAISO Balancing Authority Area. CBM may be used only after:

- all non-firm sales have been terminated,
- direct-control Load management has been implemented,
- customer interruptible Demands have been interrupted,
- if the LSE calling for its use is experiencing a Generation deficiency and its transmission service provider is also experiencing Transmission Constraints relative to imports of Energy on its transmission system.

The level of CBM for each Transmission Interface is determined by the amount of estimated capacity needed to serve firm Load and provide Operating Reserves based on historical, scheduled, and/or forecast data using the following equation to set the maximum CBM:

CBM = (Demand + Reserves) - Resources

Where:

- Demand = forecasted area Demand
- Reserves = reserve requirements
- Resources = internal area resources plus resources available on other Transmission Interfaces

The CAISO does not use CBMs. The CBM value is set at zero.

L.2 ATC Algorithm

The ATC algorithm is a calculation used to determine the transfer capability remaining in the physical transmission network and available for further commercial activity over and above already committed uses. The CAISO posts the ATC values in megawatts (MW) to OASIS in conjunction with the closing events for the Day-Ahead Market and HASP Real-Time Market process.

The following OASIS ATC algorithms are used to implement the CAISO ATC calculation for the ATC rated path (Transmission Interface):

ATC Calculation For Imports:
ATC = TTC - CBM - TRM – AS from Imports- Net Energy Flow - Hourly Unused TR Capacity.

ATC Calculation For Exports:
ATC = TTC - CBM - TRM – Net Energy Flow - Hourly Unused TR Capacity.

ATC Calculation For Internal Paths 15 and 26:
ATC = TTC - CBM - TRM – Net Energy Flow

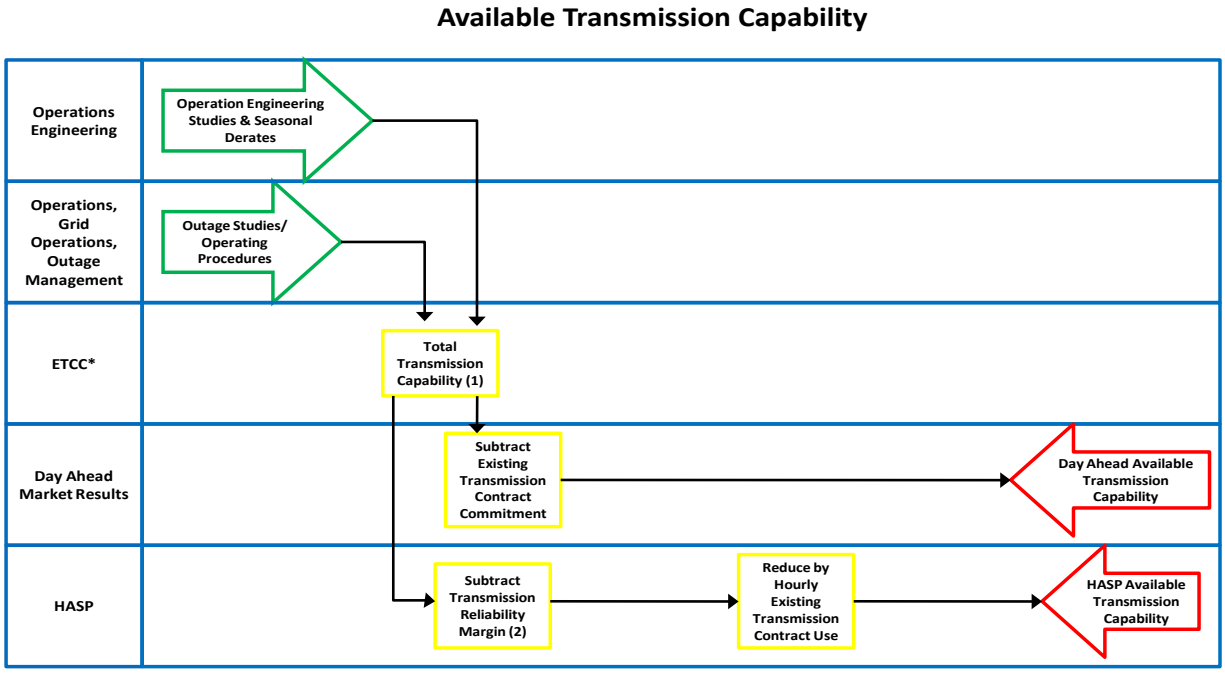
The specific data points used in the ATC calculation are each described in the following table.

ATC	ATC MW	Available Transfer Capability, in MW, per Transmission Interface and path direction.
Hourly Unused TR Capacity	USAGE_MW	The sum of any unscheduled existing transmission commitments (scheduled transmission rights capacity for ETC or TOR), in MW, per path direction.
Scheduled Net Energy from Imports/Exports (Net Energy Flow)	ENE IMPORT MW	Total hourly net Energy flow for a specified Transmission Interface.
AS from Imports	AS IMPORT MW	Ancillary Services scheduled, in MW, as imports over a specified Transmission Interface.
TTC	TTC MW	Hourly Total Transfer Capability of a specified Transmission Interface, per path direction, with consideration given to known Constraints and

		operating limitations.
CBM	CBM MW	Hourly Capacity Benefit Margin, in MW, for a specified Transmission Interface, per Path Direction.
TRM	TRM MW	Hourly Transmission Reliability Margin, in MW, for a specified Transmission Interface, per path direction.

Actual ATC mathematical algorithms and other ATC calculational information are located in the CAISO's ATC Implementation Document (ATCID) posted on OASIS.

L.3 ATC Process Flowchart



*ETCC – Existing Transmission Contract Calculator
(1) – WECC rated path methodology
(2) - See TRMID posted on OASIS

L.4 TTC Determination

All transfer capabilities are developed to ensure that power flows are within their respective operating limits, both pre-Contingency and post-Contingency. Operating limits are developed based on thermal, voltage and stability concerns according to industry reliability criteria (WECC/NERC) for transmission paths. The process for developing TTC also requires the inclusion or exclusion of operating Transmission Constraints based on system conditions being studied.

* * *

L.4.1.2 At the CAISO, studies for all major inter-area paths' (mostly 500 kV) TTC are governed by the California Operating Studies Subcommittee (OSS) as one of four sub-regional study groups of the WECC OTCPC (i.e., for California sub-region), which provides detailed criteria and methodology. For transmission system elements below 500 kV the methodology for calculating these flow limits is detailed in Section L.4.3 and is applicable to the operating horizon.

* * *

L.4.3.1 **System Limits** – The transfer capability of the transmission network may be limited by the physical and electrical characteristics of the systems including thermal, voltage, and stability consideration. Once the critical Contingencies are identified, their impact on the network must be evaluated to determine the most restrictive of those limitations. Therefore, the TTC becomes:

TTC = lesser of {Thermal Limit, Voltage Limit, Stability Limit} following $N\text{-}1_{worst}$

L.5 Developing a Power Flow Base-Case

L.5.1 **Base-cases** will be selected to model reality to the greatest extent possible including attributes like area Generation, area Load, Intertie flows, etc. At other times (e.g., studying longer range horizons), it is prudent to stress a base-case by making one or more attributes (Load, Generation, line flows, path flows, etc.) of that base-case more extreme than would otherwise be expected.

L.5.2 **Power Flow Base-Cases Separated By Geographic Region**
The standard RTE base-cases are split into geographical regions within the CAISO Controlled Grid.

* * *

Attachment B - Marked Tariff

California Independent System Operator Corporation

Fifth Replacement FERC Electric Tariff

Transmission Reliability Margin Amendment to Tariff

April 10, 2012

6.5.2.1 Communications Regarding the State of the CAISO Controlled Grid

The CAISO shall use OASIS to provide public information to Market Participants regarding the CAISO Controlled Grid or facilities that affect the CAISO Controlled Grid. Such information may include but is not limited to:

(a) Future planned Outages of transmission facilities;

(b) Total~~Operating~~ Transfer Capability (TTC~~OTC~~); and

(c) Available Transfer Capability (ATC) for WECC paths and Transmission Interfaces with external Balancing Authority Areas.

* * *

6.5.2.3.2 Network and System Conditions

By 6:00 p.m. the day prior to the target Day-Ahead Market, the CAISO will publish known network and system conditions, including but not limited to TTC~~OTC~~ and ATC, the total capacity of inter-Balancing Authority Area Transmission Interfaces, and the available capacity.

* * *

23 Categories Of Transmission Capacity

References to new firm uses shall mean any use of CAISO transmission service, except for uses associated with Existing Rights or TORs. Prior to the start of the Day-Ahead Market, for each Balancing Authority Area Transmission Interface, the CAISO will allocate the forecasted Total Transfer Capability of the Transmission Interface to four categories. This allocation will represent the CAISO's best estimates at the time, and is not intended to affect any rights provided under Existing Contracts or TORs. The CAISO's forecast of Total Transfer Capability for each Balancing Authority Area Transmission Interface will depend on prevailing conditions for the relevant Trading Day, including~~, but not limited to, the effects of parallel path (unscheduled) flows and/or other~~ limiting operational conditions. This information will be posted on OASIS in accordance with this CAISO Tariff. The four categories are as follows:

(a) transmission capacity that must be reserved for firm Existing Rights;

(b) transmission capacity that may be allocated for use as CAISO transmission service (i.e., "new firm uses");

(c) transmission capacity that may be allocated by the CAISO for conditional firm Existing Rights; and

(d) transmission capacity that may remain for any other uses, such as non-firm Existing Rights for which the Responsible PTO has no discretion over whether or not to provide such non-firm service.

* * *

30.8 Bids On Out-Of-Service Paths At Scheduling Points Prohibited

Scheduling Coordinators shall not submit any Bids or ETC Self-Schedules at Scheduling Points using a transmission path for any Settlement Period for which the Total~~Operating~~ Transfer Capability for that path is zero (0) MW. The CAISO shall reject Bids or ETC Self-Schedules submitted at Scheduling Points where the Total~~Operating~~ Transfer Capability on the transmission path is zero (0) MW. If the Total~~Operating~~ Transfer Capability of a transmission path at the relevant Scheduling Point is reduced to zero (0) after Day-Ahead Schedules have been issued, then, if time permits, the CAISO shall direct the responsible Scheduling Coordinators to reduce all MWh associated with the Bids on such zero-rated transmission paths to zero (0) in the HASP. As necessary to comply with Applicable Reliability Criteria, the CAISO shall reduce any non-zero (0) HASP Bids across zero-rated transmission paths to zero after the Market Close for the HASP.

* * *

36.4 FNM For CRR Allocation And CRR Auction

When the CAISO conducts its CRR Allocation and CRR Auction, the CAISO shall use the most up-to-date DC FNM which is based on the AC FNM used in the Day-Ahead Market. The Seasonal Available CRR Capacity shall be based on the DC FNM, taking into consideration the following, all of which are discussed in the applicable Business Practice Manual: (i) any long-term scheduled transmission Outages, (ii) TTC~~OTC~~ adjusted for any long-term scheduled derates, (iii) a downward adjustment due to TOR or ETC as determined by the CAISO, and (iv) the impact on transmission elements used in the annual CRR Allocation and Auction of (a) transmission Outage or derates that are not scheduled at the time the CAISO conducts the Seasonal CRR Allocation or Auction determined through a methodology that calculates the breakeven point for revenue adequacy based on historical Outages and derates, and (b)

known system topology changes, both as further defined in the Business Practice Manuals. The Monthly Available CRR Capacity shall be based on the DC FNM, taking into consideration: (i) any scheduled transmission Outages known at least thirty (30) days in advance of the start of that month as submitted for approval consistent with the criteria specified in Section 36.4.3, (ii) adjustments to compensate for the expected impact of Outages that are not required to be scheduled thirty (30) days in advance, including unplanned transmission Outages, (iii) adjustments to restore Outages or derates that were applied for use in calculating Seasonal Available CRR Capacity but are not applicable for the current month, (iv) any new transmission facilities added to the CAISO Controlled Grid that were not part of the DC FNM used to determine the prior Seasonal Available CRR Capacity and that have already been placed in-service and energized at the time the CAISO starts the applicable monthly process, (v) TTC~~OTC~~ adjusted for any scheduled derates or Outages for that month, and (vi) a downward adjustment due to TOR or ETC as determined by the CAISO. For the first monthly CRR Allocation and CRR Auction for CRR Year One, to account for any planned or unplanned Outages that may occur for the first month of CRR Year One, the CAISO will derate all flow limits, including Transmission Interface limits and normal thermal limits, based on statistical factors determined as provided in the Business Practice Manuals.

* * *

Appendix A
Master Definitions Supplement

*** * ***

- Available Transfer Capability (ATC)
The available capacity of a given transmission path, in MW, after subtraction from that path's Total Transfer Capability of capacity associated with Existing Contracts and Transmission Ownership Rights and any Transmission Reliability Margin, as ~~from that path's Operating Transfer Capability~~ established consistent with CAISO and WECC transmission capacity rating guidelines, as further described in Appendix L.

* * *

- Monthly Available CRR Capacity
The upper limit of network capacity that will be used in the monthly CRR Allocation and monthly CRR Auctions calculated by using TTC~~OTC~~ adjusted for Outages, derates, and Transmission Ownership Rights for the relevant month in accordance with Section 36.4.

* * *

~~**- Operating Transfer Capability**~~

~~The maximum capability of a transmission path to transmit real power, expressed in MW, at a given point in time, as further defined in Appendix L.~~

* * *

- Seasonal Available CRR Capacity

The upper limit of network capacity that will be used in the annual CRR Allocation and annual CRR Auction calculated by effectively reducing TTC~~OTC~~ for Transmission Ownership Rights as if all lines will be in service for the relevant year in accordance with Section 36.4.

* * *

- Total Transfer Capability (TTC)

The amount of electric power that can be moved or transferred reliably from one area to another area of the~~over an~~ interconnected transmission systems by way~~network in a reliable manner while meeting all of a specific set~~ of all transmission lines or (paths) between those areas under specified ~~defined pre-Contingency and post-Contingency~~ system conditions.

* * *

Appendix L
Method To Assess Available Transfer Capability

L.1.1 **Available Transfer Capability (ATC)** is a measure of the transfer capability in the physical transmission network resulting from system conditions and that remains available for further commercial activity over and above already committed uses.

ATC is defined as the Total Transfer Capability (TTC) less applicable operating Transmission Constraints due to system conditions and Outages (i.e., OTC), less the Transmission Reliability Margin (TRM), less the sum of any unused existing transmission commitments (ETComm) (i.e., transmission rights capacity for ETC or TOR), less the Capacity Benefit Margin (CBM) (which value is set at zero), less the Scheduled Net Energy from Imports/Exports, less Ancillary Service capacity from Imports.

L.1.2 **Total Transfer Capability (TTC)** is defined as the amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission system by way of all transmission lines (or paths) between those areas, under specified system conditions.~~.~~ In collaboration with owners of rated paths and the WECC Operating Transfer Capability Policy Committee (OTCPC), the CAISO utilizes rated path methodology to establish the TTC of CAISO Transmission Interfaces.

~~**L.1.3** **Operating Transfer Capability (OTC)** is the TTC reduced by any operational Transmission Constraints caused by seasonal derates or Outages. CAISO Regional Transmission Engineers (RTE) determine OTC through studies using computer modeling.~~

L.1.3 **Existing Transmission Commitments (ETComm)** include Existing Contracts and Transmission Ownership Rights (TOR). The CAISO reserves transmission capacity for each ETC and TOR based on TRTC Instructions the responsible Participating Transmission Owner or Non-Participating Transmission Owner submits to the CAISO as to the amount of firm transmission capacity that should be reserved on each Transmission Interface for each hour of the Trading Day in accordance with Sections

16 and 17 of the CAISO Tariff. The types of TRTC Instructions the CAISO receives generally fall into three basic categories:

- The ETC or TOR reservation is a fixed percentage of the TTC on a line, which decreases as the TTC is derated (ex. TTC = 300 MW, ETC fixed percentage = 2%, ETC = 6 MWs. TTC derated to 200 MWs, ETC = 4 MWs);

- The ETC or TOR reservation is a fixed amount of capacity, which decreases if the line's TTC is derated below the reservation level (ex. ETC = 80 MWs, TTC declines to 60 MW, ETC = TTC~~OTC~~ or 60 MWs; or

- The ETC or TOR reservation is determined by an algorithm that changes at various levels of TTC for the line (ex. Intertie TTC = 3,000 MWs, when line is operating greater than 2,000 MWs to full capacity ETC = 400 MWs, when capacity is below 2000 MWs ETC = TTC~~OTC~~/2000* ETC).

Existing Contract capacity reservations remain reserved during the Day-Ahead Market and Hour-Ahead Scheduling Process (HASP). To the extent that the reservations are unused, they are released in real-time operations for use in the Real-Time Market.

Transmissions Ownership Rights capacity reservations remain reserved during the Day-Ahead Market and HASP, as well as through real-time operations. This capacity is under the control of the Non-Participating Transmission Owner and is not released to the CAISO for use in the markets.

L.1.4~~5~~ ETC Reservations Calculator (ETCC). The ETCC calculates the amount of firm transmission capacity reserved (in MW) for each ETC or TOR on each Transmission Interface for each hour of the Trading Day.

- **CAISO Updates to ETCC Reservations Table.** The CAISO updates the ETC and TOR reservations table (if required) prior to running the Day-Ahead Market and HASP. The amount of transmission capacity reservation for ETC and TOR rights is determined based on the TTC~~OTC~~ of each Transmission Interface and in accordance with the curtailment procedures stipulated in the existing agreements and provided to the CAISO by the responsible Participating Transmission Owner or Non-Participating Transmission Owner.

- **Market Notification.** ETC and TOR allocation (MW) information is published for all Scheduling Coordinators which have ETC or TOR scheduling responsibility in advance of the Day-Ahead Market and HASP. This information is posted on the Open Access Same-Time Information System (OASIS).

- For further information, see CAISO Operating Procedure M-423, Scheduling of Existing Transmission Contract and Transmission Ownership Rights, which is publicly available on the CAISO Website.

~~**L.1.6 Transmission Reliability Margin (TRM)** is that amount of transmission transfer capability necessary reserved in the Day-Ahead Market (DAM) to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions. This DAM implementation avoids Real-Time Schedule curtailments that would otherwise be necessary due to:~~

- ~~Demand Forecast error~~
- ~~Anticipated uncertainty in transmission system topology~~
- ~~Unscheduled flow~~
- ~~Simultaneous path interactions~~

- ~~Variations in Generation Dispatch~~
- ~~Operating Reserve actions~~

~~The level of TRM for each Transmission Interface will be determined by CAISO Regional Transmission Engineers (RTE).~~

~~The CAISO does not use TRMs. The TRM value is set at zero.~~

L.1.5 Transmission Reliability Margin (TRM) is an amount of transmission transfer capability reserved at a CAISO Intertie point that is 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 CAISO uses TRM at Intertie points to account for the following NERC-approved components of uncertainty:

- Forecast uncertainty in transmission system topology, including forced or unplanned outages or maintenance outages.
- Allowances for parallel path (loop flow) impacts, including unscheduled loop flow.
- Allowances for simultaneous path interactions.

The CAISO establishes hourly TRM values for each of the applicable components of uncertainty prior to the Market Close of the HASP. The CAISO does not use TRM (i.e., TRM values for Intertie points are set at zero) during the beyond day-ahead and pre-schedule (i.e., planning) time frame indentified in R.1.3.3 of NERC Reliability Standard MOD-008-1. A positive TRM value for a given hour is set only if one or more of the conditions set forth below exists for a particular Intertie point. Where none of these conditions exist, the TRM value for a given hour is set at zero.

The methodology the CAISO uses to establish each component of uncertainty is as follows:

The CAISO uses the transmission system topology component of uncertainty to address a potential ATC path limit reduction at an Intertie resulting from an emerging event, such as an approaching wildfire, that is expected to cause a derate of one or more transmission facilities comprising the ATC path. When the CAISO, based on existing circumstances, forecasts that such a derate is expected to occur, the CAISO may establish a TRM value for the affected ATC path in an amount up to, but no greater than, the amount of the expected derate.

The CAISO uses the parallel path component of uncertainty to address the impact of unscheduled flow (USF) over an ATC path that is expected, in the absence of the TRM, to result in curtailment of Intertie Schedules in Real Time as a result of the requirements established in WECC's applicable USF mitigation policies and procedures (WECC USF Policy). When the CAISO forecasts, based on currently observed USF conditions and projected scheduled flow for an upcoming Operating Hour(s), that in the absence of a TRM, scheduled flow will need to be curtailed in Real Time under the applicable WECC USF Policy, the CAISO may establish a TRM for the ATC path for the applicable hour(s) in an amount up to, but no greater than, the forecasted amount that is expected to be curtailed in Real Time pursuant to the WECC USF Policy.

The CAISO uses the simultaneous path interactions component of uncertainty to address the impact that transmission flows on an ATC path located outside the CAISO's Balancing Authority Area may have on the transmission transfer capability of an ATC path located at an Intertie. In the event of such path interactions, the CAISO uses a TRM value to prevent the risk of a system operating limit violation in Real Time for the CAISO ATC path. The amount of the TRM value may be set at a level up to, but not greater

than, the forecasted impact on the CAISO ATC path's capacity imposed by expected flow on the non-CAISO ATC path.

The CAISO uses the following databases or information systems, or their successors, in connection with establishing TRM values: SLIC, Existing Transmission Contract Calculator (ETCC), PI, EMS, and CAS.

L.1.6~~7~~ **Capacity Benefit Margin (CBM)** is that amount of transmission transfer capability reserved for Load Serving Entities (LSEs) to ensure access to Generation from interconnected systems to meet generation reliability requirements. In the Day-Ahead Market, CBM may be used to provide reliable delivery of Energy to CAISO Balancing Authority Area Loads and to meet CAISO responsibility for resource reliability requirements in Real-Time. The purpose of this DAM implementation is to avoid Real-Time Schedule curtailments and firm Load interruptions that would otherwise be necessary. CBM may be used to reestablish Operating Reserves. CBM is not available for non-firm transmission in the CAISO Balancing Authority Area. CBM may be used only after:

- all non-firm sales have been terminated,
- direct-control Load management has been implemented,
- customer interruptible Demands have been interrupted,
- if the LSE calling for its use is experiencing a Generation deficiency and its transmission service provider is also experiencing Transmission Constraints relative to imports of Energy on its transmission system.

The level of CBM for each Transmission Interface is determined by the amount of estimated capacity needed to serve firm Load and provide Operating Reserves based on historical, scheduled, and/or forecast data using the following equation to set the maximum CBM:

CBM = (Demand + Reserves) - Resources

Where:

- Demand = forecasted area Demand
- Reserves = reserve requirements
- Resources = internal area resources plus resources available on other Transmission Interfaces

The CAISO does not use CBMs. The CBM value is set at zero.

L.2 ATC Algorithm

The ATC algorithm is a calculation used to determine the transfer capability remaining in the physical transmission network and available for further commercial activity over and above already committed uses. The CAISO posts the ATC values in megawatts (MW) to OASIS in conjunction with the closing events for the Day-Ahead Market and HASP Real-Time Market process.

The following OASIS ATC algorithms are used to implement the CAISO ATC calculation for the ATC rated path (Transmission Interface):

~~OTC = TTC – CBM – TRM - Operating Constraints~~

ATC Calculation For Imports:
ATC = TTC - CBM - TRM~~OTC~~ – AS from Imports- Net Energy Flow - Hourly Unused TR Capacity.

ATC Calculation For Exports:

ATC = TTC - CBM - TRM~~OTC~~ – Net Energy Flow - Hourly Unused TR Capacity.

ATC Calculation For Internal Paths 15 and 26:
ATC = TTC - CBM - TRM~~OTC~~ – Net Energy Flow

The specific data points used in the ATC calculation are each described in the following table.

ATC	ATC MW	Available Transfer Capability, in MW, per Transmission Interface and path direction.
Hourly Unused TR Capacity	USAGE_MW	The sum of any unscheduled existing transmission commitments (scheduled transmission rights capacity for ETC or TOR), in MW, per path direction.
Scheduled Net Energy from Imports/Exports (Net Energy Flow)	ENE IMPORT MW	Total hourly net Energy flow for a specified Transmission Interface.
AS from Imports	AS IMPORT MW	Ancillary Services scheduled, in MW, as imports over a specified Transmission Interface.
TTC~~**OTC**~~	TTC~~**OTC**~~ MW	Hourly Total~~**Operating**~~ Transfer Capability of a specified Transmission Interface, per path direction, with consideration given to known Constraints and operating limitations.
~~Transmission Constraint~~	~~Constraint MW~~	~~Hourly Transmission Constraints, in MW, for a specific Transmission Interface and path direction.~~
CBM	CBM MW	Hourly Capacity Benefit Margin, in MW, for a specified Transmission Interface, per Path Direction.
TRM	TRM MW	Hourly Transmission Reliability Margin, in MW, for a specified Transmission Interface, per path direction.

~~TTC~~	~~TTC MW~~	~~Hourly Total Transfer Capability, in MW, of a specified Transmission Interface, per path direction.~~

~~The links to the CAISO Website where the actual~~ Actual ATC mathematical algorithms and other ATC calculational information are located in the CAISO's ATC Implementation Document (ATCID) posted on OASIS~~. are as follows:~~

~~Operating Procedures – Transmission~~
~~http://www.caiso.com/thegrid/operations/opsdoc/transmon/index.html~~

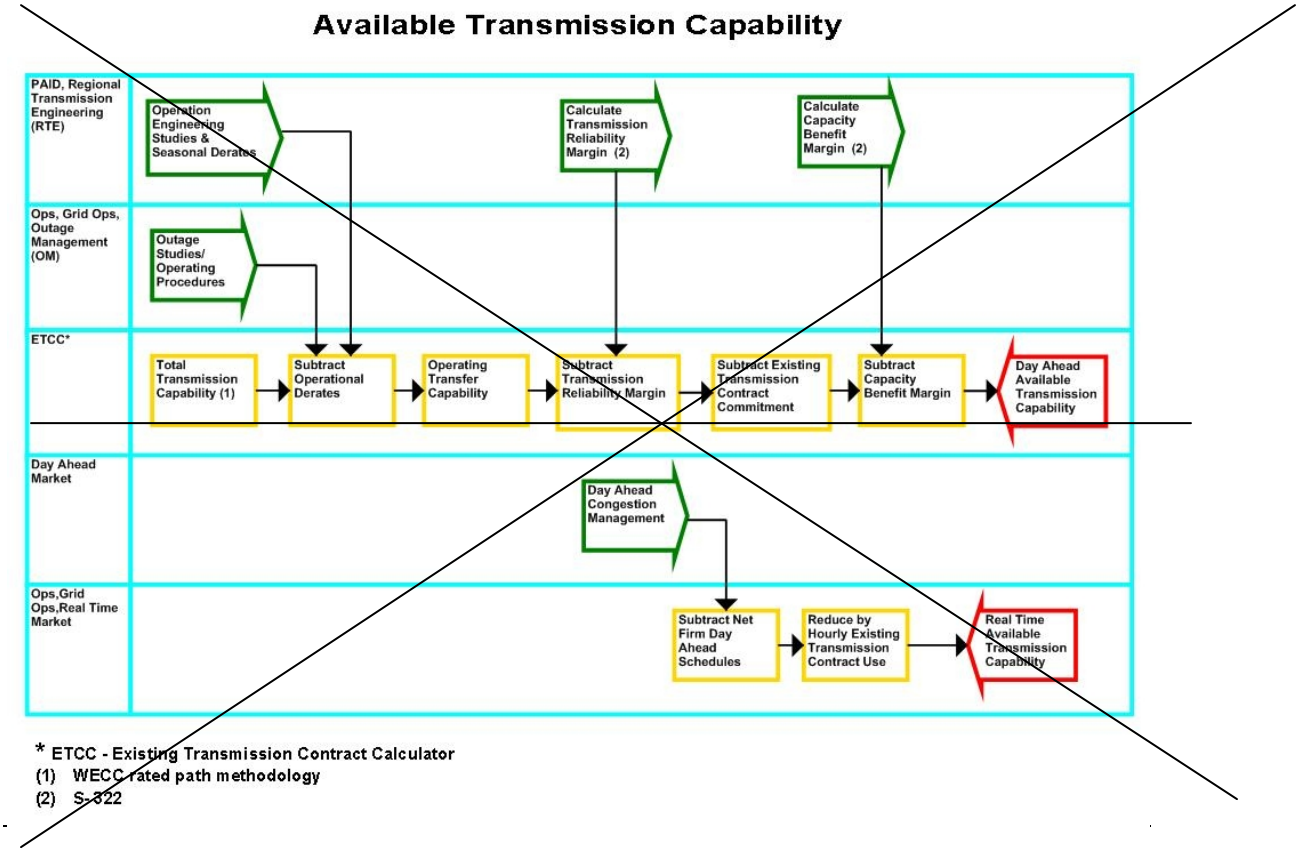
~~Operating Procedure - Total Transfer Capability Methodology~~
~~http://www.caiso.com/1bfe/1bfe98134fa0.pdf~~

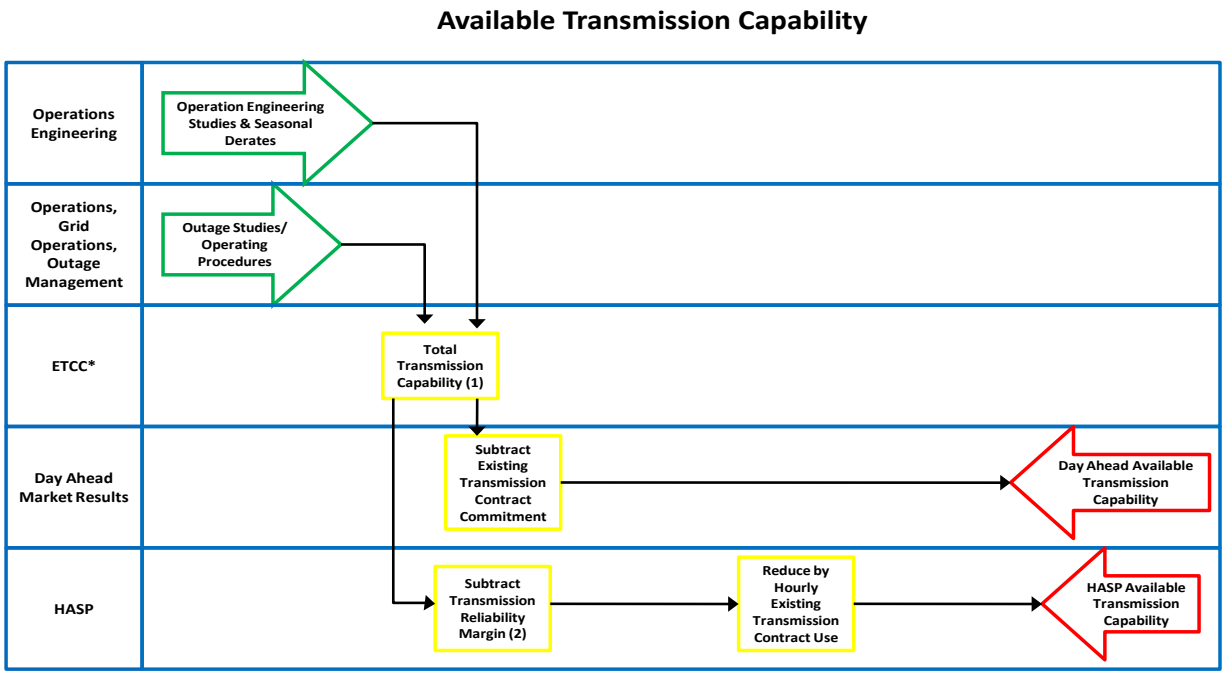
~~Operating Procedure - System Operating Methodology~~
~~http://www.caiso.com/1c13/1c1390d420810.pdf~~

~~Business Practice Manual for Market Operations~~
~~https://bpm.caiso.com/bpm/bpm/version/000000000000005~~

~~– Transmission Information~~
~~http://oasis.caiso.com/mrtu-oasis~~

L.3 ATC Process Flowchart





*ETCC – Existing Transmission Contract Calculator
(1) – WECC rated path methodology
(2) - See TRMID posted on OASIS

L.4 TTC ~~– OTC~~ Determination

All transfer capabilities are developed to ensure that power flows are within their respective operating limits, both pre-Contingency and post-Contingency. Operating limits are developed based on thermal, voltage and stability concerns according to industry reliability criteria (WECC/NERC) for transmission paths. The process for developing TTC also requires~~or OTC is~~ the ~~same with the exception of~~ inclusion or exclusion of operating Transmission Constraints based on system conditions being studied. ~~Accordingly, further description of the process to determine either OTC or TTC will refer only to TTC.~~

* * *

L.4.1.2 At the CAISO, studies for all major inter-area paths'~~paths~~ (mostly 500 kV) TTC~~OTC~~ are governed by the California Operating Studies Subcommittee (OSS) as one of four sub-regional study groups of the WECC OTCPC (i.e., for California sub-region), which provides detailed criteria and methodology. For transmission system elements below 500 kV the methodology for calculating these flow limits is detailed in Section L.4.3 and is applicable to the operating horizon.

* * *

L.4.3.1 System Limits – The transfer capability of the transmission network may be limited by the physical and electrical characteristics of the systems including thermal, voltage, and stability consideration. Once the critical Contingencies are identified, their impact on the network must be evaluated to determine the most restrictive of those limitations. Therefore, the TTC~~TTC1~~ becomes:

$$TTC\text{~~}TTC_1\text{~~} = \text{lesser of } \{\text{Thermal Limit, Voltage Limit, Stability Limit}\} \text{ following } N\text{-}1_{worst}$$

~~**L.4.3.2** Parallel path flows will be considered in determining transfer capability and must be sufficient in scope to ensure that limits throughout the interconnected network are addressed. In some~~

~~cases, the parallel path flows may result in transmission limitations in systems other than the transacting systems, which can limit the TTC between two transacting areas. This will be labeled TTC_2. Combined with **Section L**.4.3.1 above TTC becomes:~~

~~TTC = lesser of {TTC_1 or TTC_2}~~

L.5 Developing a Power Flow Base-Case

L.5.1 Base-cases will be selected ~~used~~ to model reality to the greatest extent possible including attributes like area Generation, area Load, Intertie flows, etc. At other times (e.g., studying longer range horizons), it is prudent to stress a base-case by making one or more attributes (Load, Generation, line flows, path flows, etc.) of that base-case more extreme than would otherwise be expected.

L.5.2 Power Flow Base-Cases Separated By Geographic Region

The standard RTE base-cases are split into ~~five~~ geographical regions within ~~in~~ the CAISO Controlled Grid ~~including the Bay Area, Fresno Area, North Area, SDG&E Area, and SCE Area~~.

* * *

Attachment C

Draft Transmission Reliability Margin Implementation Document

April 10, 2012

Draft Transmission Reliability Margin Implementation Document

1.0 Purpose

The California Independent System Operator Corporation (ISO), 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 ISO OASIS at http://www.caiso.com/235f/235fcbd556310.html. (MOD-008-1 R2)

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

The ISO considers the following components of uncertainty in establishing TRM values for ATC Paths located at intertie points:

- 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.

3.0 Description of Method Used to Calculate and Allocate TRM for Each Component of Uncertainty (MOD-008-1 R1.2)

The ISO 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 ISO 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.

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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.

[2] "Real Time" is defined in Appendix A of the ISO Tariff.

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 ISO 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 ISO 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 WECC Unscheduled Flow Mitigation Procedure (WECC USF Procedure)[4] for that Path, the ISO 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 WECC USF Procedure.

Example: An intertie ATC Path has a TTC value of 1000 MW, the path is a qualified path for the WECC USF Procedure, 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 WECC USF Procedure Step 2 will ne***ed to*** be invoked in Real Time absent application of a TRM.

- ***Then***
  - The ISO may 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).[5]

When it is expected based on the forecast 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.

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3 "Operating Hour" is defined in Appendix A of the ISO Tariff.

4 The WECC USF Procedure followed by the ISO is set forth in ISO Operating Procedure 3510, which is available on the ISO's public website. The ISO's WECC USF Procedure implements the WECC Unscheduled Flow Reduction Guideline, which is set forth as Appendix 3510A to Operating Procedure 3510.

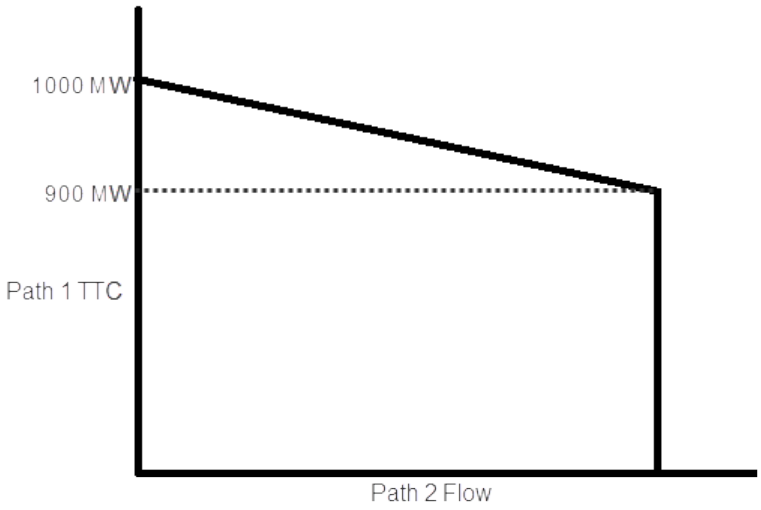
5 The "Hour Ahead Scheduling Process (HASP)" is defined in Appendix A of the ISO Tariff.

3.3 Allowances for simultaneous path interactions.

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

Example: If an ATC Path within the ISO is found to be dependent with other ATC Paths as seen in Figure Below:



In the example above, the ISO may utilize up to 100 MW of TRM value in Path 1 if the ISO 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 ISO 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 ISO 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 ISO does not maintain Capacity Benefit Margin (CBM). Therefore, the ISO 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 ISO documentation associated with TRM can be found in the ISO Tariff, Appendix L. The ISO Tariff is available on the ISO's public website.

7.0 Posting TRM Values (MOD-008 R5)

The TRM values established by the ISO will be made public and posted in OASIS.

8.0 Revisions to TRMID

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

Attachment D

Memorandum to ISO Board of Governors and Board Resolution

April 10, 2012

Memorandum

To: ISO Board of Governors

From: Eric Schmitt, Vice President, Operations

Date: March 15, 2012

Re: **Decision on Transmission Reliability Margin**

This memorandum requires Board action.

EXECUTIVE SUMMARY

Management proposes to refine its operational practices, to provide greater clarity in the California Independent System Operator Corporation's management of transmission constraints at interties in the real-time market. Currently, the ISO performs reliability adjustments to intertie schedules within the operating hour, which can be disruptive to market participants' commercial transactions when bilateral trades are curtailed, as well as to the ISO's operations when reduced imports must be replaced from others sources. Using a mechanism known as transmission reliability margin, the ISO will be able to manage these transmission limitations in advance by reflecting the limitations in the hour-ahead scheduling process thereby reducing the impact to market participants. The proposed use of hourly transmission reliability margin values will be limited to the current day, no earlier than two hours in advance of dispatch. For the day-ahead market and longer time horizons, the ISO will not limit intertie capacity through the transmission reliability margin mechanism. The system changes to OASIS are planned to be implemented in the fall of 2012. The ISO is currently working on an interim solution so the transmission reliability margin can be utilized during the summer months when it is most beneficial.

This memo describes three operational issues that will be addressed by implementing a transmission reliability margin, and presents the proposed implementation plan:

1. Unscheduled loop flow through the ISO grid from schedules between other balancing authority areas;

2. Forecast uncertainty in transmission system topology, such as forced or maintenance outages; and

3. Simultaneous interactions between intertie paths into the ISO and paths through other balancing authority areas.

These three issues are described in further detail in this memo.

Moved, that the ISO Board of Governors approves the proposed transmission reliability margin proposal, as described in the memorandum dated March 15, 2012; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.

BACKGROUND

This proposal responds to concerns raised by market participants. The ISO can reduce intertie schedules to manage unscheduled flow, topology issues, and simultaneous path flows only within operating hours, but the tariff does not allow the ISO to proactively manage these issues at its interties. Thus, a scheduling coordinator can be awarded an energy schedule on the intertie in the hour-ahead scheduling process, and the ISO must then cut the schedule in real-time to manage the identified issues, even if they can be anticipated before the start of the operating hour. This can be very frustrating to market participants as their awarded schedules are curtailed at times when they have little recourse in finding alternative sources or sinks of energy, and increases the manual work for the ISO operators, including procurement of imbalance energy to replace the curtailed schedules. In addition, because the calculations of available transfer capability are established before the beginning of the operating hour, the ISO's OASIS data currently continues to show that capacity is available even when the occasional curtailments in real-time have affected market schedules.

NERC's reliability standards allow transmission operators to use transmission reliability margin values in establishing the available transfer capability value for any given period for an intertie interconnection. Transmission reliability margin is a limitation on transmission transfer capacity that is necessary to provide reasonable assurance that the interconnected transmission network will be secure when accounting for various types of inherent uncertainty in system conditions.

The proposed tariff amendment would allow the ISO to impose a transmission reliability margin value shortly in advance of the hour-ahead scheduling process to account for three potential uncertainties: (1) unscheduled parallel loop flow; (2) uncertainties in transmission system topology (e.g., unplanned outages due to an encroaching fire or other circumstance); and (3) simultaneous path interactions. Each of these three elements of uncertainty is an expressly permitted use for transmission reliability margin under applicable NERC reliability standards. The ISO would employ transmission reliability margin only when these circumstances occur and only for the affected interties. While the use of transmission reliability margin will reduce the available scheduling capacity, it will have the benefit of reducing the frequency with which awarded schedules are curtailed in real time, within operating hours, as a result of these three elements of uncertainty.

Management is also proposing related tariff changes to better align the ISO's terminology and methodology to revised mandatory reliability standards which establish certain requirements for how transmission operators are to calculate available transfer capability for interties with other transmission operators.

The transmission reliability margin proposal will improve the transparency of the ISO's processes through publication of the specific adjustments made by the ISO, rather than market participants simply being informed of schedule curtailments. In addition to providing advance notice of the expected capacity reductions, at a time that allows market participants to make final adjustments to their own schedules, the ISO will publish the values for each of the three individual components that contribute to the ISO's transmission reliability margin calculation.

This proposal addresses limits that must be enforced as scheduling limits across the ISO's interties, and does not address operational procedures to conform the physical MW flow-based limits of transmission constraints in the market model within the ISO controlled grid to actual physical conditions. The ISO's operational procedures for conforming flow-based transmission constraints have been explained, and policy issues of data release have been addressed, in a previous stakeholder process.

PROPOSAL

The proposed tariff amendment will allow the ISO to designate a transmission reliability margin under specified circumstances, and better align the ISO's terminology with the terminology and methodology approved by NERC and FERC in the NERC MOD-001, MOD-008, and MOD-029 reliability standards that became effective on April 1, 2011. The impacts of these proposed changes will include: (1) changes to current OASIS posting practices for total transfer capability and available transfer capability values; (2) temporary reductions to permitted scheduling limits at certain intertie points in instances where a transmission reliability margin is applied; (3) correspondingly, less frequent real-time schedule curtailments at those intertie points in periods when a transmission reliability margin is in effect; and (4) better transparency for stakeholders concerning operator decision making in addressing intertie constraints.

The following discussion further reviews the basis for the three transmission reliability margin components that Management proposes to implement and provides an overview of how Management intends to calculate the transmission reliability margin value for each component.

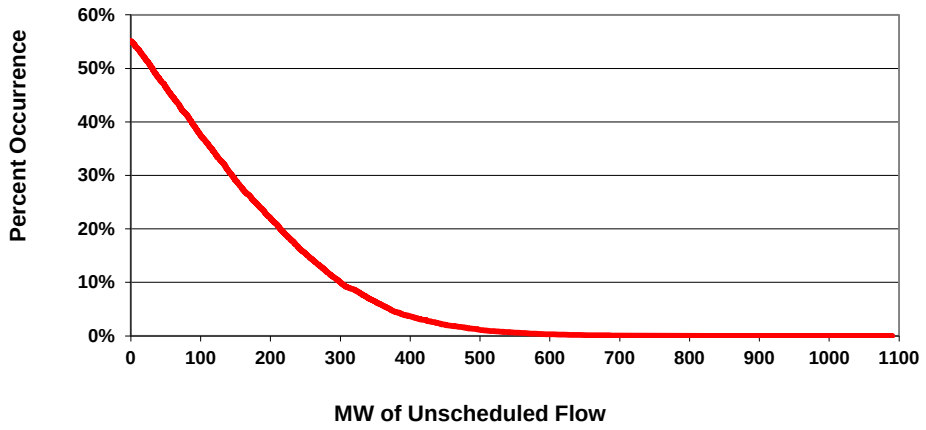
1. Unscheduled loop flow through the ISO grid from schedules between other balancing authority areas

Unscheduled flow is the difference between the scheduled and actual energy flow as it travels across the transmission grid throughout the WECC system. Because this grid essentially circles the region and the California-Oregon Intertie being a major path

within the grid, the California-Oregon Intertie is susceptible to significant amounts of unscheduled loop flow.

The following graph illustrates the frequency of occurrence of unscheduled flow on California Oregon Intertie, in the form of a duration curve showing that some amount of north-to-south unscheduled flow occurs 55% of the time, exceeds 200 MW 22% of the time, and exceeds 500 MW only 1% of the time.

California Oregon Intertie Unscheduled Flow
12/1/2010 to 11/30/2011



The combination of scheduled and unscheduled flows on a transmission path may cause the path to overload. In some hours, the unscheduled flow on California Oregon Intertie, combined with scheduled flow, results in schedule curtailments through WECC's Unscheduled Flow Mitigation Procedure. The California Oregon Intertie is the only WECC "qualified path" under ISO's control. . As the path operator, the ISO's responsibilities include keeping actual flows within its transfer capability limits using available tools including the Unscheduled Flow Mitigation Procedure which requires the ISO to accommodate unscheduled flow up to 5% of the total transfer capability. Without the use of transmission reliability margin, the ISO curtailing schedules to facilitate the required accommodation. Currently, the ISO reduces net schedules required by the Unscheduled Flow Mitigation Procedure by curtailing previously awarded hour ahead scheduling process schedules within the operating hour, which as discussed above is frustrating to market participants and imposes operational difficulty for the ISO. Under the transmission reliability margin proposal, the ISO would seek to avoid such operating hour curtailments by establishing, shortly before the hour ahead scheduling process run, a transmission reliability margin that is based on the expected impact of unscheduled flow anticipated to trigger an Unscheduled Flow Mitigation Procedure of step 2 or higher. If conditions and expected unscheduled flow are not forecasted to

trigger Step 2 or higher of the Unscheduled Flow Mitigation Procedure for that path, then the transmission reliability margin value for that hour would be zero.

This transmission reliability margin value would apply only for intertie paths that are subject to the curtailment procedures outlined in the Unscheduled Flow Mitigation Procedure, which as discussed above is limited to paths that meet the "qualified path" criteria set by WECC. Currently, California Oregon Intertie is the only ISO intertie path that meets WECC's "qualified path" criteria.

2. Forecast uncertainty in transmission system topology, such as forced or maintenance outages

In the event that there is uncertainty about the real-time availability of specific transmission resources due to potential forced outages, the ISO would manage risk and reliability by using a transmission reliability margin value up to the amount of the expected reduction in the path limit for the impacted interties. For example, a source of uncertainty in the available capacity of interties is the movement of fires near transmission lines or other transmission system resources. When a fire is approaching transmission facilities that may impact intertie capacity and the fire is expected to require a path limit reduction (i.e., a derate), the ISO would be permitted to impose a transmission reliability margin value for the intertie path in an amount up to the amount of the expected derate. Because these expected conditions generally can only be known close to real-time, the ISO would establish this transmission reliability margin component shortly before the hour ahead scheduling process run.

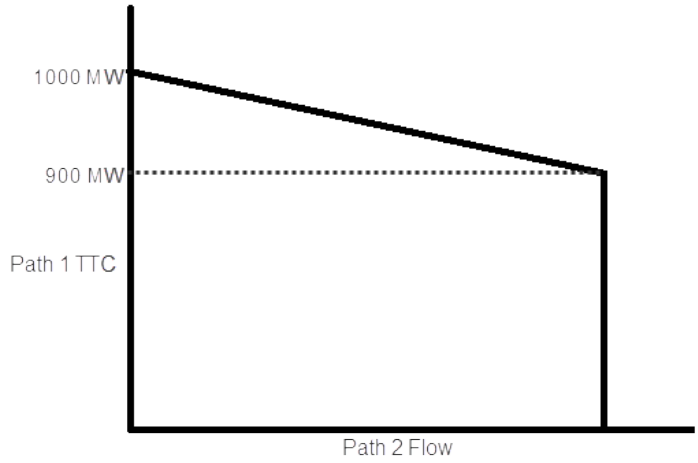
3. Simultaneous interactions between intertie paths into the ISO and paths through other balancing authority areas

In addition to transmission constraints that the ISO must enforce in the form of single-branch capacity limits and total flow on transmission corridors consisting of multiple parallel branches, the ISO must consider simultaneous interactions between transmission corridors. When the actual flow from market schedules on the affected transmission corridors is known with sufficient accuracy, such as within the ISO's balancing authority area, the ISO is able to enforce these limitations in both the day-ahead and real-time markets. Because of uncertainty in the actual real-time flow on interties, which are affected by sources and sinks that are not scheduled in the ISO's markets, the ISO does not enforce the constraints that affect interties in the day-ahead market. Rather, the impact of the interaction between multiple paths is currently accounted for with constraints that are 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 total transfer capability.

The ISO manages a number of interties that have simultaneous interactions with paths outside the ISO. In some cases, the ISO can anticipate real-time flows on non-ISO paths with reasonable certainty before the start of the operating hour. When the ISO can project that one or more interties will be constrained due to interactions with other

non-ISO paths, the ISO would utilize the transmission reliability margin mechanism to ensure there are no violations of the total transfer capability of the ISO's intertie. The amount of transmission reliability margin value assigned will be set to be no greater than the impact of the anticipated interaction with the non-ISO paths.

For example, if the limit of an ISO intertie depends on another path, shown below as Paths 1 and 2 respectively, and ISO can reasonably project the real-time flow on Path 2, the ISO would limit hour-ahead schedules through a transmission reliability margin applicable to Path 1. Limiting the schedules awarded in the hour-ahead scheduling process would avoid curtailing the awarded schedules on Path 1 within the operating hour.



In this example, the ISO would limit the transmission reliability margin reduction of Path 1's capacity to 100 MW if the ISO forecasts that Path 2 flow would be at its maximum.

POSITIONS OF THE PARTIES

This proposal responds to concerns raised by market participants, as well as to ISO operational needs. Stakeholder comments by Powerex and Southern California Edison support Management's proposal. NRG Energy supports Management's proposal and further asks for similar information to be provided for transmission constraints within the ISO, but as noted above, this was addressed in a previous stakeholder process. PG&E supports Management's proposal and suggests that the ISO could further address transmission scarcity on key transmission paths through the transmission planning process, but this is outside the scope of this stakeholder process.

MANAGEMENT RECOMMENDATION

Management requests approval of this proposal for implementing the transmission reliability margin mechanism as set forth in this memo. These revisions will position the ISO to effectively manage the available capacity of the ISO's interties, while reducing impacts on market participants that result from current procedures.

Board of Governors **March 22, 2012** **Decision on Transmission Reliability Margin**

Motion

Moved, that the ISO Board of Governors approves the proposed transmission reliability margin proposal, as described in the memorandum dated March 15, 2012; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.

Moved: Galiteva **Second: Bhagwat**

Board Action: **Passed**	Vote Count: **4-0-0**
Bhagwat	Y
Foster	Y
Galiteva	Y
Maullin	Y

Motion Number: 2012-03-G1

Attachment E

Draft Final Proposal for Transmission Reliability Margin

April 10, 2012

Draft Final Proposal for Transmission Reliability Margin

Provided in Support of Stakeholder Process to Consider Refinement of ISO Market Requirements

February 8, 2012

Draft Final Proposal for Transmission Reliability Margin

This Draft Final Proposal presents the ISO's proposed refinement to its documentation of operational practices, to provide greater clarity in the ISO's management of transmission constraints at interties in the real-time market. Currently, the ISO implements certain adjustments to intertie schedules within operating hours, which can be disruptive to market participants' commercial transactions when bilateral trades are curtailed, as well as to the ISO's operations when reduced imports must be replaced from other sources. Using a mechanism known as "Transmission Reliability Margin" (TRM), the ISO will be able to anticipate these transmission constraints in advance and reduce these issues by reflecting them in market processes before schedules are awarded in the hour-ahead scheduling process (HASP).[1]

The ISO's proposed hourly TRM values will be limited to the current day, no earlier than 2 hours in advance of dispatch, due to the types of operating conditions that they reflect, as discussed in this document. For the day-ahead market and longer time horizons, the ISO will set its TRM values at zero MW. Whenever a TRM value greater than zero is established due to the existence of uncertainty, the hourly TRM values will be set for the duration during which the uncertainty is expected to occur.

NERC standards require transmission operators to publish a TRM Implementation Document (TRMID) if they maintain a TRM. The TRMID identifies each component of uncertainty that the transmission operator considers in establishing its TRM and describes how it is calculated. The ISO currently maintains TRM values of zero at its interties,[2] but has determined that it can improve the transparency of its operations to stakeholders by adopting the use of TRM values in certain narrow circumstances as defined in this initiative. This initiative develops tariff revisions and the needed implementation documents .[3]

This Draft Final Proposal describes the operational issues that will be addressed in the ISO's TRMID, and presents the ISO's proposed TRMID and supporting tariff

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1 NERC standards also allow for use of a Capacity Benefit Margin (CBM) in calculations of available transfer capability, which would be an amount of capacity reserved for load serving entities to ensure access to generation from interconnected systems. The ISO does not maintain CBM or include any of the components of CBM to establish its TRM values, and the CBM value is set at zero. The ISO is not proposing to change this practice.

2 ISO tariff Appendix L, section L.1.6, currently states in part: "The CAISO does not use TRMs. The TRM value is set at zero."

3 The proposed tariff amendment consists primarily of amending Appendix L of the ISO Tariff, which sets forth the ISO's methodology for calculating Total Transfer Capacity (TTC), Available Transfer Capacity (ATC), and the various components of ATC, including Transmission Reliability Margin (TRM), to update these terms for consistency with NERC standards, allow the TRM to be non-zero, and describe the associated calculations.

revision. In preparing this Draft Final Proposal, the ISO has considered the stakeholder discussion and comments on the Issue Paper and Straw Proposal, and added explanations where needed. This Draft Final Proposal will then be the subject of additional stakeholder discussion and comments. The anticipated schedule for completion of this stakeholder process is as follows, leading to initial implementation by June 2012, and full implementation in Fall 2012:

December 21, 2011	Issue Paper and Straw Proposal published
January 10, 2012	Stakeholder conference call on Issue Paper and Straw Proposal
January 18, 2012	Stakeholder comments received on Issue Paper and Straw Proposal
February 8, 2012	Draft Final Proposal (including draft final tariff language) published
February 15, 2012	Stakeholder comments received on draft final tariff language
February 21, 2012	Stakeholder conference call on Draft Final Proposal and draft final tariff language
February 28, 2012	Stakeholder comments received on Draft Final Proposal and draft final tariff language
March 22-23, 2012	ISO Board of Governors meeting

This Draft Final Proposal first presents a background explanation of the proposed use of a TRM, and then summarizes the specific factors that the ISO proposes to include. Two attachments present the proposed TRMID and tariff revision.[4]

Background

The development of the ISO's new TRMID and associated tariff amendment involves revising the portion of the tariff's Appendix L involving TRM to allow the ISO to designate a TRM under specified circumstances, including in situations involving high volumes of parallel loop flow, uncertainty in transmission topology, and simultaneous path interactions. The amendment also involves revising Appendix L's terminology so that it is better aligned with the terminology and methodology approved by NERC and FERC in the NERC MOD-001 and MOD-029 reliability standards that became effective on April 1, 2011. The impacts of these proposed changes would include: (1) changes to current OASIS posting practices for total transfer capability (TTC) and available transfer capability (ATC) values; (2) temporary reductions to permitted scheduling limits at certain intertie points in instances where a TRM is applied; (3) correspondingly, less frequent real-time schedule curtailments at those intertie points in periods when a TRM is in effect; and (4) better transparency for stakeholders concerning operator decision making in addressing intertie constraints.

[4] The attachments to this Draft Final Proposal include minor updates to the draft TRMID and tariff language in the Issue Paper and Straw Proposal.

These revisions respond to concerns raised by market participants. The existing authority allows the ISO to cut interties to manage unscheduled flow, topology issues and simultaneous path flows only within operating hours, and does not allow the ISO to proactively manage these issues at its interties. Thus, a scheduling coordinator can be awarded an energy schedule on the intertie in HASP, and the ISO must then cut the schedule in real-time to manage the identified issues, even if they can be anticipated before the start of the operating hour. This can be very frustrating to market participants as their awarded schedules are curtailed at times when they have little recourse in finding alternative sources or sinks of energy, and increases the manual work for the ISO's operators, including procurement of imbalance energy to replace the curtailed schedules. In addition, because the ATC calculations are established before the beginning of the operating hour, the ISO's OASIS data currently continues to show the availability of positive ATC values even when the occasional curtailments in real-time have affected market schedules.

NERC's reliability standards allow transmission operators to use TRM values in establishing the ATC value for any given period for an intertie interconnection point (called an "ATC Path" in NERC's terminology). TRM is an amount of transmission transfer capacity that is necessary to provide reasonable assurance that the interconnected transmission network will be secure when accounting for various types of inherent uncertainty in system conditions. NERC standard MOD-008-1 recognizes a number of components of uncertainty may be used in establishing TRM:

- 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,
- 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, and
- Inertial response and frequency bias.

The ISO proposes to implement TRM for only the first three of these items.[5]

[5] It is common for ISOs to use only selected TRM components:
- Midwest ISO uses two TRM components: uncertainty and reserve sharing. The uncertainty component is used 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, but TRM can be released.
- New England ISO sets its TRM to account for inertial impact from loss of HVDC line imports.
- PJM's TRM has two components: load forecast error and allowance for parallel path flow (loop flow). To account for load forecast error as a TRM component, the percentage difference in flow

The ISO does not currently have tariff authority to establish and impose TRM values on intertie ATC Paths under Appendix L of the Tariff. The proposed tariff amendment would revise Appendix L to allow the ISO to impose a TRM value in the real-time timeframe (shortly in advance of HASP) to account for three potential uncertainties: (1) unscheduled parallel loop flow; (2) uncertainties in transmission system topology (e.g., unplanned outages due to an encroaching fire or other circumstance); and (3) simultaneous path interactions. Each of these three elements of uncertainty is an expressly permitted use for TRM under applicable NERC reliability standards. The ISO would employ TRM only when these circumstances occur and only for the affected ATC Paths. While the use of TRM will reduce the capacity available for scheduling in the HASP by the amount of the TRM, it will have the benefit of reducing the frequency with which awarded schedules are curtailed in real time, within operating hours, as a result of these three elements of uncertainty.

The amendment will also improve the transparency of the ISO's processes through publication of the specific adjustments made by the ISO, rather than market participants simply being informed of schedule curtailments. In addition to providing advance notice of the expected capacity reductions, at a time that allows market participants to make final adjustments to their own schedules, the ISO will publish the values for each of the three components that contribute to the ISO's TRM calculation.

Related tariff changes result from NERC's revised MOD-001 and MOD-029 reliability standards, which establish certain requirements for how transmission operators (such as the ISO) are to calculate ATC for ATC Paths with other transmission operators. Among other requirements, NERC's standards require that the ATC calculation be made by subtracting specific identified elements from the TTC of the ATC Path. The ISO's current Appendix L contains an algorithm for calculating ATC, but relies upon a starting point that the ISO refers to as Operating Transfer Capability (OTC). Although the OTC starting point is effectively equivalent to TTC mathematically in NERC's terminology, Appendix L will be updated to remove the references to OTC and instead rely upon the TTC terminology approved by NERC. References elsewhere in the tariff to OTC will also be updated to refer to TTC.

This proposal addresses limits that must be enforced on schedules across the ISO's interties, and does not address operational procedures to conform the limits of transmission constraints that apply to physical MW flows within the ISO controlled grid (sometimes known as "biasing" these limits). The ISO's operational procedures for conforming flow-based transmission constraints have been explained, and policy issues of data release have been addressed, in a previous stakeholder process.[6]

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on the flowgates with changes in load is applied to flowgates as a percentage of their rating. To account for loop flow as a TRM component, the percentage of difference in flow on the flowgates is applied to flowgates as a percentage of rating.

- SPP's TRM is utilized for reserve sharing.

[6] Supporting documentation is available in a number of sources. Technical Bulletin 2009-07-02 explains the ISO's operating practices and is available at http://www.caiso.com/Documents/TechnicalBulletin-Process_BiasingFlowgate-NomogramOperatingLimits_DayAheadandRealTimeMarkets.pdf. The ISO Department of Market Monitoring (DMM) quarterly report for Q3 of 2009 further explains these practices and is available at http://www.caiso.com/2457/2457987152ab0.pdf - see section 5. DMM's annual reports for

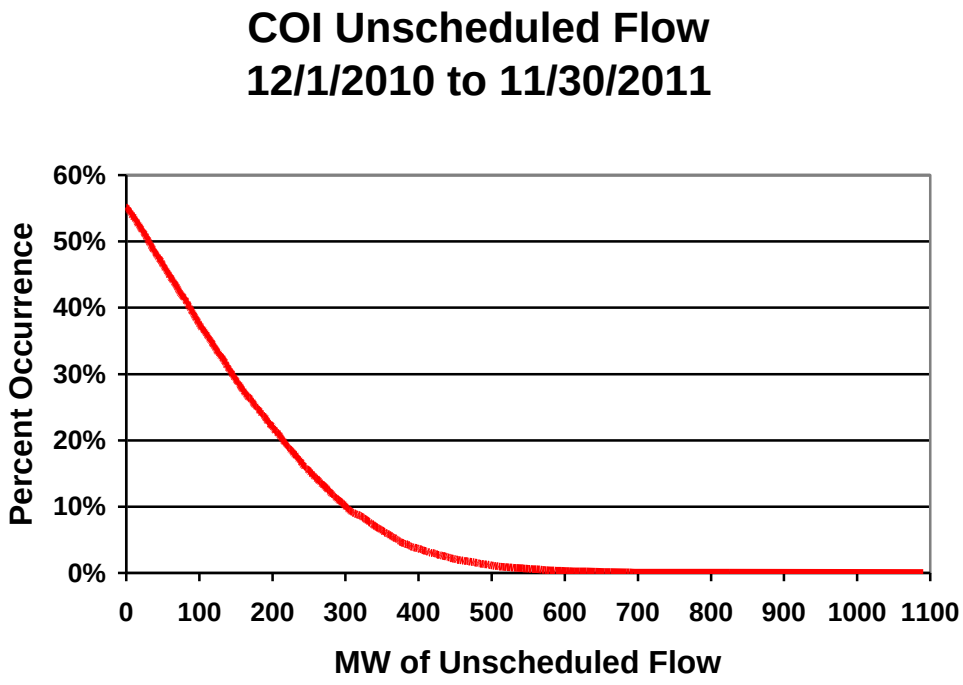
Specific Factors to be Included in TRM

The following discussion further reviews the basis for the three TRM components that the ISO proposes to implement.

Real-time curtailment of import schedules on COI after HASP awards are published, due to unscheduled flow

The position of the ISO in the overall WECC transmission grid is such that the California-Oregon Intertie (COI) is susceptible to significant amounts of unscheduled loop flow between sources and sinks elsewhere in WECC. Unscheduled flow is the difference between the scheduled flow and the actual flow. The following graph illustrates the frequency of occurrence of unscheduled flow on COI, in the form of a duration curve showing that some amount of north-to-south unscheduled flow occurs 55% of the time, exceeds 200 MW 22% of the time, and exceeds 500 MW only 1% of the time.

2009 and 2010 contain further information and are available at http://www.caiso.com/Documents/2009AnnualReportonMarketIssuesandPerformance.pdf (see section 5.6) and http://www.caiso.com/Documents/2010AnnualReportonMarketIssuesandPerformance.pdf (see section 5.6). The Draft Final Proposal for Data Release Phase 1, concerning policy development for availability of data concerning transmission constraints, is at http://www.caiso.com/Documents/RevisedDraftFinalProposal-TransmissionConstraints-Redlined08-Jan-2010.pdf, and resulted in the ISO's filing in FERC docket ER10-1229. The Draft Final Proposal for Phase 3 also discussed transmission limits in section 8.1.4 and is at http://www.caiso.com/Documents/DraftFinalProposal-DataReleaseandAccessibilityPhase3MarketEfficiency.pdf. The ISO's filing in ER10-1229 is at http://www.caiso.com/Documents/May7_2010Amendmentimplementinginformationre-transmissionconstraintsindocketno_ER10-1229-000_ER09-1542-001.pdf. A pertinent tariff section for this discussion is section 6.5.7. FERC's decision in ER10-1229 is at http://www.caiso.com/Documents/July12_2010Orderacceptingtariffrevisionsindocketno_ER10-1229-000_transmissionconstraints_.pdf. The monthly report implementing tariff section 6.5.7 (see the section titled "Adjustments of Transmission Constraints") is in the monthly Market Performance Metric Catalog, at http://www.caiso.com/informed/Pages/BulletinsReportsStudies/Default.aspx, under "Market performance reports", "Market performance metric catalog", for example at http://www.caiso.com/Documents/MarketPerformanceMetricCatalogNovember2011.pdf.)



The combination of scheduled and unscheduled flows on a transmission path may cause the path to overload. In some hours, the unscheduled flow on COI, combined with scheduled flow, results in schedule curtailments through WECC's Unscheduled Flow Mitigation Procedure (USFMP).

The details of the USFMP are stated in WECC's Unscheduled Flow Reduction Guideline, which is set forth as Appendix 3510A to the ISO's Operating Procedure 3510, which implements WECC's procedure.[7] Among the corridors for which WECC has formally established ratings, COI is Path 66 and consists of the two 500 kV lines from Malin to Round Mountain (in the ISO's balancing authority area) and one 500 kV line from Captain Jack to Olinda (in the Balancing Area of Northern California, which is managed by SMUD). Path 66 is recognized as a "Qualified Path" under the USFMP, having met criteria of having at least 100 hours in the most recent 36 months with actual flow exceeding 97 percent of its TTC, and having energy schedules curtailed because of unscheduled flow. As path operator for Path 66 under the USFMP, the ISO's responsibilities include monitoring scheduled and unscheduled flows on the path, keeping actual flows within its transfer capability using available tools including the USFMP when its implementation criteria are met, and coordinating accommodation of unscheduled flow on the qualified path.

Accommodation is a reduction made to schedules on a Qualified Path to allow for unscheduled flow across that path, or to keep its flow within operating limits. Effectively,

[7] ISO Operating Procedure 3510, its Appendix 3510A, and related documents are available at http://www.caiso.com/Documents/3510.pdf, http://www.caiso.com/Documents/3510A.pdf, and http://www.caiso.com/rules/Pages/OperatingProcedures/Default.aspx, repectively.

accommodation is a reduction to the scheduling capacity of that Qualified Path, since actual schedules across the path are reduced below the established path capacity.

The nine steps of the USFMP state the sequence of the measures to be taken by the path operator of the Qualified Path, and four levels of contributing schedule curtailment as steps to be taken by other WECC member systems in response to notifications made by the path operator. When there is, or it is anticipated that there will be, a scheduling limitation due to unscheduled flow, the path operator and those scheduling across the path are required first to accommodate a minimum level of unscheduled flow. This accommodation is achieved by ensuring that the net schedules across the Qualified Path are reduced below the available TTC by the greater of 50 MW or 5 percent of the TTC. When the path operator has met this accommodation requirement, it may request additional relief under the USFMP, including the coordinated operation of certain controllable devices or curtailments by others who are scheduling across other transfer paths. In USFMP step 1 (as well as later steps), the ISO would ask the WECC reliability coordinator to request operation of phase shifters (located in Utah) for maximum relief of north-to-south flow on Path 66. In USFMP step 2, the path operator verifies that schedules on the Qualified Path do not exceed 95% of the path limit (including, for Path 66, that BANC's schedules are below 95% of its 1/3 share of the Path 66 Limit). Additional steps of the USFMP are available if the path operator determines that the actual flow on the Qualified Path remains equal to or greater than 95% of the current TTC, as detailed in Operating Procedure 3510 and its appendices.

When the ISO needs to implement the UFMP in real-time, within the operating hour, the resulting curtailments to market schedules require market participants to adjust other schedules outside of their normal time horizons, and the ISO faces significant manual adjustments at a time when its operators are trying to restore the COI flow within its limits. Within its conformance with the USFMP, the ISO instead can adjust the COI limit as it issues market awards in HASP, through using the TRM. In the event that the ISO forecasts, based on currently observed parallel path (loop flow) conditions and projected scheduled flow for an upcoming operating hour, that parallel path (loop flow) impacts will occur in real-time over the qualified ATC Path in amounts sufficient to trigger Step 2 or higher of the USFMP for that path, the ISO may establish a TRM value for that path up to the amount that would be required to be curtailed in real-time under the applicable step of the USFMP.

The TRMID illustrates this using the following example. If:

- An ATC Path is rated at 1000 MW,
- The path is a qualified path for the USFMP,
- Unscheduled flow plus scheduled flow is forecasted to be above the path's TTC,
- Unscheduled flow is forecasted to exceed 5% of the path's applicable limit, and
- The ISO forecasts that it will need to invoke USFMP step 2 in real-time absent application of a TRM,

then the ISO may utilize up to 5% of path's TTC as the TRM value for the impacted path for the next available HASP run.

When the ISO forecasts that it will need to invoke USFMP step 6 or 7 in real-time, absent application of a TRM, the ISO would use up to 6% of the path's TTC as the TRM value for the next available HASP run. When the forecast is to invoke USFMP step 8 or 9, the ISO would use up to 7% of TTC as the TRM value.

The forecasting of unscheduled flow that is involved in USFMP can only be done close to real-time, so the applicability of this TRM component is in the values published for HASP.

Uncertainty of transmission system availability due to threatened or actual fires

Another source of uncertainty in the available capacity of interties is the movement of fires near transmission lines or other transmission system resources. In the event that there is uncertainty about the real-time availability of specific transmission resources due to potential forced outages, the ISO would manage risk and reliability by using a TRM value up to the amount of the expected reduction in the path limit for the impacted ATC Paths.

The TRMID illustrates this using the following example. If an ATC Path is rated at 1000 MW when the system is intact, but approaching fires mean that there is an uncertainty of its full availability due to a potential forced outage that may derate the ATC Path by 200 MW (i.e., to a new rating of 800 MW), then the ISO would utilize up to 200 MW of TRM values for the time period during which that uncertainty exists.

These expected conditions can only be known close to real-time, so the applicability of this TRM component is in the values published for HASP.

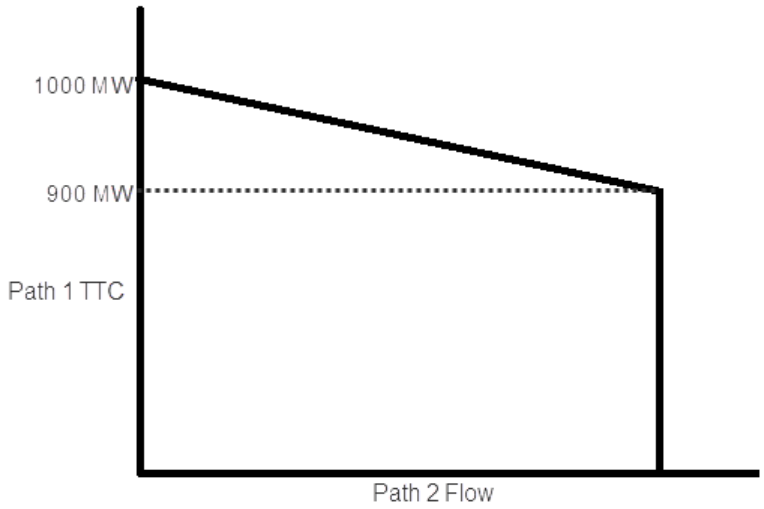
Simultaneous interaction between different paths that may result in reduction of the TTC for the ISO path

In addition to transmission constraints that the ISO must enforce in the form of single-branch capacity limits and total flow on transmission corridors consisting of multiple parallel branches, the ISO must consider simultaneous interactions between transmission corridors, in the form of nomograms. When the actual flow from market schedules on the components of a nomogram is known with sufficient accuracy, such as within the ISO's balancing authority area, the ISO is able to enforce these nomograms in both the day-ahead and real-time markets. Because of uncertainty in the actual real-time flow on interties, which are affected by sources and sinks that are not scheduled in the ISO's markets, the ISO does not enforce nomogram constraints that affect interties in the day-ahead market. Rather, the impact of the interaction between multiple ATC Paths is currently 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 TTC.

There are, however, a number of ATC Paths that are managed by the ISO and have simultaneous interactions with non-ISO ATC Paths. In some cases, the real-time

flow on non-ISO ATC Paths can be anticipated with reasonable certainty before the start of the operating hour. In the event that the ISO can project that one or more ISO ATC Paths will become constrained due to interactions with another non-ISO ATC Path, TRM may be utilized to ensure there are no violations of the TTC of the ISO's ATC Path. The amount of TRM value assigned will be set to be no greater than the impact of its interaction with the non ISO ATC Path.

The TRMID illustrates this using the following example. If an ATC Path within the ISO is found to be dependant with another non-ATC Path, shown below as Paths 1 and 2 respectively, and ISO can reasonably project the real-time flow on Path 2, the ISO would limit HASP schedules through a TRM applicable to Path 1. Limiting the schedules awarded in HASP would avoid curtailing the awarded schedules on Path 1 within the operating hour, to the extent that the ISO can anticipate the real-time operating conditions.



In this example, the ISO would limit the TRM value for Path 1 to 100 MW if the ISO forecasts that Path 2 flow would be at its maximum.

These expected conditions can only be known close to real-time, so the applicability of this TRM component is in the values published for HASP.

Summary of Stakeholder Comments and ISO Responses

Following the January 10, 2012, stakeholder conference call concerning the Issue and Straw Proposal, the ISO received comments from stakeholders, which generally support the ISO's proposals. The ISO has added explanations (including the following table) as needed to address issues identified by these comments. The following table summarizes the stakeholder comments that were submitted following the ISO's Issue Paper and Straw Proposal, and the ISO responses. The full text of the stakeholder comments is available at http://www.caiso.com/Documents/Transmission%20reliability%20margin%20-%20stakeholder%20comments.

Stakeholder	Summary of Stakeholder Comment	ISO Response
NRG Energy	NRG appreciates the ISO's efforts to provide transparency regarding holding intertie transmission capacity to deal with uncertainty through the use of a TRM. NRG remains concerned about the lack of transparency regarding the similar practice of conforming the limits of internal transmission constraints to deal with uncertainty as well as the difference between market model results and actual flows. As indicated in the ISO's monthly market performance metric catalogs, the number of paths whose limits were conformed in any of the DA, RTUC and RTD markets increased from 39 in Jan. 2011 to 87 in July 2011, decreasing only to 72 in Nov. 2011. Moreover, in July 2011, the limits on Path 26 were conformed in all hours at substantial levels. Market participants do not know how these adjustments affect market prices, or until well after the fact that the ISO has even applied these adjustments. The ISO views conforming internal constraints to be outside the scope of applying TRMs to intertie scheduling points, but NRG urges additional transparency in the future.	The ISO appreciates NRG's support for reducing uncertainty through the TRM. The issue of conforming internal constraints concerns flow-based constraints rather than the scheduling constraints that are addressed in this stakeholder process, and TRM does not apply to these internal constraints. The ISO has addressed data release concerning the flow-based constraints in a previous stakeholder process. As it does concerning all aspects of market operations, the ISO will continue to identify and implement appropriate ways in which it can increase market transparency.
Pacific Gas and Electric Company (PG&E)	PG&E appreciates the opportunity to participate in the stakeholder process for the TRM Issue Paper and Straw Proposal. PG&E understands the benefits of anticipating transmission constraints in advance and reflect their impacts in market processes before schedules are awarded in HASP. PG&E generally supports the ISO's TRM proposal. In addition, PG&E suggests another way in which the ISO could help address operational issues related to transmission scarcity on key transmission pathways. The ISO's proposed use of a non-zero	The ISO appreciates PG&E's support for the TRM proposal. As discussed in the Issue Paper and Straw Proposal, and in this Draft Final Proposal, the ISO proposes to limit the use of TRM at this time to the RT and HASP market timeframe, up to two hours before the start of the operating hour, and not to use TRM in the DA market. The ISO appreciates PG&E's suggestion that

	TRM has merit. Anticipating and attenuating potential market disruptions caused by uncertainty is consistent with PG&E's practices prior to the ISO taking operational control of the system. Accounting for uncertainty in transfer capability seems to smooth RTM prices by ensuring unit commitment to fill in for lost inter-tie capacity. The ISO's two-hour timeframe seems reasonable, considering the time required to fit available short start units into the STUC timeframe. It also ensures that the TRM is implemented prior to the close of RTM and HASP. Uncertainties generally increase with the timeframe, so increased time would only add to the uncertainty and possibly excessive or inadequate TRM declarations. For these reasons, PG&E cannot support TRM in IFM at this point. In its issue paper, the ISO notes the disadvantages operating the grid with little or no transmission reserve. [Page 4, ISO "Issue Paper and Straw Proposal for Transmission Reliability Margin" dated December 21, 2011] In addition to near real time operational mitigation measures, the ISO should consider other longer-term solutions that could be realized through the transmission planning process. For example, building reserve capacity into key portions of the grid could further mitigate challenges and frustrations. With a modest margin of transmission capacity built into the system, the ISO could lessen its burden of forecasting uncertainties and reduce frustration among market participants adversely impacted by ISO estimates of RT flows. Other benefits of planning for reserve transmission capacity include lower energy and AS prices, increased operating flexibility, and flexibility in procuring renewable resources, at a modest cost compared to renewable	additional flexibility could also be provided through the transmission planning process. However, this suggestion goes beyond the scope of this stakeholder process, and the ISO encourages PG&E to offer its proposal in other stakeholder processes related to transmission planning, as appropriate.

	and non-renewable procurement.	
Powerex	Powerex supports the ISO's efforts in refining its operational practices, providing greater clarity in the management of transmission constraints in the real-time markets, and seeking the tariff authority from FERC. Powerex supports the ISO's proposal to limit the reasons for using TRM to unscheduled flow, uncertainty of transmission system availability, and simultaneous interaction between different paths. Powerex also strongly supports the proposal to limit the use of TRM to the current day, no earlier than 2 hours in advance of dispatch.	The ISO appreciates Powerex's support for the TRM proposal.
Southern California Edison (SCE)	SCE's requested clarifications concerning biasing and intertie applicability should be part of the proposal. The changes in intertie scheduling like dynamic transfer and TRM will benefit from a more predictable curtailment methodology for self-scheduled resources. The ISO should clarify its intent to use TRM on all interties and speak to the level of TRM expected at each intertie. The ISO proposal focuses on the problem of loop flow at COI, but implies that TRM can be used at all interties. In the updated proposal the ISO should clarify whether TRM may be reserved by operators on all interties, and how its application is limited to cases where ISO projections of loop flow, parallel path interactions, and uncertainty in topology are projected threats to reliability. TRM and path biasing appear, on the surface, to serve similar purposes. Clarifying the similarities differences will reduce confusion and support the proposal. The ISO should examine how TRM might eliminate or reduce biasing in RT. The question of intertie curtailment priorities should be reopened. TRM is a	The scheduling priority of various types of self-schedules has been established in accordance with FERC decisions, after consideration in stakeholder processes, and is documented in the ISO's Business Practice Manual, including but not limited to sections 2.5.2, 5.1, 6.6, and 7.5 of the Business Practice Manual for Market Operations. The Issue Paper and Straw Proposal, and this Draft Final Proposal, present the TRM as being applicable to all interties. Only the provisions for unscheduled flow are currently applicable only to COI, which is because this component is founded on the WECC's Unscheduled Flow Mitigation Procedure, which in turn currently applies to only six Qualified Paths in WECC, of which only COI is under ISO management.

	partial solution to the on-going, yet unresolved need for an orderly and predictable intertie curtailment methodology.	The intertie scheduling limits to which TRM will apply are a separate type of constraint from the flow-based limits that are subject to conforming to actual physical conditions (sometimes referred to as “biasing”). TRM does not apply to the flow-based constraints.
SCE	The ISO proposes to implement TRM for three highlighted items (allowances for parallel path loop flow impacts, forecast uncertainty in transmission system topology, and allowances for simultaneous path interactions), but not for others that may be used to establish TRM. What is ISO's justification to implement TRM only for the above three highlighted items? As the Renewable Portfolio Standard (RPS) reaches 33%, the renewable energy will have higher impact on TRM. What is the reason not to consider the impact of the uncertainty caused by the high penetration of renewable energy?	As discussed in the January 10, 2012, stakeholder conference call, the ISO does not anticipate real-time operating conditions that would lead to using a TRM for the remaining items that could be used in a TRM. The ISO has good knowledge of actual demand during the real-time market, and at any rate would not limit import schedules because of uncertainty in ISO demand, or of the distribution of demand within the ISO. Similarly, the ISO would offset variations in generation dispatch by dispatching other generation within the ISO, not by limiting import schedules. The ISO schedules operating reserve awards during the day-ahead market to meet 100% of its expected obligation, including intertie resources to the extent they are the most economical resources, and would not limit import schedules to allow for later procurement. The ISO does not have reserve sharing arrangements with other BAAs that would require intertie capacity

		reservations. The ISO meets its inertial response and frequency bias requirements using internal resources, and again no intertie capacity reservation is required.

Attachment 1

Draft Transmission Reliability Margin Implementation Document

1.0 Purpose

The California Independent System Operator Corporation (ISO), as a registered Transmission Operator (TOP)[8] 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, describes how TRM is calculated and allocated for each component is used to establish a TRM value 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 ISO OASIS at http://www.caiso.com/235f/235fcbd556310.html. (MOD-008-1 R2)

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

The ISO considers the following components of uncertainty in establishing for ATC Paths located at intertie points:

- 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.

3.0 Description of Method Used to Calculate and Allocate TRM for Each Component of Uncertainty (MOD-008-1 R1.2)

The ISO 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).

[8] 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.

In the event that there is uncertainty about the availability in Real Time[9] of certain Transmission system resources due to potential Forced Outages, the ISO 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 ISO would utilize up to 200 MW of TRM values for the time period during which that uncertainty exists.

3.2 Allowances for parallel path (loop flow) impacts.

In the event that the ISO forecasts, based on currently observed parallel path (loop flow) conditions and projected scheduled flow for an upcoming Operating Hour[10], 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 WECC Unscheduled Flow Mitigation Procedure (WECC USF Procedure)[11] for that Path, the ISO 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 WECC USF Procedure.

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

- Unscheduled flow + Real Time flow is forecasted to be above Path TTC, ***And***
- Unscheduled flow is forecasted to be > 5% of the Path's Unscheduled flow applicable limit, ***And***
- It is expected based on the forecast that WECC USF Procedure Step 2 will need to be invoked in Real Time absent application of a TRM.

- ***Then***
  - The ISO may 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).[12]

When it is expected based on the forecast that WECC USF Procedure Step 6 or 7 will need to be invoked in Real Time absent application of a TRM, the ISO will

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9 "Real Time" is defined in Appendix A of the ISO Tariff.

10 "Operating Hour" is defined in Appendix A of the ISO Tariff.

11 The WECC USF Procedure followed by the ISO is set forth in ISO Operating Procedure 3510, which is available on the ISO's public website. The ISO's WECC USF Procedure implements the WECC Unscheduled Flow Reduction Guideline, which is set forth as Appendix 3510A to Operating Procedure 3510.

12 The "Hour Ahead Scheduling Process (HASP)" is defined in Appendix A of the ISO Tariff.

utilize up to 6% of Path TTC as the TRM value for the impacted Path for the next available HASP run.

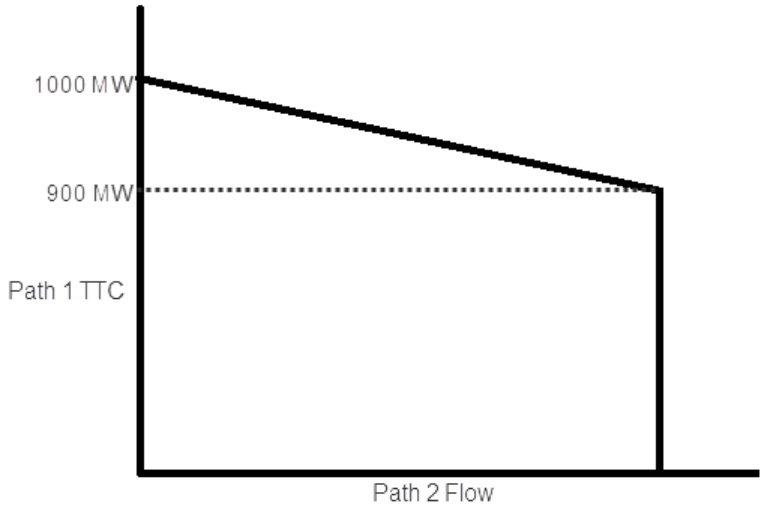
When it is expected based on the forecast that WECC USF Procedure Step 8 or 9 will need to be invoked in Real Time absent application of a TRM, the ISO will utilize up to 7% of Path TTC as the TRM value for the impacted Path for the next available HASP run.

3.3 Allowances for simultaneous path interactions.

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

Example: If an ATC Path within ISO is found to be dependant with other ATC Paths as seen in Figure Below:



In the example above, the ISO may utilize up to 100 MW of TRM value in Path 1 if the ISO 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 ISO 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 ISO 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 ISO does not maintain Capacity Benefit Margin (CBM). Therefore, the ISO does not include any of the components of CBM establish 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 ISO documentation associated with TRM can be found atISO Tariff, Appendix L. The ISO Tariff is available on the ISO's public website.

7.0 Posting TRM Values (MOD-008 R5)

The TRM values established by the ISO will be made public and posted in OASIS.

8.0 Revisions to TRMID

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

Attachment 2

Blackline of Revisions to the Tariff

Appendix L: Method To Assess Available Transfer Capability

L.1 Description of Terms

The following descriptions augment existing definitions found in Appendix A "Master Definitions Supplement."

L.1.1 Available Transfer Capability (ATC) is a measure of the transfer capability in the physical transmission network resulting from system conditions and that remains available for further commercial activity over and above already committed uses.

ATC is defined as the Total Transfer Capability (TTC) less applicable operating Transmission Constraints due to system conditions and Outages (i.e., OTC), less the Transmission Reliability Margin (TRM) ~~(which value is set at zero),~~ less the sum of any unused existing transmission commitments (ETComm) (i.e., transmission rights capacity for ETC or TOR), less the Capacity Benefit Margin (CBM) (which value is set at zero), less the Scheduled Net Energy from Imports/Exports, less Ancillary Service capacity from Imports.

L.1.2 Total Transfer Capability (TTC) is defined as the amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission system by way of all transmission lines (or paths) between those areas~~.~~ under specified system conditions. In collaboration with owners of rated paths and the WECC Operating Transfer Capability Policy Committee (OTCPC), the CAISO utilizes rated path methodology to establish the TTC of CAISO Transmission Interfaces.

~~**L.1.3 Operating Transfer Capability (OTC)** is the TTC reduced by any operational Transmission Constraints caused by seasonal derates or Outages. CAISO Regional Transmission Engineers (RTE) determine OTC through studies using computer modeling.~~

L.1.3 .

L.1.4 Existing Transmission Commitments (ETComm) include Existing Contracts and Transmission Ownership Rights (TOR). The CAISO reserves transmission capacity for each ETC and TOR based on TRTC Instructions the responsible Participating Transmission Owner or Non-Participating Transmission Owner submits to the CAISO as to the amount of firm transmission capacity that should be reserved on each Transmission Interface for each hour of the Trading Day in

accordance with Sections 16 and 17 of the CAISO Tariff. The types of TRTC Instructions the CAISO receives generally fall into three basic categories:

- The ETC or TOR reservation is a fixed percentage of the TTC on a line, which decreases as the TTC is derated (ex. TTC = 300 MW, ETC fixed percentage = 2%, ETC = 6 MWs. TTC derated to 200 MWs, ETC = 4 MWs);

- The ETC or TOR reservation is a fixed amount of capacity, which decreases if the line's TTC is derated below the reservation level (ex. ETC = 80 MWs, TTC declines to 60 MW, ETC = ~~OTC~~TTC or 60 MWs; or

- The ETC or TOR reservation is determined by an algorithm that changes at various levels of TTC for the line (ex. Intertie TTC = 3,000 MWs, when line is operating greater than 2,000 MWs to full capacity ETC = 400 MWs, when capacity is below 2000 MWs ETC = ~~OTC~~TTC/2000* ETC).

Existing Contract capacity reservations remain reserved during the Day-Ahead Market and Hour-Ahead Scheduling Process (HASP). To the extent that the reservations are unused, they are released in real-time operations for use in the Real-Time Market.

Transmissions Ownership Rights capacity reservations remain reserved during the Day-Ahead Market and HASP, as well as through real-time operations. This capacity is under the control of the Non-Participating Transmission Owner and is not released to the CAISO for use in the markets.

L.1.5 ETC Reservations Calculator (ETCC). The ETCC calculates the amount of firm transmission capacity reserved (in MW) for each ETC or TOR on each Transmission Interface for each hour of the Trading Day.

- **CAISO Updates to ETCC Reservations Table.** The CAISO updates the ETC and TOR reservations table (if required) prior to running the Day-Ahead Market and HASP. The amount of transmission capacity reservation for ETC and TOR rights is determined based on the ~~OTC~~TTC of each Transmission Interface and in accordance with the curtailment procedures stipulated in the existing agreements and provided to the CAISO by the responsible Participating Transmission Owner or Non-Participating Transmission Owner.

- **Market Notification.** ETC and TOR allocation (MW) information is published for all Scheduling Coordinators which have ETC or TOR scheduling responsibility in advance of the Day-Ahead Market and HASP. This information is posted on the Open Access Same-Time Information System (OASIS).

- For further information, see CAISO Operating Procedure M-423, Scheduling of Existing Transmission Contract and Transmission Ownership Rights, which is publicly available on the CAISO Website.

~~**L.1.6 Transmission Reliability Margin (TRM)** is that amount of transmission transfer capability necessary reserved in the Day-Ahead Market (DAM) to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions. This DAM implementation avoids Real-Time Schedule curtailments that would otherwise be necessary due to:~~

- ~~Demand Forecast error~~
- ~~Anticipated uncertainty in transmission system topology~~
- ~~Unscheduled flow~~
- ~~Simultaneous path interactions~~
- ~~Variations in Generation Dispatch~~
- ~~Operating Reserve actions~~

~~The level of TRM for each Transmission Interface will be determined by CAISO Regional Transmission Engineers (RTE).~~

~~The CAISO does not use TRMs. The TRM value is set at zero.~~

L.1.6 Transmission Reliability Margin (TRM) is ~~the~~ an amount of transmission transfer capability reserved at a CAISO Intertie point that is 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 CAISO uses TRM at Intertie points to account for the following NERC-approved components of uncertainty:

- Forecast uncertainty in transmission system topology, including forced or unplanned outages or maintenance outages.
- Allowances for parallel path (loop flow) impacts, including unscheduled loop flow.
- Allowances for simultaneous path interactions.

The CAISO establishes hourly TRM values for each of the applicable components of uncertainty prior to the Market Close of the HASP. The CAISO does not use TRM (i.e., TRM values for Intertie points are set at zero) during the beyond day-ahead and pre-schedule (i.e., planning) time frame indentified in R.1.3.3 of NERC Reliability Standard MOD-008-1. A positive TRM value for a given hour is set only if one or more of the conditions set forth below exists for a particular Intertie point. Where none of these conditions exist, the TRM value for a given hour is set at zero.

The methodology the CAISO uses to establish each component of uncertainty is as follows:

The CAISO uses the transmission system topology component of uncertainty to address a potential ATC path limit reduction at an Intertie resulting from an emerging event, such as an approaching wildfire, that is expected to cause a derate of one or more transmission facilities comprising the ATC path. When the CAISO, based on existing circumstances, forecasts that such a derate is expected to occur, the CAISO may establish a TRM value for the affected ATC path in an amount up to, but no greater than, the amount of the expected derate.

The CAISO uses the parallel path component of uncertainty to address the impact of unscheduled flow (USF) over an ATC path that is expected, in the absence of the TRM, to result in curtailment of Intertie Schedules in Real Time as a result of the requirements established in WECC's applicable USF mitigation policies and procedures (WECC USF Policy). When the CAISO forecasts, based on currently observed USF conditions and projected scheduled flow for an upcoming Operating Hour(s), that in the absence of a TRM, scheduled flow will need to be curtailed in Real Time under the applicable WECC USF Policy, the CAISO may establish a TRM for the ATC path for the applicable hour(s) in an amount up to, but no greater than, the forecasted amount that is expected to be curtailed in Real Time pursuant to the WECC USF Policy. The CAISO uses snapshots of USF data from its EMS in establishing TRM values for this component of uncertainty.

The CAISO uses the simultaneous path interactions component of uncertainty to address the impact that transmission flows on an ATC path located outside the CAISO's Balancing Authority Area may have on the transmission transfer capability of an ATC path located at an Intertie. In the event of such path interactions, the CAISO uses a TRM value to prevent the risk of a system operating limit violation in Real Time for the CAISO ATC path. The amount of the TRM value may be set at a level up to, but not greater than, the forecasted impact on the CAISO ATC path's capacity imposed by expected flow on the non-CAISO ATC path.

The CAISO uses the following databases or information systems, or their successors, in connection with establishing TRM values: SLIC, Existing Transmission Contract Calculator (ETCC), PI, EMS, and CAS.

L.1.7 Capacity Benefit Margin (CBM) is that amount of transmission transfer capability reserved for Load Serving Entities (LSEs) to ensure access to Generation from interconnected systems to meet generation reliability requirements. In the Day-Ahead Market, CBM may be used to provide reliable delivery of Energy to CAISO Balancing Authority Area Loads and to meet CAISO responsibility for resource reliability requirements in Real-Time. The purpose of this DAM implementation is to avoid Real-Time Schedule curtailments and firm Load interruptions that would otherwise be necessary. CBM may be used to reestablish Operating Reserves. CBM is not available for non-firm transmission in the CAISO Balancing Authority Area. CBM may be used only after:

- all non-firm sales have been terminated,
- direct-control Load management has been implemented,

- customer interruptible Demands have been interrupted,
- if the LSE calling for its use is experiencing a Generation deficiency and its transmission service provider is also experiencing transmission Constraints relative to imports of Energy on its transmission system.

The level of CBM for each Transmission Interface is determined by the amount of estimated capacity needed to serve firm Load and provide Operating Reserves based on historical, scheduled, and/or forecast data using the following equation to set the maximum CBM:

CBM = (Demand + Reserves) - Resources

Where:

- Demand = forecasted area Demand
- Reserves = reserve requirements
- Resources = internal area resources plus resources available on other Transmission Interfaces

The CAISO does not use CBMs. The CBM value is set at zero.

L.2 ATC Algorithm

The ATC algorithm is a calculation used to determine the transfer capability remaining in the physical transmission network and available for further commercial activity over and above already committed uses. The CAISO posts the ATC values in megawatts (MW) to OASIS in conjunction with the closing events for the Day-Ahead Market and HASP Real-Time Market process.

The following OASIS ATC algorithms are used to implement the CAISO ATC calculation for the ATC rated path (Transmission Interface):

~~OTC = TTC – CBM – TRM - Operating Constraints~~

ATC Calculation For Imports:
ATC = ~~OTC~~TTC – CBM – TRM – AS from Imports- Net Energy Flow - Hourly Unused TR Capacity.

ATC Calculation For Exports:
ATC = ~~OTC~~TTC – CBM – TRM – Net Energy Flow - Hourly Unused TR Capacity.

ATC Calculation For Internal Paths 15 and 26:
ATC = ~~OTC~~TTC – CBM – TRM – Net Energy Flow

The specific data points used in the ATC calculation are each described in the following table.

ATC	ATC MW	Available Transfer Capability, in MW, per Transmission Interface and path direction.
Hourly Unused TR Capacity	USAGE_MW	The sum of any unscheduled existing transmission commitments (scheduled transmission rights capacity for ETC or TOR), in MW, per path direction.
Scheduled Net Energy from Imports/Exports (Net Energy Flow)	ENE IMPORT MW	Total hourly net Energy flow for a specified Transmission Interface.
AS from Imports	AS IMPORT MW	Ancillary Services scheduled, in MW, as imports over a specified Transmission Interface.
~~OTC~~TTC	~~OTC~~TTC MW	Hourly ~~Operating~~Total Transfer Capability of a specified Transmission Interface, per path direction, with consideration given to known Constraints and operating limitations.
~~Transmission Constraint~~	~~Constraint MW~~	~~Hourly Transmission Constraints, in MW, for a specific Transmission Interface and path direction.~~
CBM	CBM MW	Hourly Capacity Benefit Margin, in MW, for a specified Transmission Interface, per Path Direction.
TRM	TRM MW	Hourly Transmission Reliability Margin, in MW, for a specified Transmission Interface, per path direction.
~~TTC~~	~~TTC MW~~	~~Hourly Total Transfer Capability, in MW, of a specified Transmission Interface, per path direction.~~.

~~The links to the CAISO Website where the actual~~Actual ATC mathematical algorithms and other ATC calculational information are located ~~are as follows:~~

~~Operating Procedures – Transmission~~
~~http://www.caiso.com/thegrid/operations/opsdoc/transmon/index.html~~

~~Operating Procedure - Total Transfer Capability Methodology~~
~~http://www.caiso.com/1bfe/1bfe98134fa0.pdf~~

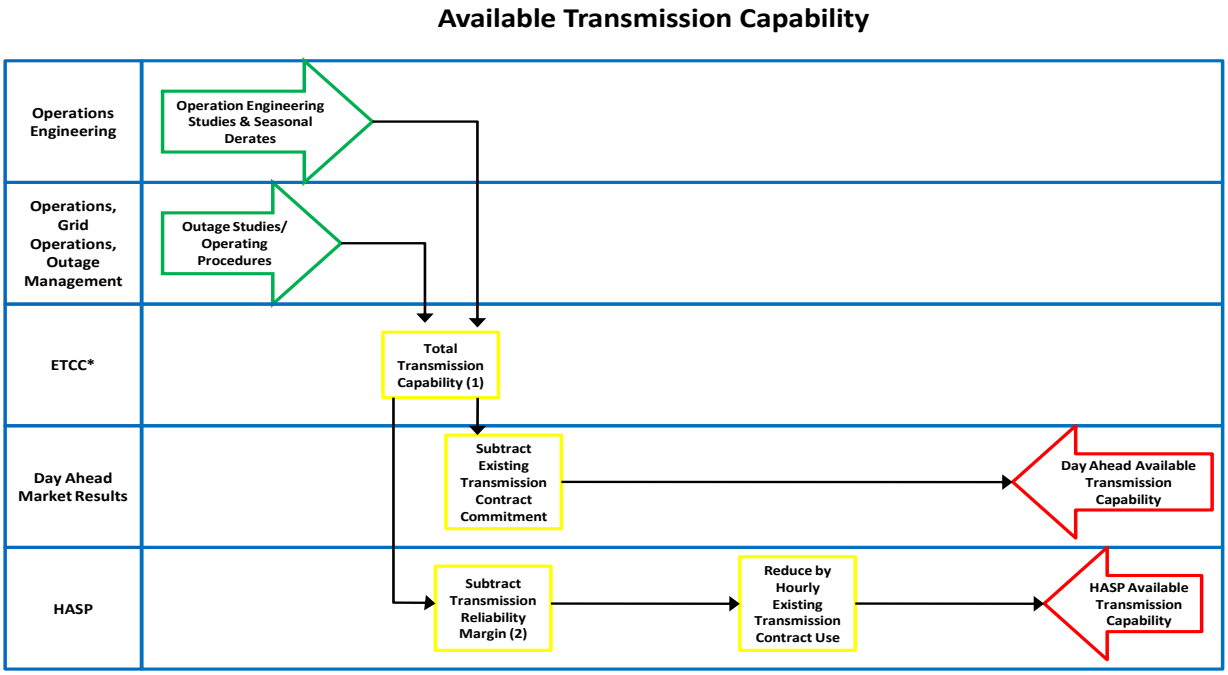
~~Operating Procedure - System Operating Methodology~~
~~http://www.caiso.com/1c13/1c1390d420810.pdf~~

~~Business Practice Manual for Market Operations~~
~~https://bpm.caiso.com/bpm/bpm/version/000000000000005~~

in the CAISO's ATC Implementation Document (ATCID) posted on OASIS~~ – Transmission Information~~.
~~http://oasis.caiso.com/mrtu-oasis~~

L.3 ATC Process Flowchart

[Note to Stakeholders: This is a revised version of the ATC Process Flowchart that appears in Section L.3 of the ISO's current Appendix L. We are unable to show the changes in redline format.]



*ETCC – Existing Transmission Contract Calculator
(1) – WECC rated path methodology
(2) - See TRMID posted on OASIS

L.4 TTC ~~– OTC~~ Determination

All transfer capabilities are developed to ensure that power flows are within their respective operating limits, both pre-Contingency and post-Contingency. Operating limits are developed based on thermal, voltage and stability concerns according to industry reliability criteria (WECC/NERC) for transmission paths. The process for developing TTC ~~or OTC is the same with the exception of~~also requires the inclusion or exclusion of operating Constraints based on system conditions being studied. ~~Accordingly, further description of the process to determine either OTC or TTC will refer only to TTC~~ .

L.4.1 Transfer capabilities for studied configurations may be used as a maximum transfer capability for similar conditions without conducting additional studies.

Increased transfer capability for similar conditions must be supported by conducting appropriate studies.

L.4.1.2 At the CAISO, studies for all major inter-area ~~paths~~paths' (mostly 500 kV) ~~OTC~~TTC are governed by the California Operating Studies Subcommittee (OSS) as one of four sub-regional study groups of the WECC OTCPC (i.e., for California sub-region), which provides detailed criteria and methodology. For transmission system elements below 500 kV the methodology for calculating these flow limits is detailed in Section L.4.3 and is applicable to the operating horizon.

L.4.2 Transfer capability may be limited by the physical and electrical characteristics of the systems including any one or more of the following:

- **Thermal Limits** – Thermal limits establish the maximum amount of electric current that a transmission line or electrical facility can conduct over a specified time-period as established by the Transmission Owner.

- **Voltage Limits** – System voltages and changes in voltages must be maintained within the range of acceptable minimum and maximum limits to avoid a widespread collapse of system voltage.

- **Stability Limits** – The transmission network must be capable of surviving disturbances through the transient and dynamic time-periods (from milliseconds to several minutes, respectively) following the disturbance so as to avoid generator instability or uncontrolled, widespread interruption of electric supply to customers.

L.4.3 **Determination of transfer capability** is based on computer simulations of the operation of the interconnected transmission network under a specific set of assumed operating conditions. Each simulation represents a single "snapshot" of the operation of the interconnected network based on the projections of many factors. As such, they are viewed as reasonable indicators of network performance and may ultimately be used to determine Available Transfer Capability. The study is meant to capture the worst operating scenario based on the RTE experience and good engineering judgment.

L.4.3.1 **System Limits** – The transfer capability of the transmission network may be limited by the physical and electrical characteristics of the systems including thermal, voltage, and stability consideration. Once the critical Contingencies are identified, their impact on the network must be evaluated to determine the most restrictive of those limitations. Therefore, the ~~TTC1~~TTC becomes:

~~TTC$_1$~~TTC = lesser of {Thermal Limit, Voltage Limit, Stability Limit} following N-1$_{worst}$

L.4.3.2 ~~Parallel path flows will be considered in determining transfer capability and must be sufficient in scope to ensure that limits throughout the interconnected network are addressed. In some cases, the parallel path flows may result in transmission limitations in systems other than the transacting systems, which can limit the TTC between two transacting areas. This will be labeled TTC_2. Combined with **Section L**.4.3.1 above TTC becomes:}~~

~~TTC = lesser of {TTC_1 or TTC_2}~~

L.5 Developing a Power Flow Base-Case

L.5.1 **Base-cases** will be selected ~~used~~ to model reality to the greatest extent possible including attributes like area Generation, area Load, Intertie flows, etc. At other times (e.g., studying longer range horizons), it is prudent to stress a base-case by making one or more attributes (Load, Generation, line flows, path flows, etc.) of that base-case more extreme than would otherwise be expected.

L.5.2 Power Flow Base-Cases Separated By Geographic Region

The standard RTE base-cases are split into ~~five~~ geographical regions ~~in~~within the CAISO Controlled Grid ~~including the Bay Area, Fresno Area, North Area, SDG&E Area, and SCE Area~~.

L.5.3 Power Flow Base-Cases Selection Methodology

The RTE determines the studied geographical area of the procedure. This determines the study base-cases from the Bay Area, Fresno Area, North Area, SCE Area, or SDG&E Area.

The transfer capability studies may require studying a series of base-cases including both peak and off-peak operation conditions.

L.5.4 Update a Power Flow Base-Case

After the RTE has obtained one or more base-case studies, the base-case will be updated to represent the current grid conditions during the applicable season. The following will be considered to update the base-cases:

- Recent transmission network changes and updates
- Overlapping scheduled and Forced Outages
- Area Load level
- Major path flows
- Generation level
- Voltage levels
- Operating requirements

L.5.4.1 Outage Consideration

Unless detailed otherwise, the RTE considers modeling Outages of:

- Transmission lines, 500 kV
- Transformers, 500/230 kV
- Large Generating Units
- Generating Units within the studied area
- Transmission elements within the studied area

At the judgment of the RTE, only the necessary Outages will be modeled to avoid an unnecessarily burdensome and large number of base-cases.

L.5.4.2 Area Load Level

Base-case Demand levels should be appropriate to the current studied system conditions and customer Demand levels under study and may be representative of peak, off-peak or shoulder, or light Demand conditions. The RTE estimates the area Load levels to be utilized in the peak, partial-peak and/or off-peak base-cases. The RTE will utilize the current CAISO Load forecasting program (e.g., ALFS), ProcessBook (PI) or other competent method to estimate Load level for the studied area. Once the RTE has determined the correct Load levels to be utilized, the RTE may scale the scale the base-case Loads to the area studied, as appropriate.

L.5.4.3 Modify Path Flows

The scheduled electric power transfers considered representative of the base system conditions under analysis and agreed upon by the parties involved will be used for modeling. As needed, the RTE may estimate select path flows depending on the studied area. In the event that it is not possible to estimate path flows, the RTE will make safe assumptions about the path flows. A safe assumption is more extreme or less extreme (as conservative to the situation) than would otherwise be expected. If path flow forecasting is necessary, if possible the RTE will trend path flows on previous similar days.

L.5.4.4 Generation Level

Utility and non-utility Generating Units will be updated to keep the swing Generating Unit at a reasonable level. The actual unit-by-unit Dispatch in the studied area is more vital than in the un-studied areas. The RTE will examine past performance of select Generating Units to estimate the Generation levels, focusing on the Generating Units within the studied area. In the judgment of the RTE, large Generating Units outside the studied area will also be considered.

L.5.4.5 Voltage Levels

Studies will maintain appropriate voltage levels, based on operation procedures for critical buses for the studied base-cases. The RTE will verify that bus voltage for critical busses in within tolerance. If a bus voltage is outside the tolerance band, the RTE will model the use of voltage control devices (e.g., synchronous condensers, shunt capacitors, shunt reactors, series capacitors, generators).

L.6 Contingency Analysis

The RTE will perform Contingency analysis studies in an effort to determine the limiting conditions, especially for scheduled Outages, including pre- and post-Contingency power flow analysis modeling pre- and post-Contingency conditions and measuring the respective line flows, and bus voltages.

Other studies like reactive margin and stability may be performed as deemed appropriate.

L.6.1 Operating Criteria and Study Standards

Using standards derived from NERC and WECC Reliability Standards and historical operating experience, the RTE will perform Contingency analysis with the following operating criteria:

Pre-Contingency

- All pre-Contingency line flows shall be at or below their normal ratings.
- All pre-Contingency bus voltages shall be within a pre-determined operating range.

Post-Contingency

- All post-Contingency line flows shall be at or below their emergency ratings.
- All post-Contingency bus voltages shall be within a pre-determined operating range.

The RTE models the following Contingencies:

- Generating Unit Outages (including combined cycle Generating Unit Outages which are considered single Contingencies).
- Line Outages
- Line Outages combined with one Generating Unit Outage
- Transformer Outages
- Synchronous condenser Outages
- Shunt capacitor or capacitor bank Outages
- Series capacitor Outages
- Static VAR compensator Outages
- Bus Outages – bus Outages can be considered for the following ongoing Outage conditions.
    - For a circuit breaker bypass-and-clear Outage, bus Contingencies shall be taken on both bus segments that the bypassed circuit breaker connects to.

- For a bus segment Outage, the remaining parallel bus segment shall be considered as a single Contingency.
- Credible overlapping Contingencies – Overlapping Contingencies typically include transmission lines connected to a common tower or close proximity in the same right-of-way.

L.6.2 Manual Contingency Analysis

If manual Contingency analysis is used, the RTE will perform pre-Contingency steady-state power flow analysis and determines if pre-Contingency operating criteria is violated. If pre-Contingency operating criteria cannot be preserved, the RTE records the lines and buses that are not adhering to the criteria. If manual post-Contingency analysis is used the RTE obtains one or more Contingencies in each of the base cases. For each Contingency resulting in a violation or potential violation in the operating criteria above, the RTE records the critical post-Contingency facility loadings and bus voltages.

L.6.3 Contingency Analysis Utilizing a Contingency Processor

For a large area, the RTE may utilize a Contingency processor.

L.6.4 Determination of Crucial Limitations

After performing Contingency analysis studies, the RTE analyzes the recorded information to determine limitations. The limitations are conditions where the pre-Contingency and/or post-Contingency operating criteria cannot be conserved and may include a manageable overload on the facilities, low post-Contingency bus voltage, etc. If no crucial limitations are determined, the RTE determines if additional studies are necessary.

L.7 Traditional Planning Methodology to Protect Against Violating Operating Limits

After performing Contingency analysis studies, the RTE next develops the transfer capability and develops procedures, Nomograms, RMR Generation requirements, or other Constraints to ensure that transfer capabilities respect operating limits.

L.8 Limits for Contingency Limitations

Transfer limits are developed when the post-Contingency loading on a transmission element may breach the element's emergency rating. The type of limit utilized is dependent on the application and includes one of the following limits:

- Simple Flow Limit - best utilized when the derived limit is repeatable or where parallel transmission elements feed radial Load.
- RAS or SPS – existing Remedial Action Schemes (RAS) or special protection systems (SPS) may impact the derivation of simple flow limits. When developing the limit, the RTE determines if the RAS or SPS will be in-service during the Outage and factors the interrelationship between the RAS or SPS and the derived flow

limit. RTE will update the transfer limits in recognition of the changing status and/or availability of the RAS or SPS.

Blackline of Revisions to Affected Sections of the Main Tariff

6.5.2.1 Communications Regarding the State of the CAISO Controlled Grid

The CAISO shall use OASIS to provide public information to Market Participants regarding the CAISO Controlled Grid or facilities that affect the CAISO Controlled Grid. Such information may include but is not limited to:

(a) Future planned Outages of transmission facilities;
(b) ~~Operating~~Total Transfer Capability (~~OTC~~TTC); and
(c) Available Transfer Capability (ATC) for WECC paths and Transmission Interfaces with external Balancing Authority Areas.

* * *

6.5.2.3.2 Network and System Conditions

By 6:00 p.m. the day prior to the target Day-Ahead Market, the CAISO will publish known network and system conditions, including but not limited to ~~OTC~~TTC and ATC, the total capacity of inter-Balancing Authority Area Transmission Interfaces, and the available capacity.

* * *

23. Categories Of Transmission Capacity

References to new firm uses shall mean any use of CAISO transmission service, except for uses associated with Existing Rights or TORs. Prior to the start of the Day-Ahead Market, for each Balancing Authority Area Transmission Interface, the CAISO will allocate the forecasted Total Transfer Capability of the Transmission Interface to four categories. This allocation will represent the CAISO's best estimates at the time, and is not intended to affect any rights provided under Existing Contracts or TORs. The CAISO's forecast of Total Transfer Capability for each Balancing Authority Area Transmission Interface will depend on prevailing conditions for the relevant Trading Day, including~~, but not limited to, the effects of parallel path (unscheduled) flows and/or other~~ limiting operational conditions. This information will be posted on OASIS in accordance with this CAISO Tariff. The four categories are as follows:

(a) transmission capacity that must be reserved for firm Existing Rights;
(b) transmission capacity that may be allocated for use as CAISO transmission service (i.e., "new firm uses");
(c) transmission capacity that may be allocated by the CAISO for conditional firm Existing Rights; and
(d) transmission capacity that may remain for any other uses, such as non-firm Existing Rights for which the Responsible PTO has no discretion over whether or not to provide such non-firm service.

* * *

30.8 Bids On Out-Of-Service Paths At Scheduling Points Prohibited

Scheduling Coordinators shall not submit any Bids or ETC Self-Schedules at Scheduling Points using a transmission path for any Settlement Period for which the ~~Operating~~Total Transfer Capability for that path is zero (0) MW. The CAISO shall reject

Bids or ETC Self-Schedules submitted at Scheduling Points where the ~~Operating~~Total Transfer Capability on the transmission path is zero (0) MW. If the ~~Operating~~Total Transfer Capability of a transmission path at the relevant Scheduling Point is reduced to zero (0) after Day-Ahead Schedules have been issued, then, if time permits, the CAISO shall direct the responsible Scheduling Coordinators to reduce all MWh associated with the Bids on such zero-rated transmission paths to zero (0) in the HASP. As necessary to comply with Applicable Reliability Criteria, the CAISO shall reduce any non-zero (0) HASP Bids across zero-rated transmission paths to zero after the Market Close for the HASP.

* * *

36.4 FNM For CRR Allocation And CRR Auction

When the CAISO conducts its CRR Allocation and CRR Auction, the CAISO shall use the most up-to-date DC FNM which is based on the AC FNM used in the Day-Ahead Market. The Seasonal Available CRR Capacity shall be based on the DC FNM, taking into consideration the following, all of which are discussed in the applicable Business Practice Manual: (i) any long-term scheduled transmission Outages, (ii) ~~OTC~~TTC adjusted for any long-term scheduled derates, (iii) a downward adjustment due to TOR or ETC as determined by the CAISO, and (iv) the impact on transmission elements used in the annual CRR Allocation and Auction of (a) transmission Outage or derates that are not scheduled at the time the CAISO conducts the Seasonal CRR Allocation or Auction determined through a methodology that calculates the breakeven point for revenue adequacy based on historical Outages and derates, and (b) known system topology changes, both as further defined in the Business Practice Manuals. The Monthly Available CRR Capacity shall be based on the DC FNM, taking into consideration: (i) any scheduled transmission Outages known at least thirty (30) days in advance of the start of that month as submitted for approval consistent with the criteria specified in Section 36.4.3, (ii) adjustments to compensate for the expected impact of Outages that are not required to be scheduled thirty (30) days in advance, including unplanned transmission Outages, (iii) adjustments to restore Outages or derates that were applied for use in calculating Seasonal Available CRR Capacity but are not applicable for the current month, (iv) any new transmission facilities added to the CAISO Controlled Grid that were not part of the DC FNM used to determine the prior Seasonal Available CRR Capacity and that have already been placed in-service and energized at the time the CAISO starts the applicable monthly process, (v) ~~OTC~~TTC adjusted for any scheduled derates or Outages for that month, and (vi) a downward adjustment due to TOR or ETC as determined by the CAISO. For the first monthly CRR Allocation and CRR Auction for CRR Year One, to account for any planned or unplanned Outages that may occur for the first month of CRR Year One, the CAISO will derate all flow limits, including Transmission Interface limits and normal thermal limits, based on statistical factors determined as provided in the Business Practice Manuals.

* * *

Blackline of Revisions to the Appendix A

Master Definitions Supplement

Available Transfer Capability (ATC)
The available capacity of a given transmission path, in MW, after subtraction ~~-~~from that path's Total Transfer Capability of capacity associated with Existing Contracts and Transmission Ownership Rights ~~from that path's Operating Transfer Capability~~ and any Transmission Reliability Margin, as established consistent with CAISO and WECC transmission capacity rating guidelines, as further described in Appendix L.

* * *

Monthly Available CRR Capacity
The upper limit of network capacity that will be used in the monthly CRR Allocation and monthly CRR Auctions calculated by using ~~OTC~~TTC adjusted for Outages, derates, and Transmission Ownership Rights for the relevant month in accordance with Section 36.4.

* * *

~~**Operating Transfer Capability (OTC)**~~
~~The maximum capability of a transmission path to transmit real power, expressed in MW, at a given point in time, as further defined in Appendix L.~~

* * *

Seasonal Available CRR Capacity
The upper limit of network capacity that will be used in the annual CRR Allocation and annual CRR Auction calculated by effectively reducing ~~OTC~~TTC for Transmission Ownership Rights as if all lines will be in service for the relevant year in accordance with Section 36.4.

* * *

Total Transfer Capability (TTC)
The amount of electric power that can be moved or transferred ~~over an~~reliably from one area to another area of the interconnected transmission ~~network in a reliable manner while meeting~~ systems by way of all ~~of a specific set of defined pre-Contingency and post-Contingency~~transmission lines (or paths) between those areas under specified system conditions.

Attachment F

WECC Unscheduled Flow Reduction Procedure

April 10, 2012

WESTERN ELECTRICITY COORDINATING COUNCIL

UNSCHEDULED FLOW REDUCTION PROCEDURE

The combination of scheduled and unscheduled flows on a Transfer Path may exceed the transfer capability of that Transfer Path. This Unscheduled Flow Reduction Procedure (USF Reduction Procedure) will be utilized to reduce the Unscheduled Flows (USF) across a constrained Qualified Transfer Path. The USF Reduction Procedure has the following parts:

1. Transfer Path Qualification
2. Transfer Path Requalification
3. Transfer Path Deletion
4. Actions Required Following Addition of a New Qualified Transfer Path
5. Controllable Device Qualification
6. Controllable Device Deletion
7. Accommodation Limits
8. General Terms
9. General Action Rules
10. Action Steps
11. Further Action
12. Term

This USF Reduction Procedure addresses the actions which are required by all Members. This USF Reduction Procedure recognizes the effectiveness of coordinated control and operation of the Qualified Controllable Devices installed within the **WECC** systems. It is subject to review for its effectiveness (Section 13 of the Plan) and modification as provided in Section 5.2 of the Plan.

When a Qualified Transfer Path is constrained by USF, the Transfer Path Operator will notify all Members via the **WECC** communications system, and Members will take actions as required by this USF Reduction Procedure to reduce the effects of USF across the Qualified Transfer Path. Where Schedule adjustments are required by this USF Reduction Procedure, it is the responsibility of the Member who is a Receiver to determine if any mitigation steps are required, and if so, to initiate appropriate actions. If the ultimate Receiver is not a Member, then the scheduling change administration responsibility shall belong to the Member most closely associated with the Schedule to the non-Member.

This USF Reduction Procedure is not intended to be prescriptive with regard to which Schedules are to be adjusted to effect the required USF Accommodation or Schedule reduction. Rather, when actions are required to reduce the effects of USF, it is expected that each Member will select the most appropriate Schedule reduction which will satisfy the intended accommodation and curtailment responses required by this USF Reduction Procedure.

Terms which are initially capitalized in this USF Reduction Procedure refer to defined terms in the WSCC Unscheduled Flow Mitigation Plan.

1. Transfer Path Qualification

Requests for Transfer Path qualification shall be made directly to the UFAS. To qualify a Transfer Path under this Plan, a Transfer Path Operator must specify the applicable direction and provide documentation to satisfy the requirements for qualification set forth below:

a. The Transfer Path must be a transmission element or elements across which:

   i. A Schedule (MW) can be established,

   ii. Actual Flow (MW) is metered, and

   iii. Maximum Transfer Limit has been established and published in WECC Planning Coordination Committee or WECC Operating Committee documents.

b. An historical record exists to document that:

   i. for at least 100 hours in the most recent 36 months, Actual Flow across a Transfer Path (MW) has exceeded 97 percent of the Maximum Transfer Limit in MW, and at the same time

   ii. energy Schedules were curtailed because of USF.

c. The prospective Transfer Path Operator will be expected to make a presentation to the UFAS explaining how the Maximum Transfer Limit was determined and how the historical Actual Flow and/or Schedule curtailment records were obtained.

d. An incremental matrix for the current operating season and applicable to the proposed Transfer Path confirms that a feasible combination of Schedules between Sender and Receiver can create USF across the Transfer Path whose sum is equal to or greater than five percent of the Maximum Transfer Limit.

e. After the UFAS has reviewed the documentation and presentation, a recommendation will be forwarded to the WECC Operating Committee. The Transfer Path Operator may be requested to make a presentation to the WECC Operating Committee.

f. A Transfer Path is normally qualified for USF reduction in only one direction. The Transfer Path may be qualified for USF reduction in both directions, but supporting data must be provided for each direction.

2. Transfer Path Requalification

If there is a change in the Maximum Transfer Limit for an existing Qualified Transfer Path or the addition of a Controllable Device in the Qualified Transfer Path, the Transfer Path Operator shall make a presentation to the UFAS so that the UFAS can determine if requalification of the Qualified Transfer Path is necessary.

3. Transfer Path Deletion

If there have been no Schedule reductions or USF Accommodations and the Actual Flow across a Qualified Transfer Path has not exceeded 97 percent of the Maximum Transfer Limit for the most recent 36 months, the UFAS shall make a determination as to whether the WECC system configuration has been altered sufficiently so that USF Schedule reductions or USF Accommodation on the Qualified Transfer Path would no longer be expected. An affirmative finding of the UFAS and approval by the WECC Operating Committee will be required to delete a Qualified Transfer Path.

4. Actions Required Following Addition of a New Qualified Transfer Path

a. A new Transfer Path will be added to the list of Qualified Transfer Paths, attached as Exhibit A, upon approval of the WECC Operating Committee.

b. Owners of facilities making up a Qualified Transfer Path will designate a Transfer Path Operator.

c. Incremental power flow matrices will be prepared for the current summer and winter seasons based on appropriately modified operating base cases for each Qualified Transfer Path and provided to the WECC Operating Committee members. The matrices will be based on an incremental schedule of 100 MW and express results in units of MW (equivalent to percent of individual Schedule). They will be used to determine the magnitude of each Contributing Schedule's contribution to USF. A "Contributing Schedule" is defined as the net Schedule between individual Senders and Receivers that contributes USF across a Qualified Transfer Path in the same direction as the Actual Flow across that Qualified Transfer Path.

d. The effectiveness factors and compensation for the Qualified Controllable Devices will be recalculated.

5. Controllable Device Qualification

a. Any Member wishing to qualify a Controllable Device to receive compensation for coordinated operation under the Plan shall present a plan for coordinated operation to the UFAS. This plan should include the following elements:

i. The procedures developed to ensure that adequate communication and coordination occurs between the Member's Controllable Device and other Qualified Controllable Devices to achieve the desired coordination,

ii. A demonstration that by adding the Member's Controllable Device to the overall coordinated Controllable Device control strategy, using the Controllable Devices Compensation Methodology (Attachment 3), the proposed Controllable Device will reduce USF:

(1) by an average over all of the then Qualified Transfer Paths of at least one percent of the respective Qualified Transfer Path limits, (which corresponds to average percent control of 6.7 percent in Table 1 of Attachment 3), and

(2) for more than half of the Qualified Transfer Paths, by at least one percent of each of the respective Qualified Transfer Path limits.

b. After the UFAS has reviewed the documentation and presentation, it will make a recommendation to the WECC Operating Committee. Upon approval by the WECC Operating Committee, the proposed Controllable Device will be added to the list of Qualified Controllable Devices.

6. Controllable Device Deletion

a. A Qualified Controllable Device shall be considered by UFAS for deletion from the list of Qualified Controllable Devices if the Controllable Device is no longer capable of reducing USF over all of the then Qualified Transfer Paths by the criteria specified in Section 5.a above. Approval of the Operating Committee will be required to delete a Controllable Device. The Controllable Device will no longer be required to participate in coordinated operation. However, its continued participation is encouraged.

7. Accommodation Limits

a. During normal operating conditions when Actual Flow is not exceeding the Transfer Limit and desired Schedules are not being curtailed, the Qualified Transfer Path(s) will accommodate 100 percent of the USF.

b. During those times when there is or it is anticipated that there will be a scheduling limitation on a Qualified Transfer Path due to USF, the Transfer Path Operator and those scheduling across the Qualified Transfer Path are required to accommodate a minimum level of USF. Such USF Accommodation will be achieved by ensuring that the net Schedules across the Qualified Transfer Path are reduced below the then available Transfer

Limit by the following amount:

i. The greater of 50 MW or

(1) during the first Plan Year, 10 percent of the Transfer Limit;

(2) during the second Plan Year, 7.5 percent of the Transfer Limit; or

(3) during the third and subsequent Plan Years, 5 percent of the Transfer Limit.

c. If net Schedules are reduced below the Transfer Limit by the amounts specified above, then the Transfer Path Operator has met the USF Accommodation requirement and may request additional relief under the Plan, including coordinated operation of Qualified Controllable Devices, and Schedule curtailments by other Receivers who are scheduling across other Transfer Paths.

d. It is intended that the Qualified Controllable Devices shall not be requested to operate in a coordinated manner in response to requests under this USF Reduction Procedure in excess of 4,000 hours per year, and if operation exceeds or is forecast to exceed that level, then the level of Transfer Path USF Accommodation shall be increased such that coordinated operation shall not exceed 4,000 hours annually. The UFAS shall monitor the coordinated operation of the Qualified Controllable Devices and recommend to the WECC Operating Committee adjustments to the level of USF Accommodation as needed to meet this objective.

8. General Terms

a. All Members shall cooperate with the Transfer Path Operator by reducing Schedules as requested to achieve the appropriate reduction in USF. Schedule reductions required by this USF Reduction Procedure may be taken in either the Contributing Schedule, or any other Schedule, the reduction of which achieves the equivalent effect on reducing USF on the affected Transfer Path.

b. Members having Controllable Devices, such as series capacitors, phase shifting transformers, and DC transmission lines shall cooperate with the Transfer Path Operator to the extent practical by using these elements to reduce USF across the constrained Qualified Transfer Path. Operation of such Controllable Devices shall be required where the Controllable Devices are being operated in a coordinated manner pursuant to the Plan. Operation of Controllable Devices (which are not Qualified Controllable Devices) shall be at the discretion of and consistent with the normal practice of the Member. Schedule reductions shall not be required by the Member to the extent that

controllable elements (which are not operated in a coordinated manner) are operated to achieve an equivalent reduction in USF across the constrained Qualified Transfer Path.

c. To the extent that a Qualified Controllable Device is capable of operating to achieve Actual Flows through the Controllable Device equal to Scheduled Flows, such Schedules shall be deemed to be 100 percent effective through the Controllable Device, and thus shall be exempt from the Schedule reductions required under this USF Reduction Procedure.

d. The WECC Staff will provide a summary of all qualified controllable elements which are being operated in a coordinated manner pursuant to the Plan, whenever a new Controllable Device is qualified pursuant to the Plan. This summary shall be provided to the WECC Operating Committee.

9. General Action Rules

a. This procedure applies to all Members.

b. The UFAS shall develop guidelines to enable the Transfer Path Operators to implement actions under this USF Reduction Procedure which will achieve the desired accommodation/control/curtailment results in the scheduling hour immediately following the request. Furthermore, these guidelines shall enable the Transfer Path Operators to make an initial request for any step in the procedure up through the NINTH STEP, provided however that the guidelines shall ensure that neither over-control nor over-curtailment shall be expected. Until such guidelines are developed, the following action limits shall apply:

i. The Transfer Path Operator may request actions through the FOURTH STEP in the first hour if experience indicates that such action will be needed to achieve the required reduction in USF.

ii. For requests beyond the FOURTH STEP, no more than three requests may be initiated in any clock hour. The notice must specify if this is an FIFTH, SIXTH, SEVENTH, EIGHTH, OR NINTH STEP request. The request must be transmitted to Members by at least 30 minutes prior to the hour to ensure implementation for the following Schedule hour.

c. The Transfer Path Operator will verify, if possible, the magnitude of USF across the Qualified Transfer Path by checking adjacent metered and scheduled values prior to requesting any other Member to take actions under this USF Reduction Procedure.

d. As to the actions to be taken in accordance with this Plan for each hour of a curtailment period, each Member shall promptly provide documentation of

all such accommodation, control or curtailment actions taken by its dispatchers or real-time schedulers, and in addition each Transfer Path Operator shall provide such documentation on such actions taken or not taken by others in response to its requests, to the WECC Staff following each curtailment period. Members' documentation shall use formats and reporting conventions developed and monitored by the WECC Operating Committee. The compiled information, including identification of Members who failed to adjust Schedules according to this USF Reduction Procedure, shall be promptly distributed to the WECC Operating Committee members.

e. Operation of Qualified Controllable Devices will be monitored by the WECC Operating Committee for compliance with the Minimum Operating Reliability Criteria and the WECC Controllable Devices Coordinated Operating Procedure. Results will be distributed to the WECC Operating Committee members.

f. The WECC Operating Committee shall monitor major loop USF in a minimum of four locations during hours in which any USF Accommodation or coordinated operation of the Qualified Controllable Devices or curtailments are occurring under this USF Reduction Procedure.

g. The Transfer Path Operator and those scheduling across the constrained Qualified Transfer Path will continue to take actions necessary to reduce Actual Flow to a level at or below the Transfer Limit of the Qualified Transfer Path.

h. Upon receipt of a curtailment request, Contributing Schedules which are subject to curtailments will be reduced (or equivalent alternative Schedule adjustments will be effected) in accordance with the following procedures:

    i. Receivers of Contributing Schedules will initiate the requested Schedule reductions unless an otherwise agreed upon procedure for Schedule reduction achieving the equivalent effect on the Qualified Transfer Path is established by the Receiver and/or the Sender. If the ultimate Receiver is not a Member, then the curtailment administration responsibility shall first belong to the Member utility that has scheduling responsibility for the Receiver, and then to the Member utility that has control area responsibility for the Receiver.

    ii. Members may arrange among themselves to make curtailments called for by this USF Reduction Procedure in a manner other than prescribed provided that the arrangements are as effective as the identified Schedule curtailment in reducing USF across the Qualified Transfer Path. Members may make bi-lateral arrangements which will enable a Member with Schedules on the affected Qualified Transfer Path to make the required curtailments in lieu of making larger curtailments in Schedules over other parallel paths. Where

alternative Schedule adjustments are utilized, it is the Receiver's responsibility to cause Schedule adjustments to be effected which provide the same reduction in flow across the Qualified Transfer Path as would have been achieved by the prescribed reduction in the Contributing Schedule.

iii. The total amount of requested Schedule reduction may be apportioned to the applicable Schedules at the discretion of the Receiver subject to item iv below.

iv. Irrespective of the Schedules reduced or the manner in which they are reduced, each Member's overall net reduction in Actual Flow across the constrained Qualified Transfer Path must be equivalent to the reduction which would have been achieved had the identified Schedule reduction occurred as requested.

v. System dispatchers or real-time schedulers should identify in advance those Schedules that qualify for curtailment requests for all Qualified Transfer Paths. This will expedite implementation of this USF Reduction Procedure when requested.

vi. While this USF Reduction Procedure does not expect Receivers to curtail Schedules which would result in loss of firm load, nothing in this USF Reduction Procedure shall relieve the Receiver of the obligation to achieve the required reduction in USF across the constrained Qualified Transfer Path.

i. In the event of a transmission system emergency on any Member's system, such Member may request coordinated operation of the Qualified Controllable Devices if such operation is reasonably expected to assist in relieving the emergency condition.

10. Action Steps

a. Action Taken by the Transfer Path Operator - Notification of Curtailment Period

i. The Transfer Path Operator shall advise the Members via the WECC communications system of a current or an impending curtailment period, and may request assistance in mitigating the curtailment using the following procedure:

The following actions shall become effective at the start of the next scheduling hour following the request.

b. Action Taken by the Transfer Path Operator - Controllable Devices

i. FIRST STEP: If the Qualified Transfer Path contains series connected Controllable Devices, such as series capacitors, phase shifting transformers, and DC transmission lines, these elements will be used to the maximum extent practical in reducing the USF across the constrained Qualified Transfer Path to a level at or below the Transfer Limit. Operations of such Controllable Devices shall comply with the WECC Minimum Operating Reliability Criteria.

c. Action Taken by the Transfer Path Operator - Accommodation

i. SECOND STEP: USF across a Qualified Transfer Path will be accommodated up to the greater of 50 MW or 10 percent of the Transfer Limit for that Qualified Transfer Path in the first Plan Year, 7.5 percent in the second Plan Year, and 5 percent in the third and subsequent Plan Years. USF Accommodation will be effected by the Transfer Path Operator causing the net Schedules across the Qualified Transfer Path to be reduced to not more than 90 percent of the Transfer Limit for that Qualified Transfer Path in the first Plan Year, 92.5 percent in the second Plan Year, and 95 percent in the third and subsequent Plan Years. The Transfer Path Operator shall not be expected to reduce net Schedules across the Qualified Transfer Path in this step if they are already below the appropriate USF Accommodation level (90 percent, 92.5 percent, or 95 percent of the Transfer Limit).

d. Actions Taken by Controllable Device Owners

i. THIRD STEP: At the request of a Transfer Path Operator, the Qualified Controllable Device owners shall operate their Controllable Devices in a coordinated manner so as to minimize the USF on the constrained Qualified Transfer Path, consistent with the WECC Minimum Operating Reliability Criteria. If the constraint persists, then:

e. Actions Taken by Others and the Transfer Path Operator - Curtailment of Schedules.

i. FOURTH STEP: Those Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of 50 percent or more will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would a 20 percent reduction in the Contributing Schedule. Those Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of from 30 percent to 49 percent will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as

would a 10 percent reduction in the Contributing Schedule. If the overload persists, then;

ii FIFTH STEP: Those Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of from 20 through 29 percent will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would a 10 percent reduction in the Contributing Schedule, and Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of 30 percent or more will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would an additional 5 percent reduction in the Contributing Schedule. If the overload persists, then;

iii. SIXTH STEP: USF Accommodation on the Qualified Transfer Path will increase to the greater of 75 MW or 11 percent of the Transfer Limit for that Qualified Transfer Path in the first Plan Year, 8.5 percent in the second Plan Year, and 6 percent in the third and subsequent Plan Years. Contributing Schedules will continue to be curtailed as described up through the FIFTH STEP. If the overload persists, then;

iv SEVENTH STEP: Those Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of from 15 through 19 percent will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would a 10 percent reduction in the contributing Schedule, and Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of 20 percent or more will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would an additional 5 percent reduction in the Contributing Schedule.

v. EIGHTH STEP: USF Accommodation on the Qualified Transfer Path will increase to the greater of 100 MW or 12 percent of the Transfer Limit for that Qualified Transfer Path in the first Plan Year, 9.5 percent in the second Plan Year, and 7 percent in the third and subsequent Plan Years. Contributing Schedules will continue to be curtailed as described up through the SEVENTH STEP. If the overload persists, then;

vi. NINTH STEP: Those Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of from 10 to 14 percent will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would a 10 percent reduction in the Contributing Schedule,

and Receivers with Contributing Schedules that result in USF across the constrained Qualified Transfer Path of 15 percent or more will effect a scheduling change which is intended to reduce the USF across the Qualified Transfer Path by the same amount as would an additional 5 percent reduction in the Contributing Schedule.

11. Further Action

a. The Transfer Path Operator and those scheduling across the constrained Qualified Transfer Path will continue to take actions necessary to reduce Actual Flow to a level at or below the Transfer Limit.

b. The Transfer Path Operator and those scheduling across the Qualified Transfer Path may resume some Schedules as curtailment steps are taken by others provided the net Schedule remains at or below the amount that provides for USF Accommodation at the level specified above for the Qualified Transfer Path.

c. The Transfer Path Operator must reconfirm the need to continue the present level of Schedule reductions via the WECC communications system every four hours by at least 30 minutes to the hour.

d. The Transfer Path Operator must notify Members via the WECC communications system to reduce Schedule curtailments when the Actual Flow on the Qualified Transfer Path is reduced below 97 percent of its Transfer Limit or the USF Accommodation levels above are no longer being exceeded. Schedules should be resumed in the reverse order that Schedule curtailments were initiated. If conditions warrant, the Transfer Path Operator may notify all Members to cease all curtailments at any time.

12. Term

This procedure will remain in effect coterminous with the Plan.

Revised: 4-19-02

WECC UNSCHEDULED FLOW PROCEDURE

SUMMARY OF CURTAILMENT ACTIONS

Step	**Action Description**	**Party(s) Affected**	**Unscheduled Flow Accommodation** Across Path	**Equivalent Percent Curtailment Required** in Contributing Schedule -- Based on amount of Unscheduled Flow across Path				
				10-14%	**15-19%**	**20-29%**	**30-49%**	**50+ %**
1	Operate Controllable Devices in Path	Controllable Devices in Transfer Path	NA					
2	Accommodation	Schedules Across the Path	50 MW or 5% of Maximum Transfer Limit					
3	Coordinated Operation of Qualified Controllable Devices	Qualified Controllable Devices	50 MW or 5% of Maximum Transfer Limit					
4	First Level Curtailment	Schedules in Other Paths	50 MW or 5% of Maximum Transfer Limit				10%	20%
5	Second Level Curtailment	Schedules in Other Paths	50 MW or 5% of Maximum Transfer Limit			10%	15%	25%
6	Accommodation	Schedules Across Path	75 MW or 6% of Maximum Transfer Limit			10%	15%	25%
7	Third Level Curtailment	Schedules in Other Paths	75 MW or 6% of Maximum Transfer Limit		10%	15%	20%	30%
8	Accommodation	Schedules Across Path	100 MW or 7% of Maximum Transfer Limit		10%	15%	20%	30%
9	Fourth Level Curtailment	Schedules in Other Paths	100 MW or 7% of Maximum Transfer Limit	10%	15%	20%	25%	35%

LIST OF QUALIFIED TRANSFER PATHS

Path Code	Path Opr	Qualified Transfer Path	Qualifying Direction *	Path Transfer Capability-MW**
66	CISO	California-Oregon Intertie Malin-Round Mt. 500-kV lines 1&2 Captain Jack-Olinda 500-kV line	CCW (north-south)	4800
15	CISO	Midway-Los Banos Midway-Los Banos 500 kV lines 1&2 Gates-Gregg 230 kV line Gates-Panoche 230 kV lines 1&2 Gates-McCall 230 kV line	CW (south-north)	3900
20	PAC	Path C transmission path Borah-Ben Lomond 345-kV line Brady-Treasureton 230-kV line Goshen-Fish Creek 161-kV line American Falls-Malad 138-kV line	CW (north-south)	675
21	APS	Arizona-California Interties Navajo-McCullough 500 kV line Moenkopi-Eldorado 500 kV line Palo Verde-Devers 500 kV line Palo Verde-North Gila 500 kV line Liberty-Mead 345 kV line Liberty-Parker 230 kV line Pinnacle Peak-Davis 230 kV line West Phoenix-Parker 230 kV line	CW (east-west)	5700
22	APS	Four Corners-Central Arizona Four Corners-Moenkopi 500-kV line Four Corners-Cholla 345-kV lines 1&2	CW (east-west)	2325
23	APS	Four Corners 345/500-kV Transformer with Four Corners Unit 5 out of service or at greatly reduced output	CW (low-high)	840
30	WACM	TOT 1A transmission path Hayden-Artesia-Vernal 138 kV Meeker-Rangely-Bonanza 138 kV Bears Ears-Bonanza-Mona 345 kV	CW (east-west)	550
31	WACM	TOT 2A transmission path Hesperus-San Juan 345 kV line Lost Canyon-Shiprock 230 kV line Durango-Shiprock 115 kV line	CW (north-south)	650

Path Code	Path Opr	Qualified Transfer Path	Qualifying Direction *	Path Transfer Capability-MW**
36	WACM	TOT 3 transmission path Laramie River-Ault 345-kV line Laramie River-Story 345-kV line Archer-Ault 230-kV line Sidney-N. Yuma 230-kV line Sidney-Sterling 115-kV line Cheyenne-Rockport 115-kV line	CW (north-south)	1605

* Direction in which the Path is qualified to request Unscheduled Flow relief:
CCW = Counterclockwise direction
CW = Clockwise direction

** These values are nominal. The actual value may change with system conditions. Accommodation levels are based on the path transfer capability available at the time.