

**Transmission Constraints Amendment Filing  
Fourth Replacement CAISO Tariff  
July 8, 2009**

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### 8.3.3.5 Use of the Full Network Model and Procurement of Ancillary Services.

The Full Network Model ~~and is used in~~ the SCUC application, ~~which~~ optimizes the provision of Ancillary Services and Energy in order to meet Ancillary Service requirements and Energy requirements. The Full Network Model ~~incorporates Transmission Losses and models and enforces~~ all network constraints, ~~which are reflected in but~~ the Ancillary Services Awards ~~reflect only the Ancillary Service Region and Sub-Region definitions and requirements as well as the other results from each of the CAISO Market Processes~~. The Ancillary Service requirements, the definition of Ancillary Service Regions and Ancillary Service Sub-Regions, and any minimum or maximum limit that is used within an Ancillary Service Region or Ancillary Service Sub-Region are all inputs to the Full Network Model and are incorporated into the CAISO Market Processes.

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### 27.5.1 Description of FNM for CAISO Markets.

The FNM is a representation of the CAISO Balancing Authority Area that enables the CAISO to conduct power flow analyses to identify transmission Constraints for the optimization of the CAISO Markets. External Balancing Authority Areas and external transmission systems are modeled to the extent necessary to support the commercial requirements of the CAISO Markets. External connections are retained between Intertie branches within Transmission Interfaces. Certain external loops are modeled, which allows the CAISO to increase the accuracy of the Congestion Management process. Resources are modeled at the appropriate network Nodes. The pricing Location (PNode) of a Generating Unit generally coincides with the Node where the relevant revenue quality meter is connected or corrected, to reflect the point at which the Generating Units are connected to the CAISO Controlled Grid. The Dispatch, Schedule and LMP of a Generating Unit refers to a PNode, but the Energy injection is modeled in the FNM for network analysis purposes at the corresponding Generating Unit(s) (at the physical interconnection point), taking into account any losses in the transmission network leading to the point where Energy is delivered to Demand. ~~For the CAISO Markets Processes, t~~he FNM incorporates ~~physical characteristics needed for determining~~ Transmission Losses and models ~~and enforces~~ all network Constraints within the CAISO Balancing Authority Area, which are reflected in the Day-Ahead

Schedules, AS Awards and RUC Awards, HASP Intertie Schedules, Dispatch Instructions and the LMPs resulting from each CAISO Markets Process. In operating the CAISO Markets, the CAISO establishes, enforces, and manages the transmission limits and Constraints associated with network facilities modeled in the FNM, as further described in the Business Practice Manuals. For portions of the FNM that are external to the CAISO Balancing Authority Area, the CAISO may model the resistive component for accurate modeling of Transmission Losses, but accounts for losses in the external portions of the FNM separately from Transmission Losses within the CAISO Balancing Authority Area, and does not allow such losses to determine the Marginal Cost of Losses in the LMPs that apply to the CAISO Markets. For portions of the FNM that are external to the CAISO Balancing Authority Area, the CAISO only enforces network Constraints that reflect limitations of the transmission facilities and Entitlements turned over to the Operational Control of the CAISO by a Participating TO, or that affect Congestion Management within the CAISO Balancing Authority Area or on Interties. For the HASP, STUC, RTUC and the RTD processes, the Real-Time power flow parameters developed from the State Estimator are applied to the FNM.

#### **27.5.2 Metered Subsystems.**

The FNM includes a full model of MSS transmission networks used for power flow calculations and Congestion Management in the CAISO Markets Processes. Network Constraints (i.e. circuit ratings, thermal ratings, etc.) within the MSS, or at ~~the~~ its boundaries, that are modeled in the IFM shall be monitored but not enforced in operation of the CAISO's ~~FNM Markets~~. If overloads are observed in the forward markets, are internal to the MSS or at the MSS boundaries, and are attributable to MSS operations, the CAISO shall communicate such events to the Scheduling Coordinator for the MSS and coordinate any manual Re-dispatch required in Real-Time. If, independent of the CAISO, the Scheduling Coordinator for the MSS is unable to resolve Congestion internal to the MSS or at the MSS boundaries in Real-Time, the CAISO will use Exceptional Dispatch Instructions on resources that have been bid into the HASP and RTM to resolve the Congestion. The costs of such Exceptional Dispatch will be allocated to the responsible MSS Operator. Consistent with Section 4.9, the CAISO and MSS Operator shall develop specific procedures for each MSS to determine how network Constraints will be handled.

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### **31.2.1 The Reliability and Market Power Mitigation Runs.**

The first run of the MPM-RRD procedures is the Competitive Constraints Run (CCR), in which only limits on transmission lines pre-designated as competitive are enforced. The only RMR Units considered in the CCR are Condition 1 RMR Units that have provided market Bids for the DAM and Condition 2 RMR Units when obligated to submit a Bid pursuant to an RMR Contract. The second run is the All Constraints Run (ACR), during which all transmission Constraints that will be enforced in the Integrated Forward Market are enforced. All RMR Units, Condition 1 and Condition 2, are considered in the ACR. The resources committed in the ACR form the pool of resources that is available for commitment in the IFM.

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### **31.3.3 Metered Subsystems.**

In clearing the IFM, the CAISO will not enforce Constraints within each MSS. The Full Network Model (FNM) includes a full model of MSS transmission networks used for power flow calculations and Constraint management in the IFM and RTM. Network Constraints (i.e. circuit ratings, thermal ratings, etc.) within the MSS, or at its boundaries, that are modeled in the FNM shall be monitored but not enforced in the operation of the CAISO's FNMMarkets. If overloads are observed in the forward markets that are internal to the MSS or at the MSS boundaries and are attributable to MSS operations, the CAISO shall communicate such events to the Scheduling Coordinator for the MSS and coordinate any manual Re-dispatch required in Real-Time. If, independent of the CAISO, the Scheduling Coordinator for the MSS is unable to resolve Congestion internal to the MSS or at the MSS boundaries in Real-Time, the CAISO will use Exceptional Dispatch Instructions on resources that have been bid into the HASP and RTM to resolve the Congestion. Such costs will be allocated pursuant to the provisions specified in Section 11.5.6.2.5.2. The CAISO and MSS Operator shall develop specific procedures for each MSS to determine how network Constraints will be handled. Costs associated with internal Congestion and Transmission Losses in the MSS will be the responsibility of the MSS Operator. The Scheduling Coordinator for the MSS shall be responsible for payment of Marginal Losses for transactions at any points of interconnection between the MSS and the CAISO Controlled Grid, and for the delivery of Energy to the MSS or from the MSS in accordance with the CAISO Tariff. For MSS Operators that elect Load

following, the CAISO shall exclude the effect of Transmission Losses in the relevant MSS in the CAISO's calculation of loss sensitivity factors used to calculate LMPs.

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### **39.7.2.2 Criteria.**

A transmission constraint will be deemed competitive if no three unaffiliated suppliers are jointly pivotal in relieving congestion on that constraint. The determination of whether or not the pivotal supplier criteria for an individual constraint are violated will be assessed using the Feasibility Index described in Section 39.7.2.4. Assessment of competitiveness will be performed assuming various system conditions potentially including but not limited to season, load, planned transmission and resource outages. If an individual constraint fails the pivotal supplier criteria under any of these system conditions, the constraint will be deemed uncompetitive for the entire year under all system conditions until a subsequent assessment deems the constraint competitive. In general, a constraint may be an individual transmission line or a collection of lines that create a distinct transmission constraint. For purposes of the competitive assessment, the set of constraints that will be included in the network model are those modeled along with transmission limits expected to be enforced ~~in the FNM used~~ in clearing the CAISO Markets.

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## **CAISO Tariff Appendix A**

### **Master Definitions Supplement**

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**All Constraints Run (ACR)** The second optimization run of the MPM-RRD process through which all ~~known~~ transmission Constraints that will be enforced in the market-clearing processes (IFM, RUC, STUC, RTUC and RTD) are enforced.

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